

ART and Insurance Derivatives Working Party

ART and Insurance Derivatives Working Party

ART and Insurance Derivatives **Working Party**

GIRO October 1999

WORKING PARTY MEMBERS

STEPHEN WALKER (CHAIRMAN)

GRAHAM FULCHER

PETER GREEN

ELIZABETH JONES

GRANT MAXWELL

JEFF SAYERS

ANUP SETH

TONY SILVERMAN

TONY TUDOR

Contents

INTRODUCTION	4
1 BACKGROUND	4
2 WHAT IS ALTERNATIVE RISK TRANSFER AND SECURITISATION?	6
3 INTRODUCTION	9
RISK SECURITISATION	11
4 GENERAL DISCUSSION OF RISK SECURITISATION	11
5 INNOVATIONS AND DEVELOPMENTS IN THE MARKET PLACE	12
6 UPDATED SUMMARY OF SECURITISATION TRANSACTIONS	21
7 INVESTORS IN RISK BONDS AND THEIR ATTITUDES TO INVESTING	22
8 DEVELOPMENT OF SECONDARY MARKET PRODUCTS AND STRUCTURES	27
CONVERGENCE PRODUCTS	33
9 INTRODUCTION: WHAT DO WE MEAN BY "CONVERGENCE PRODUCTS"	33
10 FINITE POLICIES	34
11 TRADITIONAL FINANCIAL GUARANTEE BUSINESS	39
INSURANCE PRODUCTS FOR THE NEW CAPITAL MARKETS	44
12 INTRODUCTION: WHAT DO WE MEAN BY "NEW CAPITAL MARKETS"?	44
13 EXAMPLE TRANSACTIONS	45
14 WHY IS THERE A NEED FOR SUCH PRODUCTS?	49
15 ASSET SECURITISATION AND INSURANCE	51
16 LEGAL AND ACCOUNTING DIFFICULTIES	52
17 PLAYERS IN THE MARKET PLACE	53
18 DEVELOPMENT OF NEW INSURANCE PRODUCTS	54
19 TRANSLATING CAPITAL MARKET BONDS INTO INSURANCE TERMS	55
INSURANCE DERIVATIVES AND DOUBLE TRIGGER COVERAGES	57
20 INTRODUCTION: WHAT ARE THESE INSTRUMENTS?	57
21 ACCOUNTING FOR PROFIT / CONSIDERATION OF BENEFITS	57
22 SECURITY OF RISK TRANSFER	60
23 OVERVIEW OF PRICING THEORY	63

APPENDICES I – CATASTROPHE RISK SECURITISATION	71
24 APPENDIX A – TRANSACTIONS COVERED IN PREVIOUS PAPERS	71
25 APPENDIX B – NEW CATASTROPHE BONDS	73
APPENDICES II – OTHER RISK SECURITISATIONS	89
26 APPENDIX C – EXAMPLES OF OTHER RISK TRANSFERS (BY ASSET TYPE)	89
APPENDICES III – OTHER NOTES	93
27 APPENDIX D – THE DEVELOPING STRUCTURE OF A COMPANY	93
28 APPENDIX E – OVERVIEW OF ASSET & RISK BACKED BOND STRUCTURES	95

INTRODUCTION

1 Background

- 1.1 In 1997 and 1998, papers on Securitisation were produced for GISG. These papers provided a background to Insurance Securitisation, a process allowing capital market investors to begin to enter a market traditionally the preserve of the larger reinsurers.
- 1.2 Insurance Securitisation is an example of the slowly moving process of convergence between the insurance and banking industries; from industries focussing traditionally on opposite sides of a customers balance sheet towards one managing a customers financial needs on a holistic basis. Here, we are using customer to mean major corporate entities.
- 1.3 The customers, who have been evolving their relationship with the insurance marketplace through both the use of captives and other mechanisms which are often labelled Alternative Risk Transfer, drive such a convergence process. This process mirrors the evolution of the management of company's cash management requirements, from simple banking products, to a wide range of instruments. Managing both currency and liquidity risks and falling under the direction of their treasury department.
- 1.4 Perhaps it is not a surprise to see several companies begin to manage all their risks together by moving the corporate captive and risk management function under the treasury department.
- 1.5 Convergence, however is not a one-way street:
 - the Securitisation of insurance risk is just one example of the wider process of Risk Securitisation;
 - the process of holistic risk management offers opportunities to insurers to offer products that pure banking organisations cannot match;
 - the emerging techniques in the financial markets provide insurers and reinsurers a new way of managing their own capital and risk exposure.

- 1.6 Insurers have important skills to add into this process and the paper aims to indicate how various current insurance products may evolve as the market transforms.
- 1.7 This paper is split into 4 sections each focussing on a particular building block of the convergence process:
- Risk Securitisation – a discussion of market innovations and possible future developments within the Catastrophe bond market.
 - Convergence Products – an overview of the features of insurance policies that are likely to play a key role in developing new products for the marketplace.
 - Capital Market Insurance – a discussion on some of the deals done where insurance products are playing a part of a Company's financial strategy. This includes a discussion on future developments within this area.
 - Insurance Derivatives – a review of pricing techniques, concentrating on assumptions and other wider issues. It is important for actuaries to be aware of these techniques when considering exotic insurance products such as double-trigger coverage.
- 1.8 We recommend that newcomers to this area of the finance industry refer to the last two year's GISG papers to understand the background to and reasons for insurance securitisation.

2 What is Alternative Risk Transfer and Securitisation?

- 2.1** The terms “Alternative Risk Transfer” and “Securitisation” represent movements in the structure of the financial services industry (at the corporate finance / capital markets level) and not specific products except at any one moment in time.

We have included a definition below for completeness, however in the rest of the paper we have tried to define the currently associated products a little more precisely.

2.2 Alternative Risk Transfer:

“The transfer of risk by contracts not deemed to be conventional or to markets not traditionally accepting such risks”

2.2.1 What is deemed to be ART has varied over time:

- The transfer of risk by excess of loss rather than quota share reinsurance
- The retention of risks within the group structure under a captive rather than transference to an insurer.
- The use of finite risk contracts rather than traditional insurance contracts.
- The use of capital market products such as catastrophe bonds.

2.3 Securitisation:

“The process of transforming a non-tradable balance sheet item or risk associated with the item into a tradable instrument. The transfer from the original balance sheet SHOULD NOT be affected by the holder of the asset”

- 2.3.1** The second sentence in the definition has been included to distinguish Securitisation from the alternative form of transfer discussed under derivitisation / insuritisation.

2.3.2 What is deemed to be Securitisation has varied over time:

- The financing of companies through tradable bonds rather than long-term bank loans.

- The management of short term borrowings through the issuance of Commercial Paper rather than bank overdrafts.
- The management of the risk of US mortgage prepayment risk (fixed rate loans repayable without penalty) through the issuance of Agency Collateralised Mortgage Obligations – ie issuance of fixed rate funding bond programs that repay at the same rate as an identified pool of mortgages.
- The transformation of Banks balance sheets through the issuance of Collateralised Loan Obligations – ie issuance of a bond program that takes the prepayment and default risk of an identified pool of corporate loans.
- The extensions of the above techniques to other type of asset finance.
- The creation of cash collateralised reinsurance contracts to allow reinsurance companies to manage their risk exposure through the issuance of catastrophe bonds.
- The extension of catastrophe bond techniques to other types of corporate risk.

2.3.3 Securitisation is having a major effect on the way companies are financed. From an actuarial point of view, it also allows the isolation of the performance risk of the asset or liability from general management risk, thus making that component more tractable to analysis.

2.3.4 Additionally, Securitisation has indirectly contributed to the movement of non-insurance companies into what can be considered gross and net accounting. This falls under FRS5 and is called “linked presentation”. An effect of such movements will be an increased level of sophistication required by analysts following the sectors affected.

2.4 Derivatisation / Insuritisation:

“The process of transforming a non-tradable balance sheet item into a instrument. The transfer from the original balance sheet MAY be affected by the holder of the contract”

2.4.1 The key distinction from Securitisation is that the person is dependent on the other party meeting the requirements of the contract. The key

distinction between "Derivatisation" and "Insuritisation" is the legal and accounting standing of the contract (see section 21).

- 2.4.2 An interesting question would be where to classify exchange traded derivative products where effectively there is a third party guarantee of the other party's obligations.

3 Introduction

Risk Securitisation

- 3.1 Risk Securitisation involves the formation of a pool of off balance sheet funds, which then has risks attached to it through a suitable contract (usually either an insurance or derivative contract). The source of the moneys to form the fund is the issuance of a bond program.
- 3.2 The most common form of Risk Securitisation to date has been the so-called "Catastrophe Bond" as the risk assumed is that of a major natural event through a reinsurance contract.
- 3.3 Risk Securitisation is close to Asset Securitisation. This is the financing of a company's asset through its sale to an off balance sheet company, the purchase being funded through the issuance of a bond program. Such a program involves the transfer of both the funding and asset performance risk. A brief overview of these structures is given in Appendix E.
- 3.4 Developments in Risk Securitisation and a discussion of market issues and future developments are covered in Sections 4 to 8.

Convergence Products

- 3.5 There are many developing opportunities for insurers to become involved in what traditionally would be the banking side of the capital markets. However such new products do not appear from thin air, but usually evolve from more established instruments.
- 3.6 Two of the key products from the insurance industry that will help to seed this process are finite (limited risk transfer / blended cover) insurance policies and financial guarantee contracts. These are discussed in Sections 9 to 11.

Insurance Products for the New Capital Markets

- 3.7 Over the last year few years there has been a trend developing of the inclusion of insurance products into the capital structure of corporations. Such developments present an exciting opportunity for insurers to leverage their risk analysis skill sets and enter an additional

market. In addition, the traditional corporate finance and insurance markets are not fully correlated – for example during the second half of 1998 the bond markets were extremely hard whereas the reinsurance market is still soft.

3.8 In Sections 12 to 19 we discuss:

- Some of the deals done to date in this market.
- Opportunities for insurers to interact with the asset Securitisation market
- Who the parties are in this market and their roles.
- A discussion of various possible winners and losers as the market develops.

Insurance Derivatives and Double Trigger Coverage

3.9 There are many misconceptions about the derivatives market and what is possible within it. In addition, the lines between the specialist reinsurance market providing products such as “double-trigger coverage” and certain over the counter derivative transactions are becoming very thin.

3.10 In Sections 20 to 23 we discuss the various pricing methodologies for these instruments and the implications from a business point of view. In particular this area is one in which insurers can provide unique products above those offered by the banking industry.

RISK SECURITISATION

4 General Discussion of Risk Securitisation

4.1 We have considered Risk Securitisation to be defined as follows:

"The process of transforming a non tradable corporate risk or balance sheet provision into a tradable instrument. The transfer from the original balance sheet SHOULD NOT be affected by the holder of the instrument"

4.2 The reasoning behind the process of risk securitisation (as an outwards protection) are as follows

- **Within the company originally subject to the risk:**
 - i. **Desire to have alternative markets within which risk may be transferred and hence a wider capital base.**
 - ii. **Concern about the ability of counter-parties to be able to deliver on contracts at the time they are most required.**
- **Within the companies traditionally accepting the risk:**
 - iii. **Concern about the accumulation of risk within a particular segment.**
 - iv. **A desire to use capital market investors to assume such risks rather than intertwining the business with competitors by cross risk transfer.**

4.3 Unless one of the above reasons become critical for an organisation, it is likely that traditional (insurance or guarantee based) products will remain cheaper than a Risk Securitisation. The major reasons for this being:

- **High structuring, legal and frictional costs.**
- **High rate of return required on the products to encourage investors to move away from their traditional comfort zones.**

- 4.4 Both of the above constraints in relation to Securitisation's costs are transient market features. The costs are falling as the process becomes familiar to the professionals involved and their cost base can be spread over a greater flow of deals. Investors are also becoming more familiar with the transactions and hence require less of a risk premium.
- 4.5 There are also the beginnings of support for Securitisation through legislative changes such as that seen in Illinois. Such changes are a welcome sign of a maturing market place.
- 4.6 As the costs of Securitisation fall, it is likely that the structure will begin to dominate certain forms of transaction, even where the risk is held entirely by the original underwriting body. The benefits of security of risk transfer (in terms of price offered by the company's client) and securing the ability to trade the portfolio of risks will outweigh the costs.

5 Innovations and Developments in the Market Place

5.1 Convergence of the contingent capital and catastrophe bond structures

- 5.1.1 In addition to the Catastrophe Bond Structure, there has been an additional group of products that have been described as Securitisations. These are the contingent funding structures, such as the CatEPut structure arranged by Aon.

Contingent funding structures are the right to receive extra moneys after an event has occurred to replenish the capital base of an insurer. These exist in two structural forms, the contingent liquidity facility and the contingent placement agreement.

Such arrangements are not transfers of the full risk, but only the cash flow or liquidity element. This is because under both arrangements there is an intention to repay the moneys utilised after the loss event. In addition, the buyer of such protection is reliant on the seller to deliver the funds on the event occurring, so are still exposed to their insolvency.

- 5.1.2 A *contingent liquidity facility* is a short-term loan facility to provide funds on demand if a specific event has occurred.

Such an arrangement, being a loan, may not help the solvency of an insurance company if provided directly (except in certain jurisdictions and suitable legal forms). It would however be possible to provide the loan to a holding company for lending on to the insurance company subsidiary on a suitably subordinated basis (to get the required regulatory treatment).

However in many of the transactions done to date, the entity receiving the funds is a state catastrophe fund and therefore the issue of solvency has not been an issue.

- 5.1.3 A *contingent placement agreement* is a requirement to receive securities if an event occurs. The rationale is to re-capitalise the insurance company after the catastrophe so it can then make profits to redeem the issued instruments.

In the case of the CatEPut product, the securities in question are redeemable preference shares that achieve the required regulatory treatment.

- 5.1.4 A considerable disadvantage of such products (for the investor) is that their contingent exposure is to a *General Obligation* (see appendix D on capital structures) of the company receiving the funds to try to repay the money. This exposes them to considerable management risk.

- 5.1.5 A number of recent issuances for example, Gemini Re (see Appendix B), for Alliance Risk Transfer have combined the concept of a contingent placement agreement with that of a catastrophe bond.

On the occurrence of a defined trigger event, the investors have to purchase a bond issued by Gemini Re, a special purpose reinsurance company. These funds are then used to collateralise a reinsurance contract that provides cover on the basis of a second trigger.

This structure offers advantages for the investors over the original re-capitalisation structures in that they are insulated from the management risk of the company through the SPV structure. The

disadvantage to the issuer is that the regulatory treatment after the first event will not be as good (i.e. the company receives reinsurance cover rather than an increase in capital).

The pricing of such agreements is also interesting. They are in effect non-tradable, over-the-counter derivatives. In addition there are only hedgeable to a limited extent (in particular the Gemini Re securities do not initially exist) and the instruments on which such approximate hedging must be based are jump processes. A discussion of the pricing of this instrument is included in section 23.

- 5.1.6 It would be possible to securitise this derivative contract to create a reverse-convertible bond. Here the bonds conversion right – to exchange it for a straight catastrophe bond – rests with the originator SPV rather than the investor (hence the “reverse”). However, for this to be successful, the frictional costs of a transaction would have to be significantly lower than present.

5.2 Relaxation of Coverage Constraints

5.2.1 *Trinity Re reset arrangement*

One of the problems with Catastrophe Bonds is that in-order to achieve the ratings, a constraint on the spread of business that can be written by geographic location has been imposed.

This clearly does not fit well with the need to manage business volumes within a rapidly changing environment. Particularly given that the Catastrophe component of the end consumer’s premium is not usually dominant and hence completion in other areas will drive volume.

- 5.2.2 A solution to this issue, which was first adopted (in the Securitisation market) for the 1998 Trinity Re issue, is to have some of the key contract terms determined after the event has happened.

A two-stage process achieves this:

- i. A model of the risk, which is acceptable to the company, arranger and rating agents, is placed in escrow.

- ii. Much broader guidelines for business volumes are then included into the agreement within which the parties are happy with the results of the model.

If an event occurs, then the insurer's actual portfolio is passed through the model producing a profile for the expected loss at inception of the contract from the ground up. Certain terms are then determined as follows:

- The attachment point is then set based on a target incident rate defined in documents.
- The exhaustion point is set at a target exhaustion probability defined in the documents.
- The level of co-insurance is set such that the expected loss on the contract is at the level defined in the documents.

These rates are benchmarked on the equivalent rate of default, rate of total loss following default, and on expected loss following default on corporate securities of the target rating and term.

5.2.3 *Level of Risk Transfer Obtainable*

The level of risk at which transfer to the capital markets has been possible has usually been restricted to be equivalent to that of a BB corporate bond.

The reason for this lies both with the purpose of the ratings and with the market itself.

- 5.2.4 Ratings are indications of the ability to meet a defined promise. For the floating rate section of bond market this is usually to "pay timely interest and ultimate return of principal". Ratings of bonds are further divided into investment grade (AAA/Aaa rating down to BBB-/Baa3 on the S&P and Moody's rating scales respectively) and non-investment grade (BB+/Ba1 downwards).

Investors in floating investment grade bonds are not in the business of assuming risks in any sense that the insurance market would traditionally understand. Such investors are more concerned with:

- Movements in the term structure of the floating rate linked time deposits (margin above the benchmark e.g. LIBOR, equivalent to the traditional yield curve for gilts).
- The additional premium required for holding more illiquid bonds and junior bonds subject to the risk of rating downgrade (i.e. funding risks), and not the expected loss.

Investors in non-investment grade bonds are much more concerned with the credit element. Issued bonds of this grade are able to have a reasonable default probability. In addition, the funding risk premium is not an insurmountable cost relative to the cost of risk.

The non-investment grade market is not very liquid, especially when it comes to newer risks. In particular many investors have minimum rating criterion on the bonds they may hold. Because of this issue the original catastrophe bonds were rated BB or further structured to achieve higher ratings (and hence widen the market) through the use of defeasance to guarantee the principal element.

5.2.5 In summer 1998, Mosaic Re (an SPV Company formed to issued Catastrophe Bonds for the benefit of the St Paul's Group) issued the first single B rated note. This development, along with the disappearance of defeasance from most new issues (as predicted in the 1997 Securitisation Working Party paper), is immensely significant as a sign of the maturing of the investor base within the market.

5.2.6 In addition, Mosaic Re is a prominent example of Risk Securitisation utilising a structured program of catastrophe bonds to transfer the risk. Instead of issuing a single note, the bonds comprise a senior and subordinate note class. If there are only minor losses then the senior note, which has a prior claim on the deposited cash, will be fully repaid whereas the junior not will suffer loss.

5.2.7 *Greater Differentiation in Bond Markets*

Although not immediately transferable to Risk Securitisation, another development in the bond market during the later half of 1998 was the decision by rating agencies to begin to differentiate the CCC rating into CCC+, CCC and CCC-. This move reflects a growing market demand for higher risk paper and the resulting requirement to begin to differentiate such issues.

5.3 Investor Support

As the variety of risk bearing securities slowly becomes wider, both measured by geographical spread, and the nature of the risk, investors in the market place can gradually move to analysing their risk bond holdings on a portfolio rather than individual basis.

To achieve this investors must begin to develop models to estimate the maximum loss that may result due to a particular event, measured over the time frame during which it would take to sell the security. In banking terminology, this is called the value at risk associated with the portfolio.

5.3.1 The value of risk for Risk Bonds can be thought of as the sum of three components:

- The loss exposure to a particular event considering the covariance of losses on the securities in the market.
- Capital changes caused by the movement in the cost of funding illiquid instruments.
- Capital changes caused by movements in the rate required for taking the risk associated with the instrument.

The first of these is nothing more than the traditional catastrophe modelling on the portfolio of business undertaken by reinsurers, however the ability to perform this analysis on a time frame suitable to support secondary market trading is required. Sales of such software represent a new source of income for the modelling firms.

5.3.2 The second and third represent risks created by the accounting methodology associated with entities that trade market instruments. The profit or loss and solvency for such bodies are determined on the basis of a notional liquidation of the portfolio and hence can change very quickly.

This is different from organisations that hold non-tradable assets or liabilities on their balance sheet. Such entities are subject to prudent accounting / reserving requirements and make their profit or losses

slowly over time. Only when a shareholder Economic Value Added analysis is undertaken do the two methods become more aligned.

5.4 Extension of Structure to Non-Catastrophe Risks

- 5.4.1 An important development both for the Securitisation industry and indirectly for the insurance industry was the issuance in recent years of several bond programs, which were issuances with the same structure as a catastrophe bond, but assumed risks relating to events other than natural disasters.
- 5.4.2 It is for this reason that, Catastrophe Bonds should now probably be viewed as a subset classification within an emerging Risk Backed Bond market.
- 5.4.3 Many of these new risks have already been structured within the Asset Securitisation market and reside within the junior notes of such a transaction.

The reasons for utilising a Catastrophe bond structure rather than a junior note in a traditional Asset Securitisation structure (c.f. Appendix E for a discussion of these structures) are as follows:

- i. Often the main originating corporation has been using Asset Securitisation to secure cheap funding for the majority of its asset creation business. To support these transactions, the corporation has retained the most junior element of the program, which has produced a large accumulation of risk on its balance sheet.
- ii. The corporation wishes to reduce its risk while leaving the original funding program in place.
- iii. There is a much clearer and cleaner risk transfer, when using a catastrophe bond structure than when using a junior piece in a funding Asset Securitisation structure. In particular, with a funding program there is the temptation / desire to engineer additional credit support to the senior notes (rather than registering a loss on the junior note) to secure future access to cheap funds. With a Catastrophe bond structure the risk transfer is clearer.
- iv. If the corporation is a bank or other entity with access to a large amount of cash but not equity capital, then they may wish to manage the risk on an activity but keep the funding. They

therefore do not want to do an asset-backed bond to secure cheap funds but would be interested in a catastrophe bond or suitable insurance policy.

- v. The extraction of the main risk from the junior notes within a structure and its separate trading as a Risk Securitisation bond allows investors to clearly consider a suitable price.
- vi. The original asset is very high quality. This would result in a very small and hence illiquid junior element in the Asset Securitisation. However, the Risk Securitisation can take the risks from many funding transactions and hence create an economically viable transaction.
- vii. Investors in a junior piece may be forced to consider a basket of too many residual risks some of which they may be unwilling to carry.

5.5 Exposure Capping / Low Risk Transfer Structures

- 5.5.1 The original risk transfer products have been focussed on the creation of additional capacity for aggregating insurance exposures. However looking across the wider financial market place, there are many examples where securitisation is used to achieve security on the maximum exposure to loss.

Traditionally this has been achieved within the asset securitisation arena through the retention of both a residual equity interest and often initially some or all of the junior notes within a funding vehicle. Such a mechanism as well as possibly securing access to cheaper funding for the creation of the asset, can also be viewed as providing a cap on the maximum loss that the originating company can sustain. However, because the issuing company retains the junior element they retain almost all the economic risk.

An alternative to the above is to issue a Risk Securitisation Bond which transfers the risks from a well-diversified portfolio of business. In these circumstances, it is possible to target bonds in the investment grade spectrum whose purpose is not to provide additional equity against rare but possible events but to provide a buffer against remoter market events.

- 5.5.2 In early 1999, there was an example of such an issue, the SECTRS transaction providing credit reinsurance capacity against losses on a

portfolio of low ticket trade finance risks for part of the Gerling group. Here the bonds in question were rated AA through to BBB. Such low risk transfer mechanisms are interesting in that they point the way towards a quantification of the cost of providing regulatory capital above the economic capital required for a line of business.

The utilisation of such analysis on an internal basis provides a coherent mechanism to control companies' capital requirements recognising the importance of both the regulatory and economic dimension.

5.6 Legislative Support for the Market

- 5.6.1 The development of the market for risk backed bond issues by specialist reinsurers, is likely to be further accelerated by the enactment of legislation permitting the creation of cell captive insurers. Such developments can be seen in the offshore financial centres of Bermuda and the Cayman Islands. Perhaps more significantly the passing of cell insurer legislation in Illinois and the sponsoring by the NAIC and the New York insurance commissioner of state level legislation is a sign of rapid change to come.

Within the UK it is possible that the changes allowing the creation of captive syndicates at Lloyds will enable one of the key UK markets to become a domicile for such companies.

These developments will directly help to reduce the administrative and legal costs associated with the current transactions. Indirectly, by bringing such structures closer to the traditional marketplaces, they may help to remove some of the mystery and thus promote their use by a wider range of companies.

6 Updated Summary of Securitisation Transactions

- 6.1.1 The market for catastrophe bonds continued at a low level during 1998 reflecting the continued weakness of the insurance cycle. In contrast the market for more general risk backed issuances was strengthened owing to a move by financial companies from managing their regulatory capital towards the management of their risk positions while retaining the funding. New Catastrophe bond issues during 1998 and 1999 to date are covered in Appendix B.
- 6.1.2 One of the main features of the bond market during 1998 was the Asian crisis which occurred in September / October. This event occurred due to a change in the dominant market appraisal of the likelihood of default on international bonds by several of the world's sovereign bodies and many of their state sponsored companies.

The immediate effect of this was that a significant proportion of the bank and hedge funds (who carried the bulk of the risk) refused to buy any debt (either new or from others) until the situation became clearer. This is called in market jargon a no-bid situation. The price at which the organisations carried the debt was marked down with two effects:

- An erosion of the capital base of the geared investors.
- The creation of a demand for government bonds. This occurs because the debt having been marked down has a much shorter discounted mean term (due to its high yield) than before, this reduces the amount of government bonds that must be sold short to remove the interest rate exposure. Hence there is a demand for government bonds to settle the borrowings.

This created a secondary effect of a general widening of the spread between all bonds and government securities due to the increased demand and created further losses for geared risk takers within the market.

The implication for this event for the Catastrophe bond market was that it made the issue of new material uneconomic compared with the traditional market place. Although given the lead times associated with issues and the occurrence of the event outside the traditional renewal season this may have not been significant.

7 Investors in Risk Bonds and their Attitudes to Investing

7.1 Some features of where we are now

- 7.1.1 It is difficult to assess to what extent insurance bonds have led to new capital being committed to the insurance process.
- 7.1.2 Publicity surrounding the issue of bonds usually emphasises the wide-ranging nature of the subscribers, often described as including investment managers and mutual fund managers. An issue's success, and the standing of the advisors when looking to be involved with further issues, will predominantly depend on the extent to which the issue is seen to have brought new capital into the insurance market.
- 7.1.3 A key element in this context, is the involvement of long term savings capital, whether in the form of segregated pension funds, mutual funds or life insurance funds. References in published literature to investment managers are normally intended to suggest that such long term savings capital has been accessed.
- 7.1.4 Confirmed evidence is hard to come by on this score. Anecdotally one of the writers followed up an institutional investor mentioned, alongside reinsurers and others, as a subscriber to one early catastrophe bond issue. The writer was able to confirm that funds managed by the investment manager, who is well known as a pension fund manager, were indeed involved. But, on this occasion, the funds used were those of a Bermuda based reinsurer who directed the fund manager to use the funds in this way!
- 7.1.5 It is thought that over half the investors in early insurance bonds have been reinsurers. Hedge funds and large private investors with an appetite for risk have been very important and, it has to be said, naïve money will also have played its usual part in any new investment medium.
- 7.1.6 Overall there are considerable doubts that mainstream, regulated, professionally managed long-term mass savings have been much involved in the number of insurance bonds issued to date. This however is not atypical in the early stages of a markets development. In the asset backed market place, the initial investors in such products

where other financial institutions seeking to balance their portfolio risk exposures. It takes considerable time for the pool of expertise to develop in the wider fund management community. However the marketing for the product needs to be further refined and targeted at the relevant people if this is to be achieved.

7.2 How can the market for insurance bonds be taken forward?

7.2.1 Conventionally desirable criteria for a mainstream investor include:

- i. Competitive risk and return profile.
- ii. Influence of factors outside of reasons for holding an investment should be diversified away and/or managed by an organisational structure located beneath the instrument held.
- iii. Whether or not to hold the investment should present a realistic investment decision to the fund manager, through which responsible stewardship of capital can be exercised.

7.2.2 The first point has been addressed by the promoters of insurance bonds with extensive studies of risk and returns available from the insurance process. These would usually include the desirable low correlation of returns with those from other investment markets.

Risk and return on a particular insurance bond are, of course, dependant on the extent to which insurance risk is bundled together with, and diluted by, a conventional bond bearing credit risk only.

On balance, there appears to be little reason to doubt the basic message of desirable, or at least acceptable, risk/return characteristics on insurance bonds.

7.2.3 The second and third points cover the expertise of mainstream investment managers who are not insurance professionals. Distinguishing between different types of insurance risks can easily appear to be an operational business decision rather than an investment decision.

This issue can be mitigated by holding a diversified portfolio of exposure to such bonds linked to a broad cross section of an insurance company's business. Such a portfolio would be managed

on the investors' behalf by specialists and is commonly used in the venture capital and emerging markets areas.

However investors are still likely to be accepting insurance business risk (represented by the ability of the managers to select appropriate bonds) whilst leaving some of the return on the table. Investors may well prefer to have a direct share in the total business result of the insurance process if they are accepting the degree of involvement with the risks of insurance business entailed in running a portfolio of insurance bonds.

Capacity of Bond market investors to accept risk

- 7.2.4 A general advantage of placing insurance risk into the capital markets is often stated to be the supposed enormous capacity of the capital markets to accept risk. In support of this idea, the aggregate daily fluctuation in market values of an aggregation of capital markets has been quoted.

- 7.2.5 Whilst this particular angle may be persuasive with issuers, it could very easily strike a discordant note with investors. Much of the fluctuation in market values is the result of movements in valuation criteria, in particular the expectation of future interest rates rather than actual cash gains or losses by quoted companies or even changes in perceived risk analysis.

To assume that such changes equate to loss is to make the (common) assumption that all investors are traders who are measured against a benchmark of immediate cash value. However, the majority of long term assets are held by institutions that have matching liabilities, many of such movements do not cause losses on a net basis.

- 7.2.6 Thus an ability to accept fluctuations in market prices is not quite the same thing as an ability to take losses. Too much emphasis on this aspect may make more knowledgeable investors uncomfortable.

Familiarity with the Risk is Important

- 7.2.7 Bond investors are not a homogeneous pool, many are concerned with no-more than management of a organisation's short term cash

surpluses achieving a market rate of return by holding very secure investments.

Other Bond investors are used to taking the risk associated with the default of a company. This translates in the short term into the risk of downgrade of a bond's credit rating; on the occurrence of such an event it is possible to sell the position and manage the loss. However a loss on an insurance bond, once incurred, cannot normally be undone. In addition, the speed with which such an event can occur may be unacceptable to such investors.

In practice, capital markets are far from being as homogeneous as an emphasis on aggregate statistics might suggest. Ask the directors of a listed UK smaller company, which has typically been neglected and lowly rated by investors over recent years, what it feels like to have access to the multi-trillion dollar international capital markets and you may not get an enthusiastic response.

Whilst bond investors are generally unfamiliar with insurance risks, equity investors are more familiar. Equity investors already run insurance risks through their holdings of insurance company shares. In this connection, general insurance companies are often described to equity investors as having "bond proxy" characteristics. The truth may be that insurance risk sits somewhere between bond and equity risk.

7.3 Some conclusions.

7.3.1 We suggest the following features would be included on any "wish list" of a potential insurance bond investor:

- Basic risk/return case should not be diluted by bundling the risk together with too much asset exposure, as is the case with direct equity investment.
- A diversified insurance portfolio should underlie the bonds
- Insurance professionals should manage the insurance process, with a continuing interest in the profitable conclusion of the business.
- The investor should enter and exit at net asset value

7.3.2 The extent to which this describes a name at Lloyd's is one of the most striking conclusions to emerge from this analysis.

7.3.3 If the promoters of insurance bonds ever do succeed in creating a large market they may well go some way along the path of reinventing large parts of Lloyd's. Is this not really a large opportunity for Lloyd's? Does Lloyd's have to be reinvented by investment banks just because it's not in the US?

7.3.4 Lloyd's represented a financial involvement for its names, which sat somewhere between a bond and an equity investment. A similar constituency could be re-approached to invest in insurance bonds without having to pretend they were going to behave in the same way as bonds exposed to credit risk only. Arguably this is already happening through hedge funds.

There were of course, many disadvantages to the structure of old names' participation at Lloyds. Insurance bonds (and indeed new Lloyds) must avoid any equivalent of these disadvantages going forward, which include:

- Possible insufficient disclosure / understanding of the risk in investing in Lloyds
- The then inability of investors to trade their positions
- The unlimited nature of the liability undertaken.

- 7.3.5 There could be some legal considerations in Lloyd's repackaging itself as a seller of investments linked to its current battles with US names in which the question of whether participating in Lloyd's in the past was an investment or not being one of the contentious issues.

8 Development of Secondary Market Products and Structures

8.1 Why is a secondary market important?

- 8.1.1 One of the benefits of Securitisation in all its forms is that it allows holders of the risks to trade their positions:

The reasons for wishing to trade Risk Securitisation instruments are threefold:

- i. to attempt to increase their returns through the selection of the risks currently offering the greatest value
 - ii. to attempt to control their exposure to a market event by altering their holdings in tradable instruments
 - iii. to allow instruments to be sold to generate funds for other purposes
- 8.1.2 The first of these reasons represents nothing more than the extension of the underwriting on a particular contract from a single one-off event to a more continuous process. This reason is also one of the creators of liquidity in the market allowing participants to achieve the other benefits.
- 8.1.3 The second reason is not restricted to control of risks within the Risk Bonds investment area. The major benefit to be obtained here is the control of the company's entire exposure through the sale of instruments within the tradable portfolio. For example, if the company were to write a Florida windstorm exposure then it could attempt to immunise this effect through the sale of correlated risks within its catastrophe bond holdings.

This risk control mechanism is known in the financial markets as hedging and is an important requirement for the development of derivatives within this sector. Only when derivatives can be created in an economically efficient manner will the benefits of Risk Securitisation accrue to smaller companies. Whilst it may not be economic to create a Risk Securitisation bond for such a company, a

third party can create a derivative that allow them to get most of the same benefits as if an issue had been achieved.

This control of risk can be even more effective if it is possible to own the economic effect of a negative number of the bonds. This can be achieved through the use other secondary market products such as stock borrowing agreements and reverse-repo agreements which are discussed in later sections below.

- 8.1.4 The third reason, the ability to quickly generate funds from the instrument, is more important than often recognised by the insurance industry. This factor defines the amount of liquidity risk associated with the instrument and therefore the premium (spread) over the risk free rate that would be required even if no event risk were transferred.

Liquidity premiums arise as costs twice within a Securitisation structure. Firstly, as described above, as a margin demanded by external investors to hold the instrument; secondly, as a margin below LIBOR that the SPV can invest the funds securing the risk transfer contract - which must be available to meet due claims should they occur.

8.2 A Need for a Risk Bond Exchange?

- 8.2.1 A secondary market will continue to exist in Risk Bonds facilitated by various intermediaries (investment banks or brokers). Such intermediaries either make a market in a product (agree to buy then sell on) or attempt to place a product (agree to find another buyer on a no commitment basis) for a holder of an instrument.

A number of companies such as Swiss Re New Markets now publish indicative quotes for secondary market Catastrophe bonds on BLOOMBERG, the dominant bond market information system. The bid / offer spreads are however currently high, perhaps reflecting low liquidity within this market, and many of the benefits associated with the ability to trade the risk will not be realisable until these tighten.

Risk bonds are sufficiently different instruments from traditional corporate bonds, that it would make sense if the people and organisations creating and trading these instruments were able to use a common market infrastructure to help facilitate the process.

- 8.2.2** The obvious location for such a market would be within one of the insurance exchanges that currently exists, in particular, as part of the Lloyd's and London Companies market. The members of such bodies already possess the skills required to enable the market to function efficiently.

In addition, such a body could provide centralised support services to help its members both create and trade such instruments. Such support mechanisms can help remove some of the structural impediments to the market developing (in particular, allowing insurance companies to re-gear their exposure more cost effectively).

8.2.3 Use of Rating Agencies

To help attract third party investors into a market place it is vital that access to independent assessments of the risk associated with a particular instrument is available. Such third party analysis provides a double check on the investor's own decisions and helps facilitate the liquidity within the marketplace.

The established rating agencies are focussed on the assessment of the risk of default of corporate bodies. They are gradually developing the ability to assess various types of assets through the use of third party experts and this approach has been applied for the major catastrophe bonds.

There is, clearly a business opportunity in this market place to establish a specialist rating agency to assess bonds with a larger element of risk associated with them. The current rating agencies are focussed on investors who want to participate in the lower risk area, a new agency with an associated rating scale focussing on the region BBB and below would be an invaluable addition to the market.

8.3 Secondary Market Products and their Uses

Stock Borrowing

- 8.3.1** Stock Borrowing is the lending of an instrument to a third party in return for which the third party posts cash collateral against the loan. The third party pays to the original investor the return on the instrument in terms of interest and principal received and receives in

exchange a deposit rate slightly below that available in the open market. In addition, the size of the cash collateral is managed over time so that it will cover the market value of the instrument, plus a margin for increase therein, and a cautious estimate of the expected return on the next payment date above the interest accruing on the deposit.

8.3.2 The arrangement can be seen to leave the original holder with:

- The economic return of holding the instrument.
- A margin (equal to the "haircut" on the deposit rate) for taking on the risk that the counter-party will default at a time where the cash collateral will not facilitate the repurchase of the instrument in the open market.

8.3.3 Such an arrangement allows the third party to sell short the instrument, usually to immunise themselves from declines in its value. Care needs to be taken in such transactions that it will be possible to deliver back to the stock lender the original or agreed acceptable alternative collateral. Occasionally a method of cash settlement (at a penal rate) may need to be defined in the contract.

One of the benefits of enabling short selling of collateral is that it enables a market in derivative products to develop more easily.

Derivative Products

8.3.4 Derivative products are contracts that enable the participants to buy and sell risks associated with a particular reference instrument without having to physically touch the asset.

8.3.5 The following are likely to be of particular relevance to the Risk Securitisation market:

- Options giving the right to sell a reference instrument at par, or receive cash settlement equal to the difference.
- Options giving the right to issue at par a particular instrument at a particular rate.

The first of these contracts can be used to protect the position of a holder of the risk. In a manner similar to credit derivatives on corporate bonds, such payments are likely to be available only on the occurrence of a trigger event on the instrument and not in general. Such a restriction helps ensure the passing of the event risk element of the bond without the liquidity or premium rate risk being transferred.

The second of these contracts enables the holder to receive compensation for any rate tightening that may occur (again restricted to after the occurrence of a reference event). Such contracts will have an important influence in smoothing the insurance market cycle. An example of such an instrument is the Gemini Re placement agreement.

Derivative products allow the smaller insurers to participate indirectly in the market place through a wide range of arrangers and counterparties. They are thus very important to prevent the benefits of ART being concentrated in the largest reinsurers.

8.3.6 In order for a derivatives market to develop one of the following must happen:

- There must exist an institution that has a portfolio of holdings in the various instruments, the risk associated with which they are happy to take on as part of their business. Such an entity can absorb the risk against its portfolio by selling appropriate instruments in its portfolio.
- There must exist the ability, to short sell an instrument with reasonable ease. This allows the creation of a derivative against a 'risk free benchmark' (i.e. with low risk).
- There must be a market of willing buyers and seller of such contracts who are willing to take the risk for trading purposes.

The first of these conditions will eventually be possible for the larger reinsurers when they have developed a portfolio of such bonds. The third exists to a limited extent in relation to the CBOT catastrophe option contracts.

- 8.3.7 Further discussion on derivatives, pricing and security of risk transfer is included in sections 20 to 23 of this paper.

REPO and Reverse REPO Transactions

- 8.3.8 A REPO transaction is the sale and simultaneous agreement to repurchase at a future date, a security. They are a key part of the financial markets and are utilised by the Bank of England to influence market rates of interest.
- 8.3.9 The significance of the REPO is that it allows a trading entity to purchase a holding in a bond on a highly geared basis. In essence the sale leg of the transaction is performed at a haircut to market value which is determined by both the rate of interest to be charged on the borrowing and the haircut used on the repurchase leg's price. The repurchase leg is undertaken at a haircut depending on the volatility and liquidity in the instrument.

The effect of this is that the REPO becomes a form of secured loan on the bond. If the investor who REPOs the bond has financial difficulties, then the lender (or Reverse REPO provider) can attempt to sell the bond and only needs to achieve the market value less the haircut to recover their position.

- 8.3.10 Unfortunately, for more illiquid investments, on default of the original borrower, the reverse REPO provider can be exposed to risk while they attempt to clear their position. While only agreeing such transactions on the basis of a portfolio of bonds can reduce this risk, it does require that the REPO provider is happy with the risk in general.

It is unlikely that banking institutions are going to be able to provide such a product for Risk Backed Bonds with which they have little expertise. This presents a major opportunity for the major reinsurers to gain new income by provide a unique product to the market, and at the same time allow the smaller insurers to purchase these instruments on a geared basis.

CONVERGENCE PRODUCTS

9 Introduction: What do we mean by "Convergence Products"

In insurance and finance no problem is "new", there have been economically similar products in existence for hundreds of years.

"New" financial products are evolution of currently available products, altered to make them more suitable for the current economic, legislative, and regulatory environment of both originator and customer.

The convergence between the insurance and capital markets will be driven by variations of certain available products. Expertise in these areas will provide most of the key pointers to the structuring of "new" solutions required.

Nobody has a crystal ball and can say what exactly will become dominant future products. However in the working parties view the following products will be key for the future.

From the capital markets:

- Securitisation as a mechanism to control capital utilisation by financial organisations by making all major risks tradable.
- Derivative pricing methods to allow the construction of products from the tradable instruments.
- Trading based business evaluation: the combination of the above techniques to ensure that business written adds value for the company's shareholders.

Form the insurance side:

- Finite Policies: Further widening of their use, to become the new form of partly paid capital for corporations.
- Financial Guarantee Insurance: Wordings for contracts to allow the proper protection of third parties.

It is these two last areas that sections 10 and 11 of the paper are focussed.

10 Finite Policies

10.1 Introduction

In this section we give a brief overview of some of the characteristics and issues associated with finite policies. There have been a number of publications in recent years that give a more detailed description of finite policies and their uses.

10.2 Characteristics of Finite Risk Policies

- These policies will tend to have lower levels of risk transfer than traditional policies. The risk transfer will typically be limited by contractual profit sharing terms such as additional premiums up-front with significant profit commission, or additional premiums payable after a loss.
- Finite policies are often multi-year, and may have the intent of smoothing results over the term of the contract, rather than assessing the effect for each year individually as in traditional risk transfers. This can allow more efficient management of results over the longer term.
- Frequently finite policies will be multi-line. Again this allows better overall management of results. Efficiency of the cover can be gained by the fact that the cover only pays out when losses have been made at the total level, and not in cases where one class has bad results but another good results.
- Because of the tendency for multi-line, multi-class policies, and the additional structuring complexity that finite policies often involve, these policies will often be larger than traditional policies.
- The reasons for buying finite policies will typically be more closely aligned with the overall management and planning of the company than would be the case for traditional policies.
- Surplus or regulatory capital relief is often an important concept in the design of finite policies.

10.3 Development of Coverage

There has been a trend towards greater risk transfer and more elaborate structuring in finite policies. Partly this is driven by regulatory change, which has meant that the early form of pure financial reinsurance (e.g. time and distance policies) don't now

achieve the benefit they were originally designed for (i.e. they give little accounting benefit). There has also been an expansion in the needs being met by finite policies. This has led to an expansion in the risks being covered, most obviously to risks that would not have been traditionally thought of as insurable, such as exchange rate risk, or asset values.

10.4 Effects on Corporate Policy

Because these new types of structures give the ability to align insurance buying more closely with the overall management of a company, they can have a different interaction with overall corporate policy than traditional insurance may have. For example:

- Finite policies are an important part of the move towards holistic risk management, where all aspects of a company's risks are considered, not just the risks that were traditionally considered insurable. This may have a significant impact on the risk appetite of a company.
- One of the uses of finite policies is in the management of capital, which will have an impact on planning and business growth. One example of this is the use of surplus relief reinsurance policies by insurance companies to reduce the capital required.
- Finite policies can have a significant impact on the external reporting for a company, and therefore the opinions or views of external investors or commentators on the company. One example of this may be the use of finite policies to smooth results over time. This reduced volatility may make the company more attractive to potential investors.

10.5 Legal and Accounting Issues

Because finite policies are frequently designed to bring regulatory or accounting benefit, legal and accounting issues are an important part of their design. Changes in regulatory and accounting rules have been one of the main drivers of developments of policies over time. In particular there have been a number of new accounting standards in the US and elsewhere that dramatically change the accounting treatment of these types of policies (for example FASB113, EITF and the ABI SORP). Further constraints may also be placed on the ability to re-characterise traditional asset risks into the form of an insurance contract particular those for which related derivative contracts exist.

10.6 Future Use of Finite Policies in the Capital Markets

Due to the fact that typically finite policies will involve lower risk transfer and more profit sharing, this may imply that less information transfer and less traditional insurance underwriting is needed to write these policies. This in turn may mean that these policies are more capable of being packaged into a portfolio and then traded as discussed in previous sections.

10.7 Example of the current use of Finite Policies in the Management of Discontinued Lines of Business

Characteristics of Run-Off Portfolios

Initially it is worth identifying the key issues for portfolios in run-off.

- As there is no ongoing business there is greater focus on claims settlement.
- Cash flow becomes more critical.
- Ultimately the run-off development will decline, although this may take many years.
- The underlying reasons that have put the portfolio in run-off usually generate a more litigious environment.
- There is greater enthusiasm for commutations to attempt to accelerate the run-off.
- The nature of the underlying exposures often means the uncertainty in the run-off is high, e.g. APH.
- Large losses and/or catastrophes usually generate a high level of reinsurance recoveries and, therefore, security and the level of bad debts are significant.

Shareholders' Requirements

This will depend very much on the shareholders financial position and the relative size of the discontinued lines of business or subsidiary. Particular areas of concern include:

- The risk of insolvency or, at minimum, regulatory involvement.
- The need to minimise the impact on earnings due to uncertainties in the run-off.
- A desire to accelerate the run-off through commutations.

- Need to crystallize the ultimate cost of the run-off.
- Are there negative margins in the balance sheet?
- If there are positive margins, e.g. non-discounting, prudent reserves, etc., how value can be extracted from the operation.
- Limit expensive management involvement in the run-off.
- Find a route to finality.
- Solutions may need to be found to discontinued lines resulting out of merger and acquisition activity.

Similarly, these issues would arise out of Lloyd's RITC for "orphan" syndicates and release calls for P & I Clubs.

In many cases there is a key constraint both from the regulatory and accounting requirements which may restrict the ability to pay dividends. In addition, overseas regulators may be involved. There may also be considerations if there are substantial tax losses.

Where does ART come in?

There is often a blurred distinction between traditional reinsurance and ART. However, typical areas where ART can play a role are:

- Reserve protection, in particular using an aggregate excess of loss on the non-discounted reserves. The terms may vary - for example:
 - include or exclude the bad debt risk, timing risk, premium payment
 - terms, finite reinsurance limit with open-ended term, aggregate
 - sub-limits to cover difficult to quantify exposures.
- Solvency protection, which may involve both reserve cover and asset movement.
- Loss portfolio transfers, ie: 100% reinsurance of the portfolio to another carrier.
- Purchase of the reinsurance debt (outstanding balances).

In general, solutions are tailor-made to the particular circumstances of the run-off and the shareholders' requirements. The main objectives of these products would be:

- to provide comfort by supporting reserve strengthening;
- to minimise the cost of this by utilising the discount;
- to limit liabilities in connection with a sale or merger;
- tax efficiency

- to accelerate the recognition of investment income and increase net asset value;
- to create a framework for run-off management.

Underwriting and Pricing Considerations

It is important in all these contracts to fully understand the nature of the liabilities that will come under the terms of the contract. Even though there may be finite limits for the total or parts of the cover, underwriting will amount to almost a full due diligence. This is important not only to understand the level of ultimate liabilities that might arise but also the key areas that will affect the cash flow.

Particular examples would be:

- the number and nature of disputes on inwards claims;
- the involvement in or pursuit of special settlements,
- commutations or other agreements which accelerate the run-off;
- the adequacy of reinsurance cover, both in terms of limits available, contract wordings, performance on reinsurance cash collections, and the nature and number of any disputes with reinsurers;
- the state of administration of the portfolio and the degree of backlogs, quality of data which may impact the reliability on which projections and pricing is undertaken;
- the level of run-off expenses and adequacy of claims handling fund;
- a full review of the business underwritten not only where there are known claims but risks which may give rise to claims in the future, i.e. latent exposures.

10.8 Examples of Recent Transactions

- Runoff cover for old Cigna business, provided by XL after purchase of Cigna by Ace.
- Adverse development cover for Fairfax provided by Centre Solutions. Limit of C\$1bn.
- Pensions cover for Sedgwick for purchase by Marsh & McLennan

11 Traditional Financial Guarantee Business

- 11.1** Financial Guarantee Insurance is the covering of a party's quantifiable financial obligations under a contract for the benefit of a third party. Such cover is provided by (often specialist) insurance companies and is economically similar to letters of credit provided by a banking institution.

The key differences between financial guarantee and other forms of insurance are:

- The insurance is purchased for the benefit of a third party, the identity of the third party may not be identifiable at the commencement of the policy.
- The insurance will be designed to run for a number of years.
- Legal issues in the contract, which are discussed further below.

- 11.2** There are five main drivers for the purchase of financial guarantee insurance:

- 1) There is a requirement imposed on a party as part of a commercial negotiation or as the result of a covenant in a commercial contract. I.e. A weak counter-party is forced to purchase additional cover to support its name on a contract.
- 2) There is a desire to use the capital markets to source long-term money to finance the creation or purchase of some asset. However the company is not capable of achieving a high credit rating on its own in connection with the project, for example it may be a new company. The company therefore purchases a Financial Guarantee policy for the benefit of the bonds – indemnities and covenants in the insurance can be used to ensure the project is managed correctly.
- 3) There is a desire to tap the capital markets through a large public securitisation. However the disclosure requirements relating to the business cause the company difficulties. The company therefore utilises a Financial Guarantee insurance to keep such matters the subject of a private contract between the issuer and the insurer.
- 4) A transaction is deemed to be very difficult to understand. This has lead to concerns that there may not be a deep primary market and/or the lack of easy trading in the secondary market will result in a very high liquidity premium for the bonds.

- 5) There is a desire to source funds from a traditional banking relationship, however the risk of the project is too great for either the bank or the original company to take.

It is the last four that we particularly interested in. These correspond to insurers; renting their management capabilities; selling privacy features; and (for the final two) providing sophisticated underwriting capabilities. These are activities in which they add value and should be able to earn a return in excess of that purely required for the risk.

- 11.3 People purchase bonds covered by financial guarantee insurance because they represent an asset backed by a highly rated name that offers diversification from traditional corporate general obligation exposures. Typically Financial Guarantee insurance companies have an extremely high credit rating, often attaining AAA (i.e. the highest credit category). In addition they are under restrictive capabilities as to what they many underwrite, are under constant scrutiny by the rating agencies and must operate as regulated insurance companies. This package of measures controlling the management risk implies that the insurer is less likely to suffer a credit down grade than a less restricted corporation.

This high and (hopefully) stable credit rating means that insured bonds should be far more liquid than other issues of similar term and maturity.

- 11.3.1 In addition, most financial guarantors have well known minimum standards credit standards that they will cover, i.e. They require a BBB or higher shadow (or private) rating on the non guaranteed bond. This results in high recovery from a "loss of the insurer's rating" events, since the investors are left holding an investment grade instrument (although the two events of loss on the bond and downgrade of the insurer may be reasonably correlated).

Finally since the premium on the contract is usually paid over time, a replacement insurer can often be found to replace the original insurance on a downgrade.

- 11.3.2 However, institutions usually operate a maximum credit exposure to any one organisation to prevent catastrophic loss. This means that

they are often reluctant to hold further insured bonds, this can increase both distribution difficulties and all in funding expense.

Because of this reluctance, where the factors listed above do not hold true, it is often preferable to use structured finance techniques such as securitisation to produce high-grade bonds senior in the program supported by higher yielding subordinated notes further down the program.

11.4 *Typical form of a Financial Guarantee Insurance Policy*

11.4.1 We have included some note on the major features of a Financial Guarantee policy of the sort utilised to protect bond investors. Concepts utilised in this area, designed to protect third party note investors, are likely to play a major role in the design of capital markets insurance policies allowing insurers to provide acceptable paper to help capitalise a company.

11.4.2 Coverage:

- a) An unconditional and irrevocable guarantee
- b) Payable to a trustee for the benefit of the note holders
- c) Of the scheduled payment amounts if unpaid (or subsequently repaid because of bankruptcy)
- d) Settled by: payment of funds to the trustee in exchange for subrogation of note holder's rights.

Since the policy is designed to protect third party note investors, it is vital that they can be assured that claims will be paid. Since the note holders are unable to influence events to create a loss the contract should be unconditional. Often the governing law of the contract may be explicitly altered so the utmost good faith defence is removed and disputes settled under normal (i.e. non-insurance) law.

In addition since the investment by the note-holder is of a long-term nature the policy must be irrevocable to match this exposure. The effect of (a) is to force the insurers to perform all their due-diligence at the underwriting of the contract rather than further examination after a claim. Misrepresentation, should it occur, would have to be recovered from one of the parties to the contract's creation, a form of pay-first-then-sue arrangement.

The trustee in (b) is involved for administrative convenience. There are an unknown number of individual note holders and it makes sense for the trustee responsible to their security on the funding side to also look after the insurance arrangement. The trustee will then be responsible for making payments to the individual note holders.

Definition of scheduled payment amounts

- a) Interest and accrued interest on original terms plus principal as originally scheduled.
- b) **Exclude:** prepayment by the issuer for any reason including those related to poor financial performance. However the insurer may elect to pay such amounts.
- c) **Exclude:** Any penalty interest or interest on unpaid amounts.
- d) **Exclude:** Withholding or other taxed imposed by government.

The schedule of payment to be covered is laid out in great detail. An important feature of the insurance is that it is this schedule that is covered and not a principal sum. This feature is a protection for the insurer against a liquidity crisis caused by a large number of losses (i.e they retain the ability to pay these over time). The ability to choose to ignore prepayments including for credit reasons further increases the insurer's ability to use funds where required in the event of a major loss.

The final two exclusions are, firstly the explicit retention of penalty amounts payable for the insurers benefit and secondly a general exclusion to control an aggregating catastrophic political risk exposure faced by the insurers in relation to taxation.

Rights of the Insurer

- a) Clauses to ensure the transfer of debtor rights and ability to direct the trustee in the event of a loss.
- b) The ability to perform actions to help ensure payment of the sums due.
- c) The ability to call the notes on the event of default of the underlying loans.
- d) Restriction of the ability of the trustee to cancel the insurance.

The ability to direct the trustee and collect debtor rights is fundamental to the contract allowing the insurer to manage the

situation once a loss has developed. The ability to perform actions such as providing surety bonds while legal actions are undertaken can prevent funds from being trapped in an insolvent situation and thus help mitigate losses.

The ability to call the note investments also helps control losses by allowing the insurer to invest in the guaranteed asset if excess funds are available. Finally the ability to prevent the trustee from cancelling the insurance:

- Increases certainty of the insurers premium cash-flow.
- Allows the premium to be charged on a level basis points per £ scheduled (rather than worrying about the incidence of risk over the life of the contract)
- Protects the reputation of the insurers with investors (who think they are buying a note insured by XYZ).

INSURANCE PRODUCTS FOR THE NEW CAPITAL MARKETS

12 Introduction : What do we mean by "New Capital Markets"?

We define the new capital markets as companies seeking to utilise financial instruments to achieve:

- I. A focus on rate of return on shareholders equity. Actions should be taken only to the extent that they create value for shareholders.
- II. A focus on the control of risk within the corporation
- III. A focus on the ability to enter and retire from a market quickly, with a capital structure that is flexible enough to follow.

The financial structure of a company cannot create economic value in a risk-adjusted sense. However the capital structure of a company, can if not properly managed destroy shareholder value at least due to second order frictional costs such as agency costs and taxation effects. For example a company may have too much equity capital or cash on deposit at the bank purely because:

- There is no efficient method to distribute it to shareholders
- It is required by regulations or commercial agreements to offset a risk which too large to be borne by a company.

The world is a faster moving and more uncertain place than at any time before. It is to deal with these issues that innovations have taken place, focussing on risk transfer and tradability of companies' major exposures and assets. Traditional finite insurance and structured finance products are being evolved to create these new instruments.

There is a major role for the insurance industry to provide support to corporations with products to support all these major focuses.

The financial structure of corporations utilising both specialised funding debt capital and finite risk insurance transfer to finance its operations is an area that should be covered by a future working party.

13 Example Transactions

13.1 *Turner & Newall Asbestos Cover*

T&N were an UK based automotive components manufacturer. In the past they mined and manufactured asbestos and are subject to claims from people suffering from asbestos related diseases.

In late 1996, T&N completed an insurance transaction to manage their future asbestosis liabilities. The objective of the deal was to improve the companies value in the stock market by "ring fencing" the historic liability through the purchase of a suitably sized insurance policy. It was felt that the insurance industry was better placed to price the risk, and hence provide the capital to support this risk than the general equity investor.

On the announcement of the insurance deal to the market, T&N's shares rose significantly (from 144.5p to 176.5p), providing some justification to the assertion. In addition the management was able to sell the company shortly thereafter for 240p per share.

Key features of this contract were as follows:

- Coverage: All T&N asbestos liabilities world-wide
- Cover: £500m above £690m retention.
- Premium: £92m with a profit commission passing some of this back to T&N if there are no losses to the layer after 15 years.

A feature of this transaction that provides a pointer to future likely structures is the consolidation of the risk within a captive insurer before entering into the reinsurance transaction. This illustrates the extension of insurance captives from corporate service providers into an important role in the corporate financial structure and mirrors the role that captive financial institutions have had in the development of the funding programs of the major corporations.

13.2 *British Aerospace Regional Aircraft Portfolio Cover*

BAe had a large exposure (c. £2.9bn) to a historic portfolio of regional aircraft where it has financed the purchase of planes through the use

of sale and leaseback for sub-leasing to airlines or has given guarantees on lease payments or aircraft values.

The size of the possible loss was sufficient for there to be concerns as to effect on the whole company during the recession of 1992. As a result the management of BAe felt the need to seek protection against the possibility of a future down turn in the market by ring fencing this exposure.

A 15 year insurance policy protecting BAe from the income on the portfolio falling below £2.4bn (subject to 10% co-insurance) was placed into the insurance market for a one off up front premium (cf£42m).

The company had made provision for £474m to cover the possible shortfalls in its accounts sufficient to broadly cover the losses between the policy and the exposure. They have therefore reduced the magnitude of any further (accounting) downside in the portfolio while retaining an economic incentive to manage the planes to recover the value held in the provision.

13.3 *Hanson US Environmental Liabilities*

The US environmental liabilities of Beazer plc were protected by a large finite risk insurance policy purchased from Centre Solutions and Swiss Re.

The policy provided \$800m of cover against the possible future costs for a premium of c. \$275m. The company had already made a provision to cover the costs, the effect of purchasing the insurance policy was to allow release of the provision creating an exceptional accounting profit.

13.4 *Sadgwick Pension Transfers and Opt-outs*

In October 1994, the Securities and Investments Board issued its report, "Pension transfers and opt-outs, reviews of past business". Its objective was to secure redress for individuals who between 29 April 1988 and 30 June 1994 were advised to transfer benefits from, or opt out of, an occupational pension plan and enter into a personal

pension plan, and have thereby suffered actual or potential loss. At that time, the review was required to consider priority cases only.

In March 1998, the Financial Services Authority and the Personal Investment Authority published their consultation document concerning Phase 2 of the pension transfers and opt-out review. This extended the review to include non-priority cases.

In April 1998, following an initial review and based on the methodology and assumptions contained in the consultation document, Sedgwick announced that they expected a cost of not less than £35m. At that time they commented that there was the potential for the figure to be materially exceeded. Following a further assessment of their position, based on their experience to date, the Directors recognised an exceptional charge of £80m in the accounts as at 30 June 1998. This charge represented the best estimate of the cost of completing the review. It was recognised that the cost could still be subject to change due to factors beyond the control of Sedgwick, such as future movements in long term interest rates, equity markets and the contents of the "Final Statement of Policy and Final Guidance" to be published by the FSA.

As a result of all the uncertainties, Sedgwick entered into insurance arrangements to protect itself against an increase of up to £37m in the estimated total cost of completing the review. The cost of this cover is included in the £80m exceptional charge recognised in the period. In addition, the group has an option to extend the cover to give protection of a further £25m. The cost of purchasing the option is also included in the exceptional charge.

- 13.5 An interesting point to note is that all four of the above transactions represent management wishing to manage their exposure to past business. The aim is to allow the management to focus on the ability to generate future profits and not be distracted by history. This is not dissimilar to the role of finite policies in the management of run-off situations.

13.6 *Lloyd's Central Fund*

The corporate and individual underwriting members of Lloyd's support each other through the central fund in the event that any member cannot meet in full their share of a valid claim.

The central fund therefore underpins the security backing all Lloyd's policies. Following the successful reconstruction three years ago Lloyd's has continued to strengthen its chain of security. This included an increase in the minimum capital requirements for some members, the extension of the risk based capital system to all members and various other measures including a requirement for regular independent actuarial assessment of reserves. These steps led to Lloyd's obtaining high quality ratings from AM Best and Standard & Poor's.

As a result of a desire to demonstrate long term financial stability and to further strengthen the security behind all policies issued by Lloyd's syndicates, in April 1999, Lloyd's announced a five-year agreement involving the insurance of the central fund for £350 million. The programme is led by Swiss Re, the other participants being Employers Re, The St. Paul Companies, Hanover Re, XL Mid Ocean Re and Chubb Corporation.

The policy, which will be effective between 1999 and 2003, has an annual excess point of £100 million, an annual limit of £350 million and an aggregate maximum payment during the five-year period of £500 million.

As a result, taking the existing central fund of c. £175 million, the value of the new £350 million insurance programme, and the ability to

call up to £300 million of further funds from members, the strength of the fund is increased to more than £800 million (\$1.3 billion).

13.7 Swiss Re Bond Reinsurance

In June 1999 Swiss Re and Partners Group announced the placing of up to \$600m of convertible bonds in Princess Private Equity Holding Ltd, a new company set up in Guernsey to invest in private equity opportunities. It will be managed and insured by a Guernsey based management company, Princess Management Ltd.

The bonds will be convertible from 2007 onwards into shares of Princess. Reinsurance will be provided by Swiss Re covering the repayment of principal of the bonds at maturity in 2010. Thus, investors are provided with downside protection, something not normally seen in the private equity market.

The bonds have been assigned an AAAr rating by Standard & Poor's (i.e. subject to a specified material risk which has not been rated, in this case the dependence on performance for the payment of interest) and an application has been made for them to be listed on the Luxembourg stock exchange.

According to Swiss Re, the structure of the bonds, with reinsurance used as security rather than treasury zeros, means that Princess can invest the entire amount of the issue in private equity rather than between 35 and 40 per cent. By putting the full capacity of the insurance structure into the fund, it will be possible to commit to over leverage much more of the fund for investment purposes.

This represents more of a movement by Swiss Re into the defeasance market than a true insurance.

14 Why is there a need for such Products?

The capital structure of companies is primarily formed utilising debt and equity instruments. These holders have fundamentally different focuses that are simply illustrated below:

Equity investors are focussed on total return. They are focussed on the intangible possibilities to make money that the company and its managers provide. Their level of understanding of event risk is typically low and it is managed by delegating the responsibility to the management of the company to manage the business prudently. Equity investments are commonly judged against the stock market index, although risk-adjusted returns might be considered.

Debt investors are usually charged with managing a pool of funds to match some liability. They are concerned with the ability of the company to pay them the rate of return and may be allowed to invest a very small amount of money in slightly more risky bonds.

This is obviously a vast simplification of the real world. However it does serve to illustrate that there is a gap for investors who are willing to take a risk unlike debt investors, but for a return which is less than an equity rate on the basis that the risk, firstly can be diversified by considering a pooled approach and secondly is a specific rather than a general obligation risk. This is exactly the function that the reinsurance market provides for the insurance community.

Competing alternatives are available but have many flaws:

- For the capitalisation of subsidiaries, parental guarantees can be used to provide support – however the rating of the parent may not be high enough to satisfy external investors, and this does not solve the bigger issue at the holding company level.
- High yield (or “junk”) debt can be used to support smaller companies. However these are a form of general obligation capital taking the residual and management risk.
- Partially paid equity – this can be used to provide finance in a particular area, however stock market restrictions and the credit risk on investors make it unattractive.

Highly rated Insurance companies providing additional capital in the form of finite risk policies covering the major event risks provides an important extension to the capital structure of a company.

15 Asset Securitisation and Insurance

- 15.1** Asset Securitisation is a mechanism for funding corporations in which predictable cash flows from an asset are used to strengthen the credit quality of a bond. In addition, the risks associated with the cash flows are often transferred to the note holders who in such cases are entirely dependent on the cash flows from the assets for their bonds to be redeemed.

An important feature about this form of Securitisation is that it replaces the original company's role as owner of the assets with that of administrator of the assets. The assets themselves are ring-fenced from any major management risks of the original company, the administrator can be replaced if their performance or credit quality is poor and recourse for negligent administration can be sought through the contract.

Considering these features from an insurance point of view there has been a removal of uninsurable management risks leaving only asset performance risks which should be broadly insurable.

15.2 Opportunities for the insurance market?

The techniques offered by Asset Securitisation offer a mechanism to enable insurers to participate in a wider range of risks than has been traditionally available.

There are two main ways that this can be achieved:

- Internally to a structure by means of the provision of acceptable finite risk policies to reduce the asset risks for the junior bonds. By acceptable we mean that the terms of the finite policy would probably have to be similar to those used in traditional financial guarantee business. Development of new types of policies is further discussed in section 20.
- Externally by writing a financial guarantee insurance on the issued bonds or some of the issued bonds.

The wrapping of asset securitisation by mono-line insurance companies has been undertaken for some time, however such companies will typically only wrap the entirety of a deal above a particular level. An extension to this market is the creation of new

insurance companies such as the joint venture between XL Capital and FGI to wrap just the sub investment grade bonds up to AA level. Such policies allow the insurer to participate in the risks but keeping control of the maximum exposure.

An issue facing insurance companies in this area is that their rating and the security of the transfer will be an important consideration. The possible outcomes are:

- This opportunity will only be available for the most highly rated (certainly not likely to be below AA rated) companies.
- The policies will have to be structured as risk backed bonds held *initially entirely by the insurer*
- Insurers will have to form highly rated and ring fenced subsidiaries from which such business can be originated.
- Some sort of market security arrangement would be required.

16 Legal and Accounting Difficulties

If, as is likely, the use of specialised insurance within a well-structured corporation becomes more widespread, the legal and accounting issues will be substantial. There are guidelines that cover the treatment of liability transfer contracts such as those mentioned under the finite risk section above. In addition guidelines for the treatment of an asset which is supported by limited recourse debt are defined under *FRS5*.

Exactly how the residual rights of a limited recourse company which has some of its liabilities covered by finite reinsurance policies will be treated is an open question.

In addition, many of these structures are relatively new to the market place (especially in Europe). Until there has been an severe recession that fully tests the legal construction of the transactions and maybe specific enabling legislation, who can be 100% sure as to the outcome?

Natural and understandable caution in this area will be a factor limiting the speed of utilisation of these techniques.

17 Players in the Market Place

The convergence of the insurance and capital markets bring with it two sets of organisations. It is important to understand the various relationships between the parties to be able to discuss where the market might evolve. Larger organisations may of course handle several roles through specialist subsidiaries.

17.1 *Originators*

These are the direct insurers and lenders whose function is to provide basic financial services to an end consumer be that another non-financial company or a real person.

Originating companies will run into constraints that require external funds and or capital support to continue to perform their main business. The management of these requirements is what the capital and reinsurance markets are all about.

In addition, large single asset, capital intensive projects have an immediate requirement for external funds and support, both to refinance the original funding and manage the risk exposures.

17.2 *Risk Takers*

The ultimate providers of that external support are other institutions who are investing the capital of others. These include:

- Traditional investment activities of acquiring financial assets to match future obligations.
- Insurance which can be regarded as a direct investment in risk.
- Trading which is aimed at making a short-term return on surplus money.

17.3 *Agents*

These fall into two functions:

- The role as a middleman bringing originators and investors together. Brokers and investment banks respectively in the insurance and capital markets traditionally fill this role. Note that many people have a misconception that investment banks are risk

takers. While this is true to a limited extent it is not their major function.

- The provision of specialist management skills for other investors capital. This role can be seen in that of fund management, venture capitalists and underwriting agencies at Lloyds. Even the management of deposits for consumers by banks and building societies is an example of such a role.

17.4 *Where will the future be?*

The only thing that is clear is that all three roles will continue to exist in the market place. The questions of interest are who will be providing the services, and what agents will the market require?

Some interesting questions:

- Do major corporations require two agents (brokers and investment banks) to manage their financial needs or are these two entities likely to merge?
- Banks are willing to underwrite some debt issues to provide comfort to their customers that money will be available. Will brokers be forced to do the same for standard insurance risks?
- Will Insurers seek to leverage their skills by managing portfolios of other peoples' capital? If this can be done using debt instruments then can the frictional tax costs associated with an insurance company be avoided?

18 Development of New Insurance Products

Companies require capital market insurance products that help them meet their business objectives. The mindset of insurers when thinking about product design must be reversed from "here is a risk that we can cover" towards "here is the objective how (and where) can we help that be achieved".

There are two main ways of developing this approach:

- A focus on corporate risk management aimed at the holding company and covering a wide range of risks.
- A focus on a project level aimed at enhancing the ability of an organisation to efficiently provide services to the end user.

The first of these two functions is likely to be managed by the derivative markets either directly by the corporation or on their behalf behind some sort of multi-line cover provided by a major insurer. The structuring and financial management of such covers would provide an interesting area for a further working party to consider.

The second of these functions involves an understanding of

- the business objectives of the project
- the areas which cause difficulty to the funding of the project in particular:
 - How the economic risk bearing equity can be provided for the transaction. Of particular interest will be constraints imposed by parties interested in the senior debt, be they banks or rating agencies. These requirements are often driven by ignorance or extreme caution and are fertile ground for developing lower risk insurance policies that can add value into the structure.
 - Issues that might cause difficulty in exiting certain parts of the transaction or in its operation. Careful design of policies can ensure the transaction achieves maximum support in the critical areas (usually the initial origination / construction phase) while managing the potential for generating aggregations of residual risk over time.

19 Translating Capital Market Bonds Into Insurance Terms

The insurance markets and bond markets have different ways of assessing the risk associated with a situation:

- The insurance market concentrates on the expected cost of the exposure appropriately loaded
- The bond market concentrates on the spread on a bond with particular features relative to some benchmark.

Neither of these approaches is wrong, they are both appropriate to manage the most material risk associated with the respective contracts:

- Event risk in the case of the insurance market.
- Macro economic conditions in the case of the bond markets.

However, these approaches converge when considering the issue of low grade Risk Securitisation bonds, junior sub-investment grade asset backed bonds and the associated financial guarantee or traditional insurance policies.

The comparison of such approaches to ensure consistence of pricing or identify opportunities between the two market places is an important issue that should be given thought by a future working party.

INSURANCE DERIVATIVES AND DOUBLE TRIGGER COVERAGES

20 Introduction: What are these instruments?

- 20.1 We will define an *Insurance Derivative* to be a contract which combines both features traditionally found in over the counter (OTC) derivative contracts and those traditionally found in insurance contracts. Legally such contracts may be constructed as either insurance or derivative contracts as the accounting treatment demanded by the client demands.

Such contracts are not new, industry loss warranties policies have existed for a long time. Lloyds used to write Tonner policies until these were specifically excluded by a by-law.

- 20.2 A *Double Trigger Coverage* is an insurance contract on which the loss is defined both by a casualty / property loss and the behaviour of market traded instruments.

Such contracts are nothing more than one end of the spectrum of insurance derivatives and so we are considering them together.

21 Accounting For Profit / Consideration of Benefits

- 21.1 There are two major distinctions between the behaviour of those contracts that are structured as a derivative and those which are structured as insurance.

- 21.1.1 The definition of Loss used to determine payment. An insurance contract is one of indemnity where the insurer will compensate a third party for some loss that they have sustained.

However the term loss is not restricted just to insurance contracts, it can also be found in some credit derivative contracts. The key issue is that the sum defined in the latter case must not be related to an amount of economic damage suffered by the third party (to be demonstrated at the time of claim).

The loss in a derivative contract must be clearly defined on the occurrence of a trigger event, and payable without penalty. This can include the right to deliver an asset such as a loan at a fixed price. The effect of such a delivery will be to cause the counter-party to suffer the financial consequence of a loss similar to that defined for an insurance contract. However, rather than compensating the third party for an unknown amount, the derivative counter-party will pay a known amount to purchase an asset and receive an unknown recovery from it.

In fact the greatest difference in between the two contracts economically, is to be found in the definition of the trigger event. Since the insurance contract is a guarantee of a loss to be demonstrated at the time of claim, it may have a far wider interpretation than the objective definition that must be utilised in the derivative contract.

For example: It is possible to buy an insurance guarantee against the non-performance by a counter party in a private commercial contract such as a lease. However a derivative event would have to relate to default on a public bond or a bankruptcy filing for the company.

This clearly offers the opportunity for insurers to provide protection for softer issues while utilising the derivatives market to lay off the major concentration issues to a client.

- 21.1.2 The method of Accounting for profit and loss under the contract. An insurance contract will be subject to the setting up of prudent reserves and earning the premium associated with assuming the risk over time. A derivative contract on the other hand has its values determined with respect to the associated benchmark asset or other market determined index. Such a contract may change in value quickly over short periods of time.

The problem is compounded by the difference in methods for accounting for assets and different forms of liabilities within a corporation. Unless care is taken it is possible to enter into business profitable on an accounting basis but not economically profitable.

A flavour of the issues can be found by considering the following cases:

1. A risk asset such as a low-grade corporate bond held on the balance sheet as a trading asset. This is likely to be accounted for by market values.
2. A risk asset such as a low-grade corporate loan held on the balance sheet as a banking asset. This is likely to be accounted for at par and the margin on the loan earned over time.
3. A risky liability such as the guarantee of a corporate default by an insurer. This is likely to be accounted by comparing a prudent estimate of the likely outgo (possibly) discounted at a margin below the risk free rate and the unearned premium.
4. A credit default swap of a corporate default. This is likely to be accounted for by reference to the market value of the hedging assets.
5. An obligation of a corporation to make payments on a loan. This was accounted for at the principal value of the loan. In some circumstances (in particular where the loan is secured on an asset which is marked to market) this must now be accounted for by taking market value of the loan.

Note that all of the five items above could conceivably be the same risk observed from differing points of view around the financial market. In particular (5) throws light on the issue of financial reporting for companies vs. regulatory reporting, by including the loan at market value we are implicitly allowing for the possibility of the company going into default. It could be argued that for regulatory purposes this is unreasonable and loans should be shown at the discounted value of their payments at an appropriate rate.

Insurance derivatives are often contracts that would in the past have lived partly on either side of a company's balance sheet. They are thus exposed to the greatest possibility of mis-pricing by the unwary. Similarly, they offer the greatest scope to aid balance sheet manipulation since financial reinsurance was invented and there is the risk they will be used for such.

22 Security of Risk Transfer

22.1 There are four basic categories into which techniques aimed at achieving greater security of the risk transfer under a contract fall:

- Clearing Houses – the contract in question is not written by the counter parties directly, but each take out a position with a third party, the central clearing house. Such an arrangement has the advantage of creating a body that can monitor each party's exposure and protect itself through the use of deposits of margin. In the event of default of a counter party, the Clearing House will purchase a new contract to ensure its positions remain balanced. As such this arrangement requires the contracts to be fungible and highly liquid but provides an extremely high level of security. For example: exchange traded contracts at LIFFE.
- Trusts and Guarantee Funds – the two parties agree that there should be regular monitoring of the contract and an agreed mechanism to deposit collateral at security to a third party trustee. To the extent that losses do not develop too quickly, such a mechanism can provide increased security for the contract.
- Rating Driven – this is a variant on the trust fund where there is no requirement to deposit collateral until the parties rating falls below some required minimum. At such point the contract may have to be collateralised against a prudent estimate of future losses until a replacement counter party with acceptable rating can be found to step into the contract on terms identical to the original. Such a mechanism provides a degree of security provided the counter party is unlikely to go bankrupt in a sudden fashion.

A trigger of a ratings downgrade is used because it is more likely to succeed. Firstly it will hopefully happen some time before a bankruptcy (reducing the possibility of challenge to the transfer in the courts), and secondly because terms requiring the transfer of funds on insolvency are unlikely to succeeded.

- None – the majority of contracts are written without any specific mechanism to increase the security of the transfer. Instead the parties rely on the regulatory framework within which they both operate be that insurance or banking.

22.2

It is important to allow for the security of risk transfer given by a contract, after all no one would suggest that an AAA corporate bond should be worth the same as an identical instrument from a BB body. A decision has to be made as to the appropriate level of consideration the issue requires and how such exposures should be controlled. For example:

- Much direct business is too small to support the additional expense associated with including additional security mechanisms. Such purchases are forced to rely on the regulatory environment for protection, indeed the smallest have explicit legislative support through the Policyholder Protection Act.
- Direct commercial business and outwards reinsurance protection purchase by smaller insurers is given extra protection through the use of brokers or an internal security committee action as a gatekeeper to which companies are acceptable counter-parties. This can be regarded as the crudest form of underwriting, either a party is acceptable or not, price does not enter into the issue.
- Large reinsurance contracts may have provision for trust funds to be established if there is a large expected claims amount. Larger banking contracts will have the requirement to post collateral if the counter party's rating slips below an agreed level.
- Contracts, which exist in a rapidly changing market and are required for hedging purposes, are supported by market clearing systems. Such a mechanism is required since there is insufficient time to appraise counter party risk.

As can be seen from the above examples the key drivers in the decision process are:

- i. Am I in a position to influence the term of a contract?
- ii. What is the purpose of the contract?
- iii. Would the failure of the contract result in an unacceptable exposure to the company?

Where a major structured insurance derivative transaction is undertaken the answers to these questions are:- Yes, contracts are individually negotiated; the reason is often capital substitution or risk trading; and failure will probably create a material loss.

Allowance for Security in the Pricing Process

22.3 Where major Capital Markets Insurance policies and structured derivatives are being considered, it is important for both the buyer and seller of protection to look at the cost / benefit of the security mechanisms. In particular the buyer needs to ensure that he will receive the protection required and allow for the cost of doing so.

22.3.1 Issues for the seller of protection are the ongoing costs associated with the proposed protection mechanism. These include:

- Allowance for the cost of trustees other required agents.
- The cost of carry on the deposits associated with the guarantee fund. This is the difference between the issuer cost of borrowing and the rate of return that can be achieved on the appropriate risk free benchmark on the deposits.
- If the guarantee fund is not funded on day 1, the cost of securing access to funds to cover the difference contingent on a downgrade. If such funds are to be provided internally then the exposure to such drawings must be monitored to prevent corporate failure due to liquidity driven reasons.
- If a third party guarantee is sought, the cost associated with providing the non-performance coverage.

The appropriate risk free rate mentioned above is not always the rate on treasuries. The rate on treasuries represents the appropriate risk free rate against a benchmark of defined cash payments that may also be liquidated at market value at any time. The benchmark required here will include consideration of the speed of payment of claims from the fund and the variability of the possible drawings.

22.3.2 Issues for the buyer of protection are the all-in cost associated with ensuring the program will perform at an adequate level. Failure of the programme to perform includes both failure to pay sums due for legal or credit reasons, and failure to pay in a timely manner.

Additional support that the buyer of protection may have to cost includes:

- The cost of providing additional default protection on the portfolio of original protection providers arranged on a first to default basis.

- The cost of securing funds that can be drawn against the moneys due under the contract to prevent liquidity problems.

Again, the buyer of protection may decide that they should carry such risks themselves. However this should be a conscious discussion and exposures properly monitored.

23 Overview of Pricing Theory

It is important that Actuaries and Analysts understand the mechanics of pricing contracts in this area, both for the purposes of providing such cover and to ensure their prices are consistent with other similar market places.

However, there are many misconceptions on how derivatives are priced. In addition the theoretic nature of the papers covering the subject acts as a barrier to people developing understanding of the concepts.

Our aim below is to shed some light on the fundamental concepts and how they relate to pricing the various form of contract. In addition it is possible to perform a reasonableness check on the price of many contracts without needing to go into the exact mathematical calculations. This certainly is a skill that needs to be developed.

23.1 "Basic" Derivative Pricing Theory

23.1.1 Basic or pure derivative pricing theory is founded on the following assumption:

- If there exists an instrument, the holding of which will remove all risks (economic, funding, accounting, counter party credit) from a contract then the "pure" price of the contract is equal to the cost of the instrument (and you charge that plus a bit for profit).

This is analogous to pricing some elements of insurance contracts, consider the following:

Question (you are a small insurer):

"How much do I charge for the £1m + large motor claim element in my comprehensive motor book"

- a) The appropriately adjusted historic burning cost loaded for the volatility associated with the distribution of claims occurring next year.
- b) What my AAA reinsurer will charge to cover the risk.

23.1.2 "Black-Scholes" Style Pricing

This extends the above into a rather more useful set of circumstances.

- There exists a continuously and 'smoothly' trading market instrument off which either the settlement price of the contract can be determined OR the instrument can be delivered to satisfy the contract.
- The instrument can be traded quickly, with low costs and sufficiently high volumes. Short selling is possible.
- The company can borrow money to fund the purchase of the instrument at the risk free rate.

These assumptions allow the company to write contracts where it is possible to synthesise an asset (by buying the commodity(s) using borrowed money if required) that exactly matches the behaviour of the contract in the next instant. This is called the hedging portfolio.

After the occurrence of that instant you (i.e. a sophisticated and hopefully correct piece of software) re-evaluates the required combination of assets and borrowings. You then buy / sell material as required to keep your hedging portfolio in kilter.

The cost of the contract is therefore:

- The cost of creating the hedging portfolio, *plus*
- The cost of maintaining the operation that manages all that trading and the frictional cost of doing so, *plus*
- A bit for profit.

Frictional costs include trading expenses, cost of carry on borrowed money etc. This leads to one of two situations in the market place:

- Because of these items the standard derivative on major corporate equities and bonds will enjoy economies of scale and tend to be provided by a few leading players in the market.
- Alternatively the ability to perform such business becomes a "must have" capability of major banks which then can make little to no profit due to over capacity.

23.2 "Advanced" Derivative Pricing Theory

23.2.1 This covers the situation where some of the required features needed to successfully apply dynamic hedging strategies do not hold. In particular where the following is possible:

- The process is not continuous but possesses randomly determined sudden movements. These are called a jump process and may possess both a continuously varying and shock components.
- There is the possibility that the market for one of the instruments required for hedging will cease to be liquid (in either direction, i.e. it is hard to buy or hard to sell).
- There is a possibility of the interruption of availability of cash to fund short-term positions.

To some extent all instruments fall into this category, in that their behaviour at times of market disruption may be materially different to that in normal circumstances.

An example of products requiring such pricing methodologies are derivatives written on low grade corporate debt, smaller companies and catastrophe bonds.

- 23.2.2 Semi-Hegibility is the concept that there exists a portfolio of instruments, the holding of which will closely track the performance of the derivative. However because of the nature of the instrument or the difficulty in re-balancing the portfolio or other unwanted additional risks in either the contract or the portfolio such tracking is only approximate.

When presented with the pricing of such contracts, it is occasionally possible to over hedge the position ensuring only positive outcomes can result. However due to obvious commercial reasons this is unlikely to produce an acceptable price.

- 23.2.3 Thus the writer must consider the size of the maximum discrepancy that can arise between the hedge and the contract, the distribution of such possible outcomes, and whether the differences will aggregate across their book of business. Based on these assessments allowance must be made as to the capital required to support the real unhedgable risk and what rate of return is required thereon.

Notice that the lack of hedge forces the derivative writer into making an assessment of price suitable for the risks associated with the contract. They can no longer entirely rely on the prices implied by the market place (where buyers of the underlying instruments are always forced to consider the value in any instrument in any case).

23.3 Insurance Derivatives / Double Trigger Coverage

23.3.1 *The key distinction of insurance derivative is a material lack of any hedge in part of the process defining how a loss may arise.*

For example:

- *A reinsurance company offers variable quota-share cover to a motor insurer to protect the portfolio from underwriting losses combined with under-performance of its investment portfolio.*
- *A Company offers to purchase a newly issued catastrophe bond at a pre-determined price if a catastrophe occurs.*

23.3.2 *Some of these policies (such as the first above) can be priced as traditional insurance contracts where the currency of the contract is measured in option contracts on the appropriate market index. For such an approach to be undertaken a sufficient volume of business in this 'currency' would have to be written. However this leads to a number of issues which include:*

- *This requires matching of reserves as well, held in units of appropriate contracts. The degree to which this is required is hard to judge, should the matching be with best estimates reserve, include a margin or be the full premium reserve when the matching asset is as risky or more risky than the liability it is used to back.*
- *Similarly the capital backing the business required to cover fluctuations in the performance needs to be related to the appropriate derivative contract. However to hold the capital in such a derivative explicitly would involve the possibility of losses even if no event risk had occurred.*
- *The accounting and solvency issues must be addressed. It may be that only those reinsurers who have economic capital far in excess of their regulator requirements are able to transact such business. This is because such companies are by their nature relatively unaffected by such issues.*

Where, as will commonly be the case, a company is writing such business on a one off basis, the issue of how the interrelated exposure can be managed is extremely complicated.

- 23.3.3 By way of illustrating that these contracts are not impossible to assess, at least for reasonableness, the working party considered the issues behind pricing a hypothetical example:

A contingent placement option for a new catastrophe bond

Hypothetical key features of the contract:

- 1) The holder has the obligation to purchase at par a newly created catastrophe bond covering Florida hurricane risk which will have a coupon of LIBOR plus 350 Basis Points contingent on a first hurricane occurring in the defined region.
- 2) The option will have a three-year life and the associated bond will have a five-year life from the date of issue.

Issues:

- There is no direct first loss risk associated with the contract in a traditional insurance sense. However from a capital market / economic standpoint there is the risk of loss caused by being forced to purchase an instrument at less than market rates at the time.
- The process defining the contract decomposes into two parts:
 - a) The value of the bond if it were issued at the time
 - b) The occurrence of the event causing the bond to be issued.

It is important to realise that these processes are not independent. The occurrence of a loss on a hypothetical bond will (almost certainly) increase the rate of return demanded by investors on comparable instruments. In addition such a change in position will happen effectively in a sudden manner (there will be a period during which the market will be in a "no bid" situation i.e. no buyers at any price, while people assess the situation, after which new prices will be in force).

- The biggest issue is can this be valued by identifying an approximate hedge for the contract (i.e. the process is semi-hedgeable)? Note that this exercise can and should be undertaken even if there is no intention to enter into the hedge. Deciding the market driven price is independent from decision to assume the risk.

- In economic terms, the process exposes us to a loss equal to the difference between the market value of the defined security on issue and par, contingent on the issuance trigger event taking place. There is however no instrument in the marketplace that would have the required value.

Asking, "What will be the likely pricing of the risk if the event occurs" can however assess our exposure to loss. We will assume that given historical experience in the reinsurance markets that rate in the market place will double to 700 BP's. This allows for both a doubling of the cost of risk and the cost of liquidity associated with the instrument.

Such a movement would mean our instrument would be worth less than par (which would depend on the then rate of LIBOR). Worse case (LIBOR is very low, say 0%) the debt would be worth 85p in the £, producing a loss of 15%.

- There are however, instruments in the market place which would have zero value if an event similar to the trigger event occurred. These are Catastrophe bonds written on similar events. Note that we are not saying that such an instrument can be used to hedge the first trigger (as they are based on differed underlying triggers). Such instruments can be used for price discovery on the cost of a bond whose value would fall to zero on the first trigger. We will assume that currently such instruments are trading at 300 Bp to LIBOR.
- If there existed a bond that exactly matched the first trigger then, if we were to short sell bonds equal to 15% of our option exposure then on occurrence of the first loss we would be compensated for the 15% loss we would have just made. To assess the price of the contract we need to assess the cost of doing this, this is equal to the rate of return on the bond plus out cost of borrowing funds. We will assume the later is 40 BP to LIBOR giving a cost of shorting the instrument of 340BPs
- This gives a basic cost for the contract of, 3.4% times 15% or 51 BP's.

The above focuses on a market lend approach to discover a price on the contract. However in practice the ability to actually hedge may not be an option, you are then forced to consider whether you believe the market price is acceptable.

You could utilise a cat model to assess the price you believe is acceptable for the risk. If this were (after appropriate allowance for variability) less than 300 BP's then it would make sense to write the contract and not hedge the risk. If more than the above then hedging would make sense, but the issue of how to allow for the utilisation of capital (especially given the issues associated with holding derivatives) would have to be addressed.

APPENDICES I – CATASTROPHE RISK SECURITISATION

24 Appendix A – Transactions Covered in Previous Papers

COMPLETED SECURITISATION DEALS

Insurer	Date	Risk Capital	Description	Index?	Risks covered
Hannover Re	1995	\$85m	Notes/preference shares	No	Multi-continental cat risk
AIG (PX Re)	May 1996	\$10m	Zero coupon note	SIGMA	Multi-continental cat risk
Hannover Re	Nov 1996	\$100m	Portfolio linked swap	No	Range of classes/territories
St Paul Re	Dec 1996	\$45m	FRN/Preferred equity	No	Range of classes/ territories
Winterthur	Feb 1997	\$7m	Convertible subtrnd. Bond	No	Swiss auto hail
Reliance National	Mar 1997	\$10m	FRN at discount	SIGMA	Range of classes/territories
USAA	Jun 1997	\$400m	Notes	Index trigger	East Coast-hurricane
Unknown Reinsurer	1997	\$35m	Swap	USAA Deal	East Coast-hurricane
Swiss Re	Aug 1997	\$113m	Notes	PCS	Californian Earthquake
Tokyo Marine	Oct 1997	\$90m	Notes	JMA	Tokyo earthquake
Florida JUA	Feb 1998	\$75m	Notes	No	Florida Windstorm
Mitsui Marine & Fire	April 1998	\$30m	Swap	JMA	Tokyo Earthquake
Reliance National	May 1998	\$25m	FRN at discount	SIGMA	Range of classes/territories
Reliance National	May 1998	\$25m	Option to issue FRN	SIGMA	Range of classes/ territories
Continental Casualty	June 1998	\$90m	Notes (Treasury Bills + 375)	Yes	Northeast hurricane
(Hedge Financial Re)					(6 month cover)
USAA	June 1998	\$450m	Notes	Index trigger	East Coast-hurricane
Yasuda	June 1998	\$80m	Notes	No	Japanese Typhoon
Client of Paribas	July 1998	\$30m	Option	No	California earthquake
F&G Re	July 1998	\$54m	Notes	No	Catastrophe reinsurance
EXEL	Aug 1998	\$100m	Swap	No	US/Caribbean hurricane and earthquakes
New York Reinsurer	Aug 1998	\$10m	Basis swap	Yes	US Windstorm

Société Générale	Nov1998	\$25m	Note and swap	(SIGMA?) Yes (PCS)	New Madrid Earthquake
Société Générale	Nov1998	\$10m	Note and swap	Yes (PCS)	New Madrid Earthquake
Allianz	Dec 1998	\$150m	Option to issue bond	No	German hailstorm
Hannover Re	Dec 1998	\$50m	Portfolio linked swap/option?	No	Range of classes/territories
F&G Re	Dec 1998	\$54m	Notes	No	Catastrophe reinsurance
Florida JUA	Feb 1999	\$50m	Notes	No	Florida Windstorm
Kemper	Mar 99	\$100M	Notes + convertible stock		New Madrid Earthquake
Sorema	April 99		Auctionable Bond		European & Japanese Catastrophes
Tokyo Disneyland	May 99	\$200m	Corporate Bond	JMA	Tokyo earthquake
Gerling	May 99	\$488m	Note	Yes	European insolvency's
USAA	Jun 99	\$200m	Notes	Index trigger	East-Coast hurricane
Société Générale	Jun 99	\$70m	Swap	Yes (PCS)	New Madrid earthquake

25 Appendix B - New Catastrophe Bonds

Appendix B1 – Joint Florida Underwriting Association (deal #2)

This bond was initially issued in February 1998 (see 1998 paper) and covered Florida hurricane risk underwritten by an insurer in the Zurich Group, which has been established since 1996 and which (to date) assumes risks from the Florida Residential Property and Casualty Joint Underwriting Association.

This insurer then had a reinsurance contract with Centre Solutions – a Bermudan reinsurer in the Zurich Group which was in turn reinsured by the special purpose vehicle for this deal – Trinity Re, located in the Cayman Islands.

In January 1999, a second bond was issued to cover the 1999 hurricane season.

The second deal had two types of note:

1. \$5m of Class A-1 (principal protected), paying LIBOR + 175 basis points
2. \$56.615m of Class A-2 (principal variable) paying LIBOR + 417 basis points.

Appendix B2 – US Automobile Association (deal #3)

USAA is a major US personal lines insurer.

In June 1997 they issued \$477M of catastrophe bonds. This bond covered USAA for one year for 80% of a loss caused by a single hurricane of Category 3, 4 or 5 on the Saffir-Simpson index of hurricane intensities resulting in insured property damage losses of between \$1 billion and \$1.5 billion to USAA policyholders in the East Coast areas from Texas to Maine.

In June 1998, on the expiry of the risk period of the first bond, USAA issued another bond. (see 1998 paper).

Finally, in June 1999 USAA re-issued the bond (for the third annual risk period) but for a reduced amount of only \$200m risk transfer (with a similar amount of the risk passed to the traditional reinsurance markets and the remainder retained) at a spread of 366 basis points. Despite the lower size of the issue, the deal was believed to be less oversubscribed than had previously been the case, possibly due to the more competitive spread.

Appendix B3 - F&G Re (Deals 1 and 2)

Introduction

In July 1998, F&G Re (a subsidiary of St Paul Re) issued a catastrophe bond for \$54M protection lined to their catastrophe reinsurance book.

The bond was marketed by Goldman Sachs and EW Blanch and was issued via a special purpose vehicle – Mosaic Re established in the Cayman Islands.

In December 1998, F&G Re placed a second bond.

Structure

For the initial deal Mosaic Re issued three types of one-year debt securities:

1. \$18M of Class A units. Rate AAA, repayable at LIBOR + 216.5 basis points. \$9m of funds was invested in defeasance certificates designed to guarantee return of capital within 15 years.
2. \$15M of Class A units, paying LIBOR + 444 basis points, capital at risk.
3. \$15M of Class B units, paying LIBOR + 827 basis points, capital at risk.

The second deal was separated into two tranches of bonds.

1. The riskier Class B units paying LIBOR plus 800-850 basis points and the less risky Class A units, LIBOR plus 400-450 basis points, as before.
2. In this case (as well as different threshold or excess points) the Class A units related to only restricted geographical areas within the US while the Class B units covered US-wide risk.

Analysis

The retrocessional coverage between Mosaic Re and F&G Re was provided on an aggregate excess-of-loss basis for a portfolio of reinsurance contracts, the first time that such a structure has been used.

Originally the initial deal was offered as a single tranche of bonds - with pricing believed to be in the range 550-575 basis points over LIBOR. Compared to other transactions, there was a high probability of the underlying reinsurance layer being breached, but a low probability of it being exhausted.

However, this deal was then restructured into two narrower layers with the lower risk layer attaching at a higher aggregate loss. In addition a defeased tranche was added to the lower risk layer. This range of tranches was designed to appeal to a range of investors.

The third tranche of the first deal was the first ever B- rated insurance security.

Appendix B4: EXEL

Introduction

EXEL is the leading Bermudan based reinsurer.

The risks reinsured by the offer were around \$200M of EXEL (XL)'s hurricane and earthquake exposure in the United States and Caribbean from its newly merged subsidiary Mid-Ocean Ltd.

The deal was placed by a group of agents lead by Goldman Sachs, but including Lehman Brothers, Merrill Lynch, Aon Capital Markets and Guy Carpenter Advisors.

Structure

The deal was structured as a swap transaction providing retrocessional cover rather than a catastrophe bond, due to time constraints.

Analysis

This deal involved a bidding process between three different markets, all potential providers of catastrophe cover:

- traditional reinsurance
- non-traditional (financial) reinsurance
- capital markets

Each market was approached with the catastrophe reinsurance risks at the same time via three different placing teams who were incentivised to find the most risk efficient solution from their market.

The end result was that around half-of the risk was placed in each of the capital markets and the non-traditional reinsurance market as both provided equally efficient solutions, much more competitive than the conventional market.

EXEL concluded that the capital markets had the advantage of:

- Being the first to return with early price indications
- Much greater capacity
- Greater security - as some up front collateral is received by the transferor of risk

but the disadvantage that

- Putting together a capital markets deal was much more time consuming, onerous and costly than in the reinsurance markets due to the amount of legal documentation needed
- Deals could not be easily designed in an “accounting-friendly” manner such as the blended part-risk part financing solutions offered by the non-traditional markets

In addition, EXEL were keen to place some of the risk in the reinsurance market, albeit in non-traditional form, so as to maintain relationships with their traditional providers of cover

This is probably the first time such explicit competition has taken place between the markets since the California Earthquake deal, one of the very first Catastrophe bond offerings where the entire layer was instead written as conventional reinsurance by Berkshire Hathaway at a price with which the capital markets could not compete.

Appendix B5: New York Reinsurer (Client of Swiss Re)

Introduction

The deal was a transaction between Swiss Re and a New York Reinsurer.

Structure

The deal was a swap between Swiss Re and the Reinsurer where swap payments are based on two floating rates. Swiss Re's payments to the insurer were based on the insurer's own losses and the insurer's payments to Swiss Re were based on industry losses.

Losses were windstorm losses in US States bordering the Atlantic or Gulf of Mexico.

Analysis

The deal indemnifies the reinsurer against losses greater than the industry norm.

The deal more represents the use of Capital Market techniques rather than the use of the Capital Markets themselves, but could form an important tool in the development of securitisation.

Experience has shown that it is easier to place index-related or industry loss risks with the capital markets than a company's own loss experience.

In contrast companies prefer to place bonds based on their own experience (indemnity based transactions) so as to avoid basis risk, and are prepared to pay a greater margin on such bonds.

The use of swap contracts could enable insurance companies to issue index-related bonds but simultaneously hedge the market exposure.

Swiss Re, in turn, by writing a series of such swaps to a number of insurers can diversify the individual basis risk.

Note that the reverse effect - receiving industry experience and paying a fixed rate say, can be used by an insurer to hedge general market movements (e.g. insurance cycle effects if losses are expressed as a ratio of premium) and to gear-up its own out-performance.

Appendix B6: Société Générale (Deals 1,2 and 3)

Introduction

This note was issued to cover a US insurer against Mid-West United States earthquake risk: specifically risk in the New Madrid region (which includes Arkansas, Illinois, Indiana, Kentucky, Missouri, Ohio and Tennessee).

Structure

The transaction was structured as a note issued by investors to a subsidiary of Société Générale, with cover also issued as an option contract with slightly better returns (for investors allowed to invest in them).

The note (giving \$25m of cover) was aimed to pay LIBOR +160-175 basis points. Capital was at risk if an earthquake caused \$8bn of total insured losses (as assessed by PCS) and entirely exhausted if losses exceeded \$10bn.

Analysis

RMS estimated a "fair" price, based on expected losses of 0.75%. Compared to other deals therefore this bond seemed very keenly priced.

However, demand for the issue was such that Société Générale were able to return to the market later in the same month and secure another \$10m of cover with a second issue.

Further, in June 1999 Société Générale issued a \$70m insurance swap option offering an effective return of 180 basis points.

Appendix B7: Allianz

Introduction

The Allianz group placed a catastrophe bond option covering the group against hail and storm losses in Germany.

The deal was written via Gemini Re - a Cayman Islands special purpose vehicle.

Structure

For a three-year option period (1999-2001), Allianz have the option, if their annual losses from German windstorm and hail losses exceed a defined trigger amount, to issue catastrophe bonds. These bonds pay LIBOR +822 basis points (and will be rated B3 by Moody's). Their principal is at risk if the losses exceed a defined attachment point in any of the three subsequent calendar years.

Investors receive an annual fee of 49 basis points as a commitment fee. The reinsurance cover under the deal is \$150m. A risk assessment by RMS estimated a 5.85% chance of the notes being issued, and then a 6.4% chance of them being triggered, a 3.6% expected loss and a 2% chance of all principal being lost.

Analysis

The structure of the deal is similar to the Reliance National deal. It does, however, represent the first major securitisation of a European catastrophe risk.

Appendix B8: Hannover Re

Introduction

Hannover Re have been pioneers at securitisation with two of the first successful non-life securitisations (KOVER and K2) as well as a life securitisation (L1).

This deal, labelled “K2+” was only offered to writers of the “K2” swap deal written in 1995.

Structure

The deal is effectively an option providing Hannover Re with \$50M of capital (in exchange for interest paying bonds) should a catastrophe occur causing market losses in excess of \$20M.

The option pays 50 basis points over LIBOR.

Appendix B9: Kemper

Introduction

Kemper is a US insurance company. This deal was designed to protect commercial property risks against New Madrid Earthquake risk and was structured and placed by Aon Capital Markets.

The deal was issued by the "Domestic" syndicate at the Illinois Insurance Exchange (INEX) and was the first ever deal based on an on-shore US exchange.

An earthquake model developed by Applied Insurance Research (AIR) was used to price and market the risk.

Structure

The issue was split into \$80M of catastrophe bonds (rated Ba2 / BB+) paying LIBOR + 369 basis points and \$20M of common stock in the syndicate.

The catastrophe bond payments are contingent on new Madrid earthquake losses not exceeding some trigger amount.

Analysis

The deal was issued by a syndicate at the Illinois Insurance Exchange (INEX) and was the first ever deal based on an on-shore US exchange, following a change in Illinois insurance regulation in December 1998 aimed at facilitating securitisation deals.

The deal is believed to have been three times over-subscribed.

Appendix B10: Constitution Re

Introduction

Constitution Re is an American reinsurer based in New York.

Structure

The deal involved the use of Arrow Re: Goldman Sachs' special purpose "transformer" Bermudan reinsurer.

Arrow Re provided a property catastrophe excess of loss cover for Gulf and East Coast US Hurricane risk. They then, using EW Blanch capital Markets Arrow Re hedged their risk via a series of industry loss warranty contracts placed with reinsurers.

Finally, Goldman Sachs and Swiss Re New Markets issued a series of instruments securitising the basis risk between the conventional and industry-based contracts.

Appendix B11: Sorena

Introduction

Sorena is a French Reinsurer which in May 1999 issued a catastrophe bond to protect its European and Japanese catastrophe portfolios.

Structure

The deal was written via Halyard Re, a special purpose vehicle located in the EU (the Netherlands) to avoid withholding tax that would be payable by Sorena, as a French company, on insurance premiums payable to the more traditional "tax-haven" locations such as the Cayman Islands.

The bond has a three – year duration, but the bonds arrangers Merrill Lynch and Aon Capital Markets have incorporated a mechanism allowing limit and spread to be altered annually (provided probability of loss is maintained at 0.84%).

The bonds are to be re-marketed annually and offered via auction, with investors unhappy at the new terms having the ability to trade-out their position using put options.

Analysis

The innovative structure was designed to allow Sorena to supplement their traditional retrocession layers and achieve greater flexibility and the ability to renegotiate at future renewals.

Appendix B12 – Oriental Land

Introduction

Oriental Land is the owner of the worlds most popular theme park – Tokyo Disneyland (in Maihama, West of Tokyo).

In May 1999, they issued a bond to protect against the risk of damage from a Tokyo earthquake.

The deal was placed by Goldman Sachs and the bonds were issued by two Cayman Islands based special purpose vehicles, Concentric Re and Circle Maihama.

Structure

The bond was in two tranches, each for \$10m with 5 year durations.

The first was issued by Concentric Re, it pays 310 basis points over LIBOR and is rated BB+/Ba1. It gives a payment of up to \$100m to Oriental Land if an earthquake of given size occurs, based on a sliding scale parametric trigger using three concentric bands around the park. Payments are triggered for an earthquake of 6.5 –7 on the JMA scale in the inner circle, 7.1 – 7.6 in the middle ring or 7.6-7.9 in the outer ring.

The second bond is a contingent debt facility, aimed to give \$100m post-event fully collateralised funding. In the event of a triggering earthquake, the period of the bonds (which are rated A- and pay LIBOR + 0.75%) can be extended by 5 to 8 years from their original term, with Oriental Land having no obligation to pay interest for the first three years post – event.

Analysis

This bond represented a considerable challenge to the insurance industry as it was the first occasion on which a corporation by-passed the insurance industry and directly accessed the capital markets for cover which traditionally would have been provided by insurers.

Previously, Oriental Land (whose buildings are designed to withstand earthquakes up to 7.0) had not purchased earthquake insurance due to its lack of availability. In addition, by using a parametric index rather than indemnity based cover, Oriental Land are implicitly buying cover not just for property damage, but for business interruption e.g. to protect against a drop-off in visitors post-quake (even when the park was re-operational).

Trying to insure this risk conventionally would involve detailed disclosure of their operations and the likelihood of disputes over payment of business interruption cover, which, in any event, is expensive to obtain in Japan.

Appendix B13 – Gerling Group

Introduction

Gerling Group is one of the World's largest reinsurers and a leading provider Of credit insurance.

In April 1999 they issued a bond which securitised credit insurance risk of its subsidiary Namur Re.

The bonds were issued by SECTRS – 1999-1, a Cayman Islands' SPV.

Structure

The note had three tranches, all with 3 year duration.

1. € 245.5m of Class A, rated AA/Aa2, paying Euribor + 45 basis points - attaching at 3.3% insolvency rate, exhausting at 4.6%.
2. € 127.5m of Class B, rated AA/A2, paying Euribor + 85 basis points – attaching at 2.6%, exhausting at 3.3%.
3. € 82M of Class C, rated BBB/Baa2, paying Euribor + 170 basis points – attaching at 2.1%, exhausting at 2.6%.

The notes are all linked to the insolvency rate of a synthetic portfolio (designed to match Gerling's client base) of 92,000 business across 5-countries (Germany, France, Belgium, Netherlands and Italy) and 52 industries in 7 broad-bands – as measured by a third-party agent (Dun and Bradstreet).

The Principal of each of the bond is at risk, depending on the level of annual insolvencies (as defined by the attachment and/or exhaustion points above, or by cumulative insolvencies over the period (as measured by separate attachment (exhaustion) points).

Analysis

This deal was the first securitisation of credit risk – and represented a new area for coverage of insurance bonds.

APPENDICES II – OTHER RISK SECURITISATIONS

26 Appendix C – Examples of Other Risk Transfers (by Asset type)

Appendix C1 – Auto Residual Value

Toyota Motor Credit Corporation is a major captive finance organisation that provides both loan and lease based products enabling consumer to finance new cars. Consumer leasing is becoming a major part of this business, and with the growing proportion of consumers choosing to return the car at the end of the lease, a residual value exposure is beginning to accumulate within such companies.

In the second quarter of 1998 a related SPV – Gramercy Place Insurance Ltd. issued a bond that takes the residual value risk present in the leasing portfolio.

Structure

The notes were structured into three classes carrying ratings of AA, A and BB. The notes take the risk of three policies guaranteeing the residual value on leases due to terminate in 1999, 2000 and 2001.

This represents a splitting of the residual value risk from the credit risk associated with the leases allowing the ownership to remain on Toyota's balance sheet and the funding to remain with the current mechanism.

Coverage on each of the policies was on the basis of 90% of RV losses above a 9% first loss retained by Toyota.

Analysis

Since the exposure covers three years, combined with the tranching nature of the deal, it is necessary to decide whether the linkage to the bonds is to be provided in aggregate or separately for the three years.

The effect of coverage being in aggregate is to release cash collateral no longer required to the most senior notes sequentially through out the three years. This would result in a rising average premium rate over the life of the transaction (assuming no losses) and an average life of the seniors dependant on the loss performance. Neither of these characteristics is particularly attractive to bond holders.

The effect of coverage being provided separately is that a portion of each note, corresponding to cash collateral no longer required, is retired each year. Unpaid principal amounts are subordinated to due amounts on all bonds for

that year (so in effect will never get paid) – i.e. the AA note can suffer a loss in the 1999 year but the BB receives principal in 2000. This feature is unusual for bond investors!

This mechanism probably points the way to the development of other risk bonds subject to attritional rather than catastrophic loss.

Appendix C2 – Corporate Loan Credit

The credit and funding risks on corporate loans have been refinanced using the techniques of asset securitisation for a number of years by means of collateralised loan obligations (CLO). However a number of large banking organisations are no longer constrained by regulatory capital requirements or any difficulty in raising funds. In addition there is a desire to use the techniques of securitisation to manage corporate risks not associated with a traditional loan (e.g. credit derivatives and SWAP counter-party exposures).

A number of transactions have been undertaken in this area. The original transactions being the BISTRO series issued by JP Morgan. They are often called synthetic CLO transaction in the market place.

Structure

The notes are issued to fund a security trust that provides collateral to cover losses on a reference pool transferred to the SPV by means of a portfolio credit default swap. Premium payable under the default swap (above that required to pay margins on the notes) is held in a reserve account to pay for future losses.

In the original BISTRO transaction two tranches of note rated AAA (\$460m) and BB (\$237m) were issued. These supported a \$10bn pool of reference obligations.

Analysis

Such transactions are extremely effective in managing the risk for organisations that do not need to secure access to cheap funding.

At first glance it may look strange that a AAA note be included in a risk securitisation. The senior note is included to help get the correct treatment for the credit default swap. Such swaps are successful in managing the exposure of an organisation (in particular, in certain jurisdictions, the requirement for regulatory capital where this is assessed using value at risk techniques) to the extent that cash collateral is available to make the required mark to market deposits. The senior note is therefore required to ensure this can continue when there are losses to the BB note and when market spreads rates are high.

Appendix C3 – Mortgage Credit Risk

Private Mortgage Backed Securities (MBS) issuers and US Government agency mortgage financial bodies have large exposures to default risk on residential mortgages.

A number of transactions for example MODERN issued for Freddie Mac, have sought to transfer some of this default risk to the capital markets.

Structure

A note program is used to fund a collateral account held under trust for the benefit of a reinsurance policy covering a pool c. \$15bn of reference mortgages originated in 1996.

Freddie Mac is entitled to receive 27% of the value of each charged off loan from the trust.

Analysis

The advantages of this structure is that it allows the defaults risk associated with a number of funding transactions to be aggregated to create a sufficient size of the risk backed notes. The junior note elements within individual transactions can be very small resulting in a limited market for the instruments. It therefore makes economic sense to aggregate to increase liquidity.

Appendix C4 – Credit Card Receivables

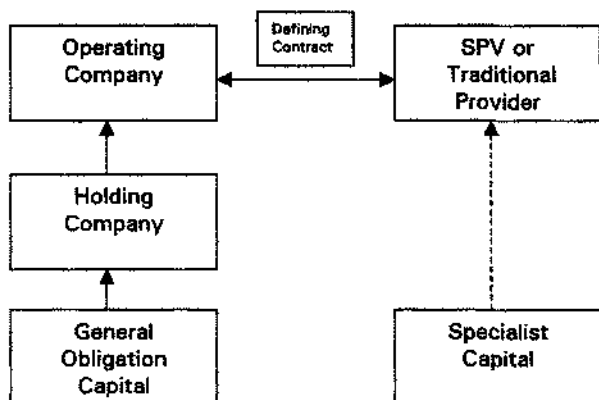
Credit card debt is a short term revolving asset that is securitised in a slightly different manner to other consumer loans. While the pool is performing above certain trigger levels the originating bank can substitute collateral (such as new debt balances on the cards) to replace the original amounts. Once a trigger event happens (or after an agreed amount of time) the pool is run down redeeming the notes sequentially.

The deal can therefore be looked on as a form of secured borrowing access to which banks will aim to secure.

A number of risk back bonds which are known in the market as cash collateral transactions have been issued including for Cheve Chase bank and City Bank.

APPENDICES III – OTHER NOTES

27 Appendix D – The Developing Structure of a Company



The capital structure of a company consists of two broad form of capital:

General Capital – represents debt or equity that is exposed in it entirety to the preformance of the management of the company both in its current business and through it future business activities.

This risk is managed by the providers of the debt capital through the covenants they include in the loans which aim to restrict the operation of the business and hence control the management risks. In addition other covenants will allow the banks / bond trustees to step in and control the business if its performance deteriorates to protect their position.

General Ogligation capital is usually provided to the holding company directly for it to use in its business management and usually takes the form of preference shared, unsecured loan stock, commercial paper and common equity.

Specialist Capital – represents debt or equity that is tied in some manner to the performance of a specific activity or asset of a company. This can be further divided into two:

- **Recourse Capital** – where there is a mechanism to ensure that the company repays any moneys due irrespective of the performance of the activity or asset in the company. Examples would include a loan secured on a physical asset or a financial reinsurance policy. The aim here is to secure cheap access to the capital rather than facilitate risk transfer from

the company. Note that such arrangement do not have to be securitisations but exist in traditional instruments.

- **Non Recourse Capital** – where the parties are entirely reliant (other than demonstrating fraud etc) on the behavior of the asset. An example of such a structure would be an asset securitisation funding structure where the asset is sold to a legally independent company or a traditional insurance policy. The aim in such structure is to achieve risk management for the company as well as funding.

From the view point of management risk exposure there may be a significant reliance on the credit quality of the company within a recourse structure in its pricing, the recourse element being used to control the loss magnitude. If such products are then securitised then the acceleration of debt / delay in recovery of the financial policy, that could result from difficulties at the company can have implications for investors. Securitisations that mirror such structures can be regarded as partial.

Where a non recourse structure is used to provide the capital, structures are included to control the management risk.

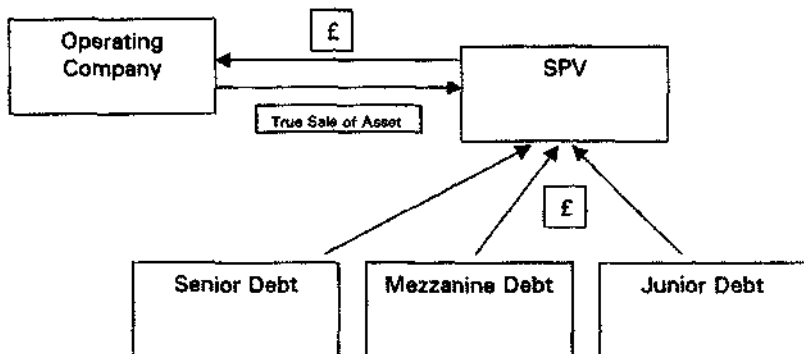
- In asset securitisation this involves reducing the original company's relationship with the asset to that of servicer. An administration agent will then monitor their performance and, if this is unsatisfactory, they will be replaced by a third party.
- In insurance structures there is the utmost good faith nature of the contract to protect the insurer by allowing the claim to be disputed.

In both cases it is the terms of the defining contract that specify exactly what risks are being undertaken by the capital provider.

28 Appendix E – Overview of Asset & Risk Backed Bond Structures

The diagrams below are included as an aid to those new to this area, to illustrate the basic structure utilised in the market (devoid of any of the complicating feature found in real life deals).

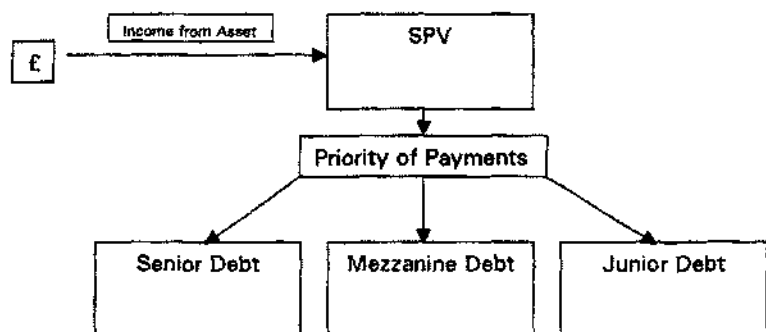
28.1 Asset Backed Bond Structure (Initial)



At the close of the transaction the asset is sold to the SPV at a market price using the amounts raised by the bond program and any junior loans provided by the operating company to the SPV directly.

The SPV now owns an asset and has the sole obligation to repay the debt. The operating company will provide services to the SPV under contract, but can be replaced by another service provider on bankruptcy or poor performance. Indeed for weaker operating companies a stand-by arrangement may but put in place as part of the transaction.

28.2 Asset Backed Bond Structure (ongoing)



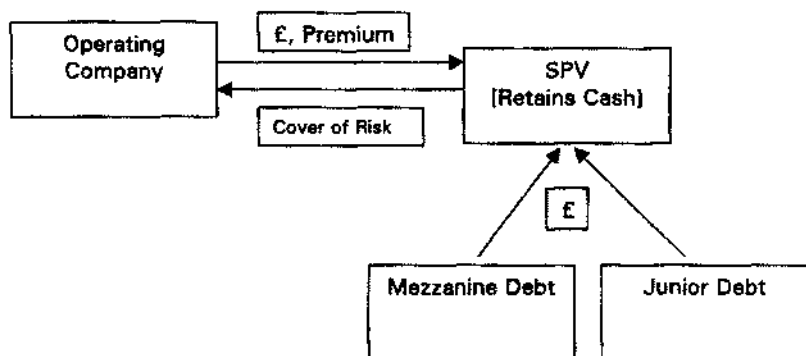
The SPV collects the cash that is received from the asset. On defined payment dates the available cash will be distributed to the classes of debt as defined by a part of the documentation known as the priority of payments or waterfall.

If the asset is under-performing then certain trigger event may cause cash to be distributed in a slightly different manner or may prevent payment of principal or interest on a particular class. In either event, if there is insufficient cash to pay the junior elements following the priority of payment and triggers, there is nothing they can do.

Because of the gearing involved the junior holder is exposed to the risk of the asset of a highly leveraged basis. When financial institutions and hedge funds purchase these assets they do so using borrowed money apart from a required solvency element.

From such a geared purchaser's point of view, they have purchased exposure to an asset for their equity, in return for which they receive a margin (difference between return on asset and cost of the borrowed money) and can lose far more than the equity element of the investment. If you consider the description above against the descriptions; underwritten; premium; exposure and solvency capital, you will notice that their position and that of a reinsurer is not dissimilar.

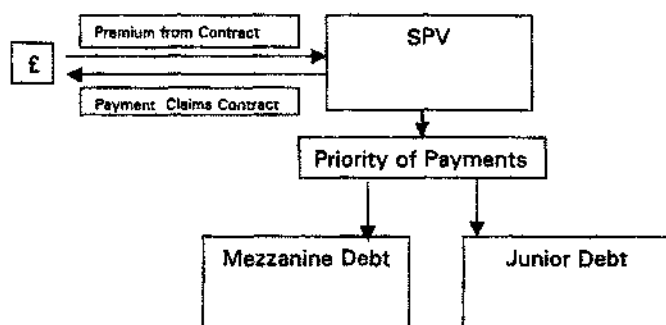
28.3 Risk Backed Bond Structure (Initial)



At the close of the transaction the SPV writes a contract transferring a defined risk to itself from the operating company. At the sale time it received the proceeds from issuing the bond program.

The SPV now is exposed to a risk and has a pot of cash that has been invested in high-grade liquid assets.

28.4 Risk Backed Bond Structure (ongoing)



On scheduled dates, the SPV collects the premium due under the contract and takes this money and interest from the assets held to pay the bonds interest due.

If a loss occurs then the SPV takes the cash and uses this to pay the claim. Bonds as defined by the priority of payments are marked down and a portion will cease to receive interest.

If no loss occurs and the maximum exposure to loss has reduced, then the cash collateral corresponding to the reduction is used to redeem certain of the bonds, again as defined in the priority of payments.