

# **INTERNATIONAL ASSOCIATION OF INSURANCE SUPERVISORS**



## **GLOBAL REINSURANCE MARKET REPORT 2008**

**17 DECEMBER 2008**

## EXECUTIVE SUMMARY based on CHAPTER HIGHLIGHTS:

<b>Preface</b> .....	<b>5</b>
<b>Chapter I: Assessing Reinsurance Market Stability</b> .....	<b>7</b>

### GRMR Highlights

- Reinsurers enjoyed a relatively calm environment, positive investment returns to post high levels of profit and a new record result in profitability for the GRMR Survey
- The GRMR survey shows a 10% growth in the global reinsurance market as measured by gross written premiums.

<b>Chapter II: Assessing Linkages of the Reinsurance Sector</b> .....	<b>31</b>
-----------------------------------------------------------------------	-----------

### GRMR Highlights

- The use credit risk transfer devices grew rapidly, despite financial turmoil, but reinsurers participation in the booming market less enthusiastic than peers
- Reinsurers continue trend as small investors, principle buyers of protection in the insurance linked securities market

<b>Chapter III: Market Turmoil and Reinsurance Sector</b> .....	<b>53</b>
-----------------------------------------------------------------	-----------

### GRMR Highlights

- Liability-side exposures to financial market volatility challenge reinsurers: loss estimates so far situate this in manageable terms, at the level of a small to medium sized catastrophe
- Reinsurers suffered minimal losses in the lead up and through the initial phases of the financial crises according to a special GRMR survey on subprime exposure

## Appendices

<b>Appendix I: Time Series Analysis</b> .....	<b>64</b>
<b>Appendix II: Participants in Reinsurance Transparency Subgroup (RTG)</b> .....	<b>68</b>
<b>Appendix III: Methodology and list of reporting reinsurers</b> .....	<b>70</b>
<b>Appendix IV: Collection, aggregation and presentation of data disseminated in this report</b> .....	<b>73</b>

## GLOBAL REINSURANCE MARKET REPORT (GRMR)

---

Graph I-1: Real GDP % Growth .....	8
Graph I-2: Major Stock Indices.....	9
Graph I-3: Long-term Interest Rate Indices.....	10
Graph I-4: Volatility Indices .....	11
Graph I-5: Assets by Major Class .....	13
Graph I-6: Number of Natural Disasters Worldwide 1980-2007 .....	16
Graph I-7: Natural Disasters 2007.....	17
Graph I-8: Overall and Insured Losses by Great Natural Catastrophes .....	18
Graph I-9: Insured Losses (>US\$ 5 billion insured loss events) .....	19
Graph I-10: Worldwide insurance penetration.....	20
Graph I-11: Combined Ratio .....	22
Graph I-12: Profitability Ratios by Participating Jurisdictions .....	22
Graph I-13: Loss Ratio by Line of Business .....	23
Graph I-14: Gearing: Recoverables as a Percentage of Capital .....	25
Graph I-15: Gross Reinsurance Premiums Assumed by Line of Business.....	26
Graph I-16: Reinsurance Premiums Assumed by Class of Business and Contract Type (US\$ millions) .....	27
Graph II-1: Gross Premiums Assumed by Region of Ceding Insurer .....	31
Graph II-2: Premiums by region: gross, ceded and net positions.....	32
Graph II-3: Gross Market Values of CDSs.....	33
Graph II-4: Notional Amounts Outstanding (US\$ trillions).....	34
Graph II-5: Credit Default Swaps (by institution) .....	35
Graph II-6: Participation in CDs and CDOs (US\$ millions).....	36
Graph II-7: ILS by risk type (in US\$ billions).....	38
Graph II-8: ILS by investor profile.....	39
Graph II-9: ILS by issuers/sponsors.....	40
Graph II-10: ILS growth (in US\$ billions).....	42
Graph II-11: Matrix of Capital Market Solutions .....	43
Graph II-12: Spectrum of ILS Solutions .....	44
Graph II-13: Cat Bond Issuance by Trigger Type.....	45
Graph II-14: Cat Bond Transaction diagram with reinsurer as transformer .....	46
Graph II-15: Map of GRMR contributors.....	49
Graph III-1: Equity and credit spreads .....	60
Graph III-2: Equity and credit spreads .....	61
Graph T-1: % Total Gross Reinsurance Premiums Assumed by Class of Business.....	65
Graph T-2: % Total Gross Reinsurance Premiums Assumed by Region of Ceding Insurer.....	65
Graph T-3: Profitability Indicators - Ratios .....	66
Graph T-4: % Regulatory Required Capital to Total Available Capital .....	66
Graph T-5: % Derivative Financial Instruments by Instrument Type .....	67
Graph T-6: % Investment Return to Net Premiums Earned.....	67

## PREFACE

---

**Peter Braumüller,**  
Chair, IAIS Executive Committee



Peter Braumüller

Reinsurance and, in particular, this annual Global Reinsurance Market Report (GRMR) are areas of high priority for the IAIS. Our worldwide unique data, presented on behalf, and with the support of IAIS members, as well as the risks and trends assessment in the report contribute to an objective of overriding importance: the facilitation of financial stability.

Indeed, the GRMR global reinsurance statistics which were initially requested by the Financial Stability Forum (FSF) and the IMF have evolved from facilitating reinsurance market transparency on an ongoing basis to providing a basis on which up to date coverage of market trends and developments can be analysed and reported.

Amid the ongoing financial turmoil the global reinsurance market has proven relatively robust and resilient against direct shocks thus far, which has contributed to both the stability of the global insurance markets as well as ultimately the security of individual insurance customers.

Looking ahead, this IAIS report and its unique range of supporting data will be further developed to help supervisors around the world in identifying and addressing potential issues of systemic concern in a proactive manner as well as to enhance the understanding of other key stakeholders on emerging issues affecting the global insurance and reinsurance markets.

## PREFACE

---

### **Al Gross**

Chair, IAIS Technical committee



Al Gross

We can't underestimate the role reinsurers play in the efficient functioning of the global insurance market through their shock absorbing capacity, including against major reinsured natural catastrophes. In this regard, the IAIS Global Reinsurance Market Report (GRMR) provides unique reinsurance related data and analysis in order to inform interested parties, including insurance and reinsurance supervisors, regarding the resiliency of the global reinsurance market. This IAIS GRMR initiative has reconfirmed its value towards enhancing transparency in the reinsurance sector in relation to credit risk transfer and beyond in 2007/2008.

I am pleased to note that since its inception five years ago, the GRMR continues to cover issues beyond the confines of reinsurance supervision, for example, by illustrating cross-sectoral interlinkages using data on credit risk transfer activity between reinsurers and banks. In particular, the coverage on potential vulnerabilities in the reinsurance sector from a systemic perspective in the 2008 GRMR demonstrates the increasing focus of reinsurance supervisors worldwide on the broader system-wide supervisory issues as well as cross-border and cross-sector systemic risks which could affect global financial stability.

## PREFACE

---

**Jeremy Cox,**  
Chair, IAIS Reinsurance Transparency Subgroup



Jeremy Cox

Welcome to the 2008 Global Reinsurance Market Report (GRMR). This year marks the 5th anniversary of the report, and we are again committed to providing reinsurance market transparency through the dissemination and analysis of unique IAIS survey data. We have also marked the occasion with a few new features, including time series analysis in Appendix I and findings from a special survey launched to assess some of the specific impacts of the credit crises on the reinsurance market. First, we launch the report with the findings of the annual GRMR statistical survey.

As expanded in Chapter I, results from our data indicate a highly profitable year for reinsurers, with some best-ever survey results in profitability. While we are presently experiencing a challenging period for reinsurers, from risk management to more significant levels of loss, 2007 placed most reinsurers in solid financial standing.

In Chapter II, we again examine the linkages of the reinsurance sector. This gives us special insight into how the reinsurance industry might weather and respond to the financial crises. Utilizing unique IAIS data, we analyze risk transfer vehicles that cross individual market barriers, making financial sector participants more susceptible to the effects of market forces. The chapter includes a broad discussion of the securitization phenomenon and, in particular, insurance-linked securities, and closes with an update on mutual recognition.

Finally, Chapter III addresses the 2007 and current market environment. Market dislocations were a major cause of concern for regulators and market participants. In the first part of 2008 - after the beginning of the financial crises developed over the latter half of 2007, fueled especially by credit concerns surrounding subprime mortgages - we introduced a supplemental survey on the exposures of reinsurers to subprime related securities. We first asked regulators to assess the impacts of the unfolding crises in their home jurisdictions and, secondly, participating reinsurers to identify and, if necessary, elaborate on their individual exposures. While the crises has grown in magnitude and scope since these initial causes, our survey results point toward durable financial positions. Reinsurers, overall, appear well positioned to meet the challenges of the continuing financial crises.

Stylistically, we are pleased to introduce a new feature in this years report: the "GRMR Highlight." Here, we aim to point readers toward the most timely and crucial issues and market developments, as elaborated through our unique IAIS survey results and analysis. Please refer to the table of contents for a listing of the highlights and watch for this diagram throughout the report:



Happy reading and don't miss the highlights!

# **CHAPTER I**



## **ASSESSING REINSURANCE MARKET STABILITY**

## GLOBAL REINSURANCE MARKET REPORT

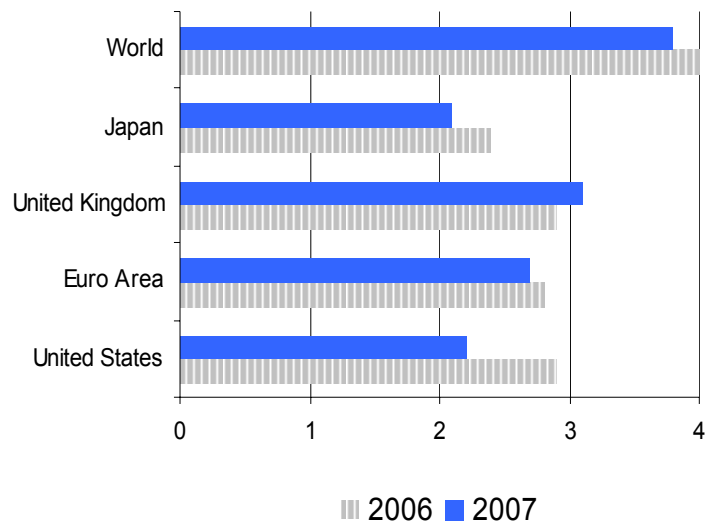
The Global Reinsurance Market Report (GRMR) edition 2008 presents data from a unique survey of reinsurers for the year 2007. The global results are assessed to evaluate reinsurance market stability as at year-end 2007, and to better understand the position of the reinsurance industry within the current, challenging overall market environment.

### Macroeconomic environment showed GDP slowdowns

The overall growth of the global economy, characterised by slowdowns in the industrialised world and accelerations (in the emerging markets, was down marginally in 2007 to 3.8% from 4% in 2006 (**Graph I-1**). GDP estimates for the first two quarters of 2008 indicate continued decelerations. There was little change in the labour markets in the United States and United Kingdom, however, in the Euro area the jobless rate fell nearly a full point to 7.4% at year-end. After remaining steady or falling over the first half of the year, rates of inflation rose sharply in the last quarter largely because of spiking consumer prices, particularly energy and food prices.

**Graph I-1: Real GDP % Growth**

Source: IMF; IAIS staff calculations



### Financial market turbulence in the latter part of 2007 foreshadowed the crises of 2008

Stocks made significant gains in the first three quarters of 2007 before losing some value toward the end of year. While markets still ended the year in generally positive territory, fourth quarter trends carried over into the first



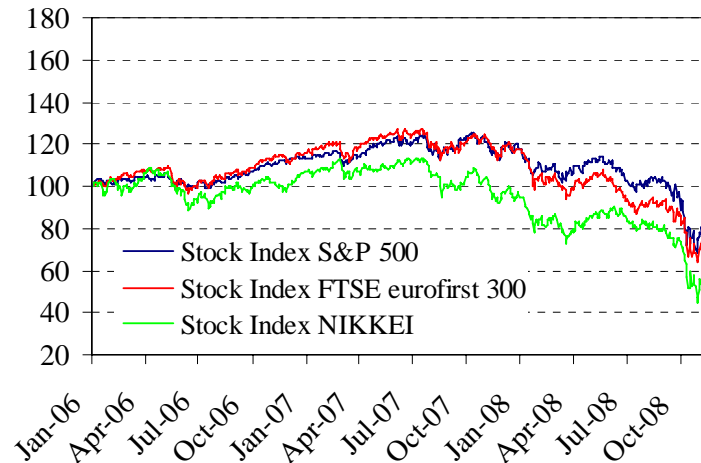
## GLOBAL REINSURANCE MARKET REPORT

---

three quarters of 2008. In the first six months of 2008, double digit declines have been the norm across major indices.

**Graph I-2: Major Stock Indices**

Source: Bloomberg; IAIS and IMF staff calculations



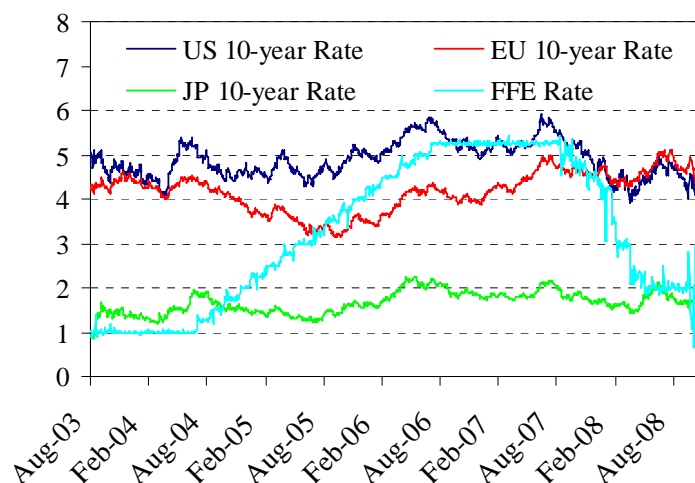
2007 was again a year marked by the further depreciation of the US dollar in foreign exchange markets. The US dollar did gain against the Euro and pound sterling in the first third of the year, but pressure quickly mounted in the summer as financial markets succumbed to increasing instability and negative outlooks on the US economy prevailed. Before recovering slightly at the end of the year, the dollar reached an all-time low against the Euro and hit its lowest mark against the British pound since 1981.

Long-term interest rates in 2007 remained mostly steady across continental Europe, while falling to some extent in the United States, United Kingdom and Japan. However, with the interventions by central banks in 2007, one would have expected rates to fall but at some jurisdictions they didn't. The fact that they remained flat in some cases is therefore not always a positive signal.

## GLOBAL REINSURANCE MARKET REPORT

**Graph I-3: Long-term Interest Rate Indices**

Source: Bloomberg; IAIS and IMF staff calculations



**... focused especially in the global credit markets...**

Since mid-2007, global credit markets have experienced considerable, and at times severe, turbulence. It started with higher-than-expected default rates in the US sub-prime mortgage market and soon spread to a wide range of markets and products. The continuing strain in global financial markets hindered the recovery of the financial sector, and deteriorating macroeconomic conditions further aggravated the outlook for the financial sector.

In the first phase of the turmoil, financial firms suffered considerable losses on complex structured products to which they had built significant exposures in the previous few years. Although financial institutions usually retained the highest rated tranches of these products, the credit enhancements applied to these tranches in order to achieve these high ratings were in many cases ineffective in the fact of default rates that were significantly higher than anticipated when the instruments were set up. Subsequently, lack of available credit led to a wider economic slowdown, leading to additional losses for the financial sector.

Then again in the market downturn the default rates in the underlying assets were extremely high. However, depending on the specific reference asset, defaults on non-subprime were raising but very high only for very recent mortgages. Moreover, an unforeseen development, that affected structured finance products, was rather the strong correlation across tranches.

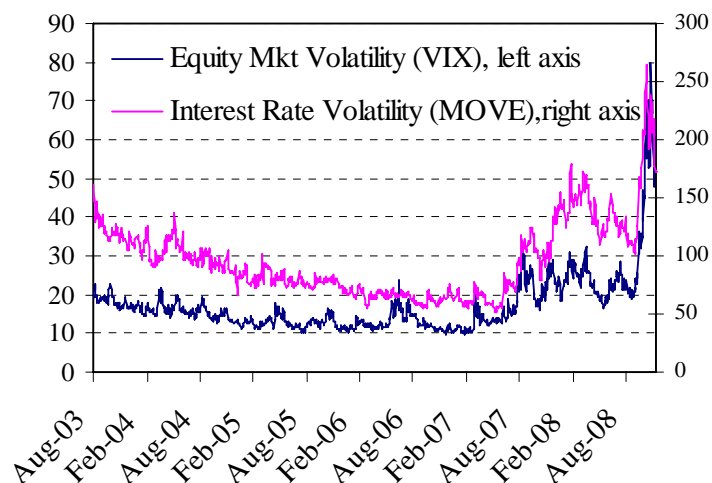
Later on, additional losses started to stem from the

## GLOBAL REINSURANCE MARKET REPORT

macroeconomic slowdown. As a result banks applied tighter lending standards, which may in turn have led to reduced credit availability.

**Graph I-4: Volatility Indices**

Source: Bloomberg; IAIS and IMF staff calculations



Balance sheet repair initially proceeded rather speedily, as affected financial institutions could raise capital from public markets and private investors. But as the market turbulence persisted, raising additional capital to match write-downs and recognised losses became increasingly difficult in 2008.

In order to stabilise financial markets, more certainty was needed about risk exposures of individual institutions, along with more confidence that housing prices had bottomed out.

**...has affected the insurance/ reinsurance industry**  
...

Initially whilst the insurance sector was not generally directly affected by the market turmoil, certain specialist underwriters, such as financial guaranty insurers (also often referred to as 'monoline' insurers), and specialist divisions of larger insurers and reinsurers, began to experience stress. These firms faced sizeable payment obligations that, in some cases, exceeded their repayment capacity.

**...importantly though credit default swaps and collateralised debt obligations**

Such payment obligations stemmed from insurers' provision of credit protection on credit default swaps

(CDSs) used to build synthetic credit structures such as collateralised debt obligations (CDOs). From a systemic perspective, strains in the insurance sector increased the flight away from risk taking and amplified concerns about the resilience of counterparty financial institutions. At the same time, the ensuing rating downgrades further weakened the financial condition of some insurers, pushing them either to raise new capital to regain their initial rating or face substantial collateral calls on their portfolios.

As insurance companies remain net protection sellers via various credit risk transfer instruments, especially CDSs, credit events affecting counterparties or reference entities are likely to produce additional strain in this sector. For instance, in the second half of 2008, some major credit events occurred, including the placement of two US Government Sponsored Enterprises (GSEs) – Fannie Mae and Freddie Mac – into conservatorship and a major US investment bank's filing for bankruptcy. The impact of the former was expected to be contained, due to the high trading levels of GSEs' debt, in most cases at or near par value, while the impact of the latter was likely to be more complex. International Swaps & Derivatives Association (ISDA) Master Agreements for the supporting documentation architecture, netting agreements, collateral agreements and other risk-reduction and risk-mitigation tools should help with closing out relevant bilateral derivatives positions. Nonetheless, these events highlight the importance of prior and ongoing efforts by the industry and governments to strengthen the infrastructure for clearing and settling OTC derivatives.

Chapter II further analyses CDSs and CDOs, along with wider trends in securitisation and the insurance-linked securities market, in the context of addressing the linkages of the reinsurance market with other sectors of the financial sector. The wider financial crisis and its bearing on the financial health of reinsurers is analysed in greater depth in Chapter III.

### **Reinsurers' investment profile offers some safety from market volatility**

We now turn to the position of reinsurers: their balance sheet health, profitability, and overall market size as reported in the 2008 GRMR survey.

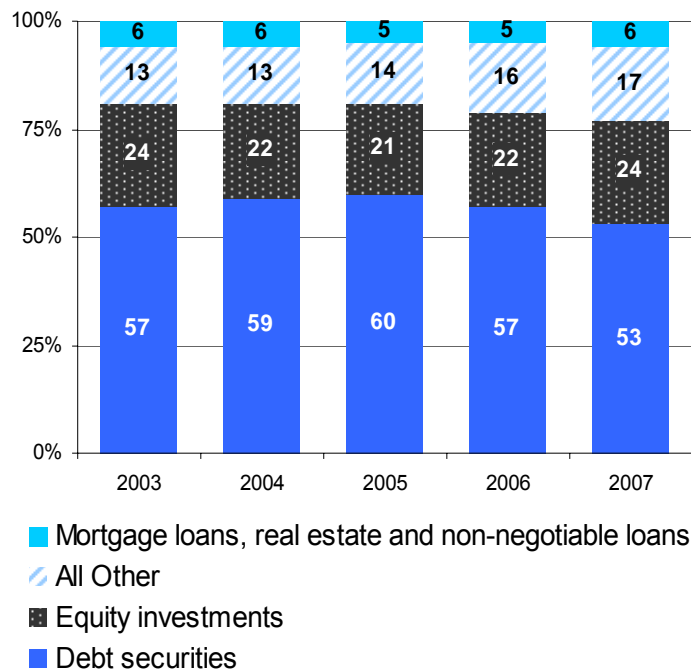
## GLOBAL REINSURANCE MARKET REPORT

Reinsurers participating in the GRMR (the Annex to this report provides a full list of participating reinsurers and also on GRMR eligibility criteria) reported total invested assets of US\$ 787 billion in 2007, marking a 5% decline from the US\$ 825 billion reported in 2006. Reinsurers have traditionally been conservative investors, relying significantly on fixed income products, along with high quality equities and real estate. This investment strategy appears to have largely sheltered the assets of reinsurers from the most severe affects of the market volatility in the United States and elsewhere.

Whilst there is some evidence to suggest that in recent years reinsurers have moved towards less conservative investment strategies, possibly in part to offset falling returns associated with traditional instruments, the relative size of holdings in such “alternative” assets—remains small - see **Graph I-5** below.

**Graph I-5: Assets by Major Class**

Source: IAIS



### Investment in debt securities ...

In 2007, debt securities accounted for 53% of invested assets, marking its lowest percentage share in the five-year span of the survey and down 4 points from 2006. Totalling US\$ 415 billion at book value, debt securities have decreased both in absolute and relative terms since 2005 (US\$ 423 billion; 60% of all assets).

### ... equities ...

Recent investment patterns in equities shows the inverse of those for debt securities. The share of all invested assets in equities increased for the second straight year to 24%, representing a book value of US\$ 188 billion (in 2005: US\$ 151 billion; 21% of all assets).

### ... mortgage loans and real estate ...

Investment in mortgage loans and real estate, measured at US\$ 27 billion or 4% of all assets in 2007, has remained flat over the last several years. In each of the two preceding years, mortgage loans and real estate tallied US\$ 26 billion. In addition, non-negotiable loans (including non-mortgage loans) accounted for US\$ 16 billion in 2007, remaining a small investment category for reinsurers.

### ... all other asset classes ...

All other investments increased to US\$ 140 billion, comprising 17% of all assets, up from 16% in 2006 and 14% in 2005 (13% in 2003 and 2004). These investments include cash and cash equivalents (including deposits), loans not captured above, derivative financial instruments, and tangible assets, such as equipment and sundry investments.

The overall investment figures from 2007 point to a slight shift away from the most conservative instruments, commonly viewed as debt securities, and an upward trend in equities and “all other” investments. Even acknowledging the market uncertainty that characterised much of the environment in the United States, reinsurers seem to be moving towards accepting at least marginally more risk on the asset side of the balance sheet.

### **A calm reinsurance environment meant a profitable year in 2007 ...**

The reinsurance environment continued to be calm in 2007 and profitability remained high. In Europe winter storm Kyrill caused an insured loss of nearly US\$ 6 billion, the single largest loss of the year, but still relatively small in the context of other storms in recent years. Overall losses from catastrophes reached approximately US\$ 86 billion at year end, with the cost to insurers at about 31% of the total figure.

From a supervisory perspective, the availability of sufficient catastrophe cover remains a major concern. Even though reinsurers enjoyed relatively benign catastrophe loss experience in 2007 funding structures are subject to many factors beyond the cycle of storms. For example, the Florida Hurricane Catastrophe Fund (FHCF), hampered by the current financial crisis, faces a probable shortfall as loss development unfolds. However, this specific part of the reinsurance market is to some extent also shaped by the fact that the FHCF is structured as a tax exempt state trust fund under the direction of the State Board of Administration.

### **... still, the frequency of natural catastrophes in 2007 reached a record high**

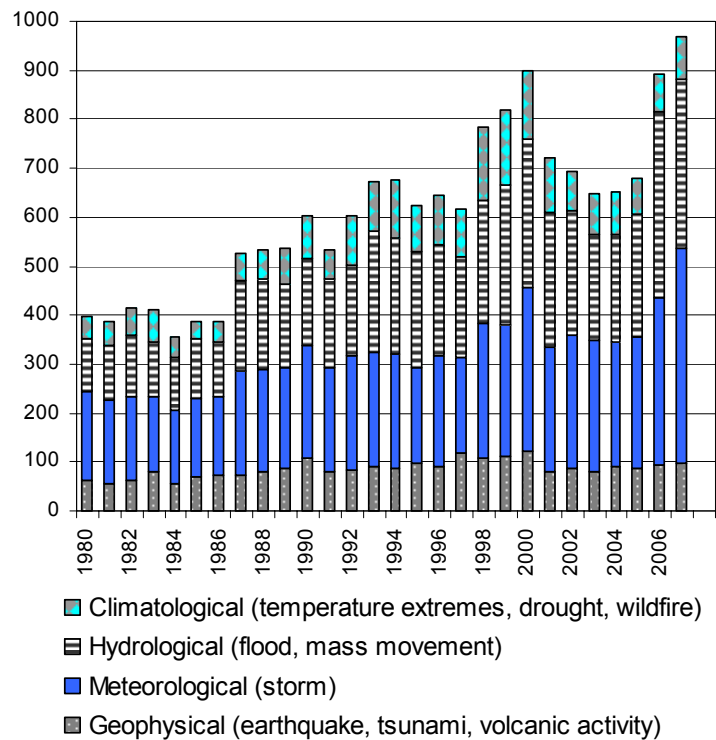
As in previous years, the rising trend in the number of events and the overall and insured losses from natural catastrophes worldwide continues. In 2007, there were 960 natural disasters worldwide, which is the highest number registered since the systematic recording of natural perils began in 1980.

Natural disasters around the world have been on the rise for decades: on average, 400 events were recorded every year in the 1980s, 630 events in the 1990s, and 730 in the last ten years.

# GLOBAL REINSURANCE MARKET REPORT

**Graph I-6: Number of Natural Disasters Worldwide 1980-2007**

Source: Munich Re NatCatSERVICE; adapted by IAIS staff



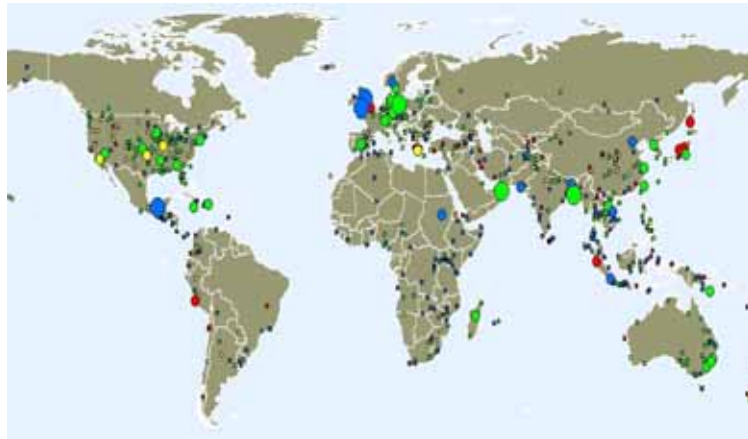
In 2007, the breakdown of events by natural hazard showed that atmospheric events dominate at 91%, whereas only 9% can be attributed to geophysical events. The six “great natural disasters” in 2007 – three storms and three floods – were atmospheric events.

From January to June 2008, there were about 400 natural catastrophes worldwide. Overall losses in the first six months of 2008 total roughly US\$ 110 billion (including losses of about US\$ 80 billion due to the Sichuan earthquake), with insured losses coming to about US\$ 13 billion.



### Graph I-7: Natural Disasters 2007

Source: Munich Re  
NatCatSERVICE



- Geophysical (earthquake, tsunami, volcanic activity)
- Meteorological (storm)
- Hydrological (flood, mass movement)
- Climatological (extreme temperature, drought, wildfire)

### Reinsurance industry largely escaped major, costly storms of the year...

The number of tropical storms in the 2007 season was 15. This was much higher than the long-term climatological average and roughly equal to the current average of storms in the Atlantic.

In 2008 (up to the end of October), 15 tropical storms occurred in the Atlantic Ocean. Seven of them reached hurricane force and four were major hurricanes.

The average of the current warm phase is 12.8 for tropical storms, 6.9 for hurricanes and 3.4 for major hurricanes. This means that overall storm activity in 2008 (up to the end of October) is above average but in line with official expectations of another high activity season. Hurricane activity was marginally reduced; there were no El Niño effects and only some La Niña remnants lingered in the atmosphere.

As far as large losses were concerned, the insurance industry was fortunately spared in 2007. In 2008, however, there were a number of catastrophic and expensive hurricanes. Hanna, Gustav, and Ike claimed the lives of many hundreds of people in Haiti, and so far insurance industry losses as a result of Ike are in the range of US\$ 15 billion. It will take some more months to get all the claims settled and to assess the final insured

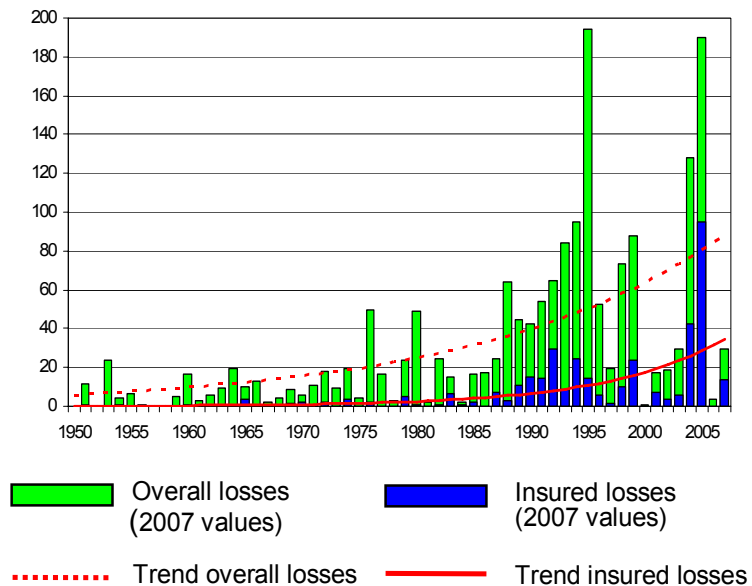
loss amount.

**... while long-term trend analyses shows rising loss burdens**

After correcting for inflation, long-term loss statistics for so called "great" natural disasters show a dramatic increase since 1950. There are many reasons for this, including the increase in world population and the simultaneous concentration of people and property in large urban centres, the development of highly exposed regions, increased dependency on – and therefore, vulnerability to failures in - technology, and finally changes in the natural environment such as climate change. As these underlying factors persist, a further increase in (re-)insurance losses arising from natural disasters is very likely.

**Graph I-8: Overall and Insured Losses by Great Natural Catastrophes**

Source: Munich Re NatCatSERVICE



If we look at **Graph I-9** of natural catastrophes with insured losses exceeding US\$ 5 billion (in original values) we see the enormous loss potential especially from hurricanes. Whilst events with losses of US\$ 10 billion were still the exception just a few years ago, there has been almost a quantum leap in losses since then. In the last 5 years, 8 out of the 13 costliest insurance-losses occurred.

## GLOBAL REINSURANCE MARKET REPORT

### Graph I-9: Insured Losses (>US\$ 5 billion insured loss events)

Source: Munich Re  
NatCatSERVICE; World Bank;  
specific presentation by IAIS  
staff;

Year	Event	Region	Ins. losses
2005	Hurricane Katrina	USA	61.6
1992	Hurricane Andrew	USA	17.0
1994	Earthquake Northridge	USA	15.3
2008	Hurricane Ike	USA	15.0
2004	Hurricane Ivan	USA, Caribbean	13.8
2005	Hurricane Wilma	USA, Caribbean, Mexico	12.4
2005	Hurricane Rita	USA	12.0
2004	Hurricane Charley	USA, Caribbean	8.0
1991	Typhoon Mireille	Japan	7.0
1999	Winter Storm Lothar	Europe	5.9
2007	Winter Storm Kyrill	Europe	5.8
2004	Hurricane Frances	USA, Caribbean	5.4
1990	Winter Storm Daria	Europe	5.1

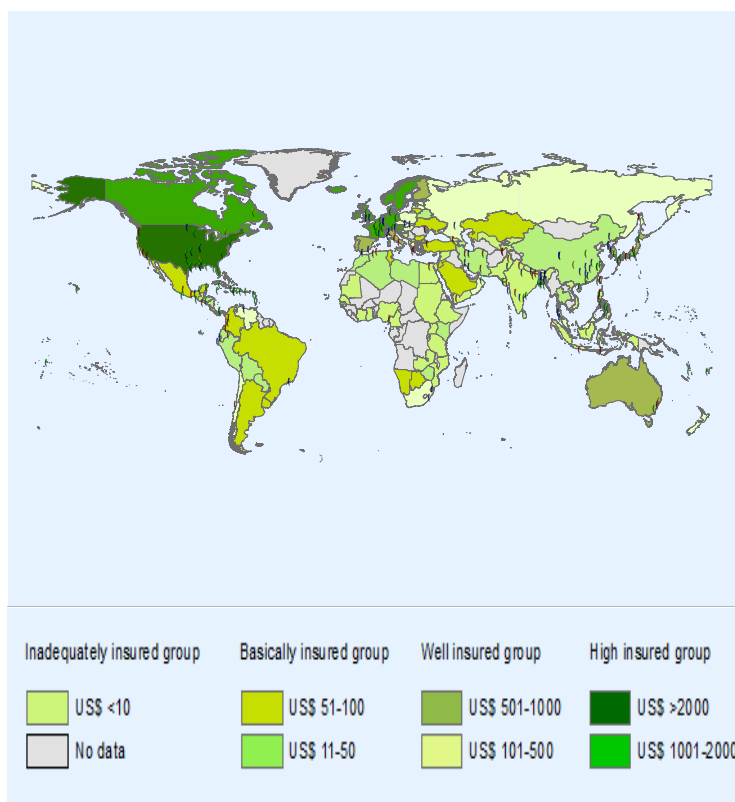
### Uneven insurance penetration characterised worldwide coverage ...

There is an uneven insurance penetration around the globe. While industrial countries are relatively well insured, developing countries are in general less so. The map on the next page shows the global distribution of 2007 property and casualty insurance premiums per capita in US dollars, including government pool solutions in some countries.

## GLOBAL REINSURANCE MARKET REPORT

**Graph I-10: Worldwide insurance penetration**

Source: Munich Re NatCatSERVICE;



Since 1980, we note that:

Natural disasters are more or less equally distributed throughout the world, regardless of whether the regions concerned are well or poorly insured.

- 77 % of all fatalities (more than 1.1 million people) were in the under-insured group. The deadliest event was the tsunami of 26 December 2004, and nearly all tsunami-affected countries are in this under-insured group. The catastrophic event of May 2008 – Cyclone Nargis in Burma – also occurred in one of these countries.
- Roughly a third of all economic losses — US\$ 580 billion — occurred in the inadequately and basically insured groups of countries. Two-thirds of the losses — US\$ 1,200 billion — occurred in wealthy countries, in part due to the high degree of industrialisation and comparatively high living standards.
- The overwhelming majority of insured losses (83%), representing a sum of more than US\$ 370 billion, was inevitably paid out in the countries with high insurance penetration. There are no

major changes to be expected in the general distribution in the near future.

In relation to key issues around disparities with respect to insurance penetration worldwide, the IAIS in general, and the IAIS Implementation Sub Committee in particular, have been developing and disseminating a wide ranging programme of education and regulatory framework implementation initiatives aimed at facilitating efficient, fair, safe and stable insurance markets for the benefit and protection of policyholders.

### **Promotion of climate protection**

Extreme weather events have become more frequent and intense with heavy rain and flooding in North America and Europe; thawing of the permafrost in the northernmost parts of Canada, the United States and Europe; heat waves and droughts particularly in southwest North America and the Mediterranean; tropical and extra tropical cyclones affecting North America and Europe; and thunderstorm activity in various regions. Such phenomena are to an extent cyclical, but the trend in insured losses to be an increasing one at least in the short term.

The insurance industry has several approaches for adapting to the growing risk to property insurance portfolios. They have improved risk management by using science-based loss models for pricing products. They have developed new products for sectors that are specifically susceptible to the effects of climate change, for example hydropower, real estate, tourism and agriculture.

The insurance industry has great potential for promoting technologies and practices that will help to protect the environment not only by considering protectionist effects in developing and pricing products, but also by taking it into account in its investments and sponsoring activities. In so doing, the insurance industry can exert a positive influence and reduce on future climate related losses.

We now turn our attention to reinsurers' profitability, looking at data in this respect provided by companies reporting to the GRMR.

### **Profitability improved over 2007**

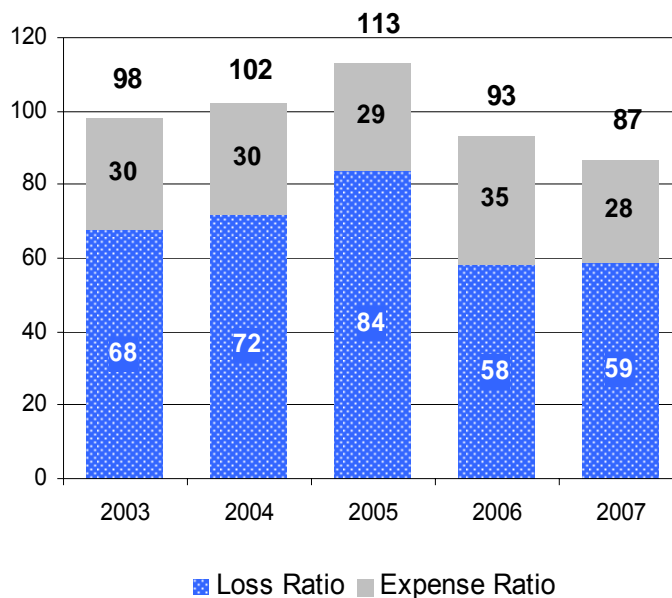
Principal indicators of profitability for non-life business (the combined, loss and expense ratio) pointed to

## GLOBAL REINSURANCE MARKET REPORT

positive results (see **Graph I-11**).

**Graph I-11: Combined Ratio**

Source: IAIS



The loss ratio (net claims incurred to net premiums earned) - the primary indicator of profitability from an underwriting standpoint - remained stable at 59% in 2007, only a one point increase over the previous year. The expense ratio (net operating expenses to net premiums earned) - an indicator of profitability from an operational viewpoint - improved over 2006 to 28%, the best result in the span of the survey. The combined ratio (the sum of loss and expense ratios) fell beneath the 90% threshold for the first time in the period of the survey, dropping 6 points from 2006 to 87%. The combined ratio's five-year average is 99%, with 2006 and 2007 below the average and eventful years 2004 and 2005 above it.

**Graph I-12: Profitability Ratios by Participating Jurisdictions**

Source: IAIS

Jurisdiction	Loss	Combined	Expense
A	58	77	19
B	52	78	26
C	58	81	23
D	49	87	38
E	64	91	27
F	61	96	35
G	70	98	28

## GLOBAL REINSURANCE MARKET REPORT

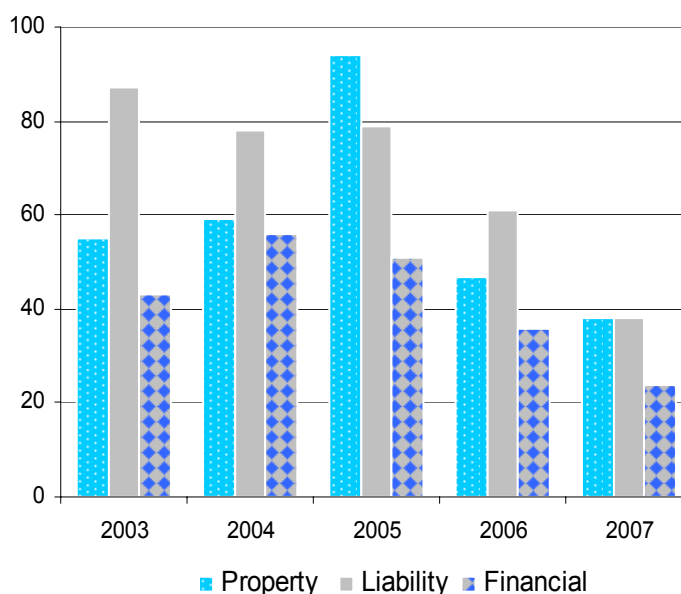
---

These ratios, developed at industry-level, are based upon all non-life business. They include reinsurance and direct insurance business, in cases where reporting reinsurers also write direct business. Profitability indicators by lines of business are drawn from reinsurance business assumed, the trends of which closely mirror industry-level indicators.

Loss ratios across all broad lines of business continued the improvement shown in 2007 resulting in the best levels since the survey began in 2003 (see **Chart I-13**). The loss ratio for property lines, which account for 55% of all reinsurance net earned, was 38%, 19 points below the 5-year average of 59%. Liability lines comprised 39% of net premiums earned with a loss ratio of 38%, 31 points below the 5-year average of 69%. Finally, the loss ratio of 25% for financial lines followed the overall movement - improving by 11 points from 2006 and substantially better than the five-year average of 42%.

**Graph I-13: Loss Ratio by Line of Business**

Source: IAIS



### **Low losses together with positive investment returns enable reinsurers to post high profits**

Favourable investment returns often contributed to the profitable results; the survey has shown that income from investments is consistently one-fifth to one-quarter the size of total net premiums (life and non-life). After jumping to US\$ 43 billion in 2006 (2005: US\$ 36 billion), investment returns increased modestly in 2007 to US\$ 47



### GRMR HIGHLIGHT

billion. These returns coupled with decreases in net claims incurred and net operating expenses, propelled most reinsurers to a profitable result.

In 2007, total pre-tax profit for the reporting reinsurers soared to a new high of US\$ 62 billion from the US\$ 36 billion in 2006. Reinsurers reported a pre-tax profit ratio of 31%, compared to 20% in 2006 and 5.8% in 2005. In 2007, the reinsurance market would have secured a profitable result even without the benefit of investment income.

#### **Reinsurers are well capitalised and actively pursue capital management strategies**

Reinsurers, in light of sustained low losses and high profitability, adopted active capital management regimes in 2007, marked by large share buyback programmes and accelerated growth in the catastrophe bond market.

Levels of capital raising instruments to fund start-up activity, including sidecars (separate, limited purpose companies that share the risks of certain policies) were lower than in 2006.

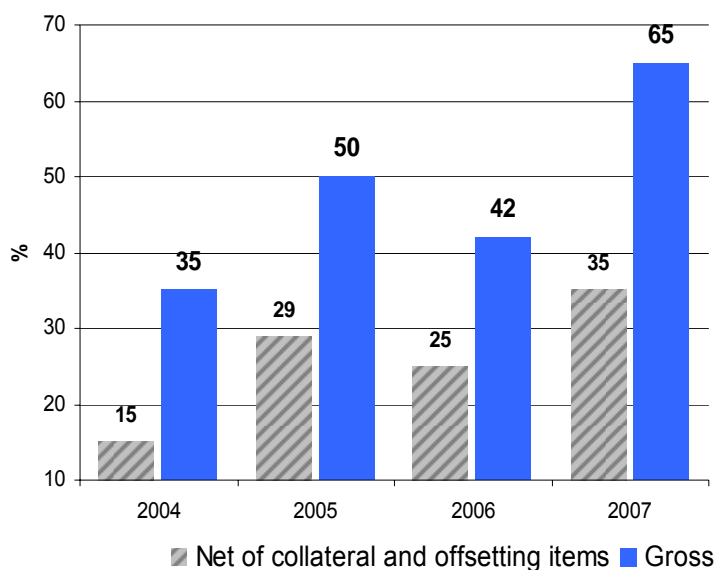
Overall, total available capital was recorded at US\$ 314 billion and total regulatory capital required at US\$ 122 billion, a surplus of US\$ 192 billion. Total available capital was reduced by 5% from 2006 (US\$ 330 billion).

In 2007, gearing ratios – another key evaluation tool of the capital base of reinsurers - climbed to 4-year highs. A gearing ratio measures an insurer's dependency on reinsurance (for direct business) and retrocession (for assumed reinsurance business) by comparing the sum of recoverables from these to its total available capital. The ratios presented here do not incorporate security provided via letters of credit for all jurisdictions.



**Graph I-14: Gearing:  
Recoverables as a  
Percentage of Capital**

Source: IAIS



Gearing ratios were at 65% (gross) and 35% (net of collateral and offsetting items). Both gearing ratios displayed a substantial rise from 2006. Two general factors influenced the upward trajectory: first, a marginal reduction to the capital base, increasing the relative impact of recoverables to reinsurance and retrocessions, and secondly, a 45%-50% increase in the absolute level of recoverables, both in gross terms and net of collateral and offsetting items.

### **The global reinsurance market continued to expand, fuelled by life reinsurance ...**

Having covered how reinsurers performed in 2007 - we now move to profile their business *size* and *composition*, focusing on what areas and by what magnitude they wrote their business.



### **GRMR HIGHLIGHT**

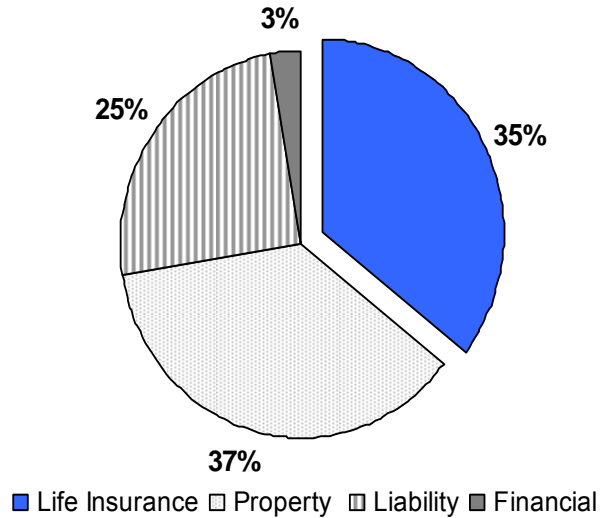
The size of the global reinsurance market increased substantially in 2007. Worldwide gross reinsurance premiums written, life and non-life, grew 10% to US\$ 190 billion. The increase was due to a rise in life reinsurance premiums among the entities reporting to the GRMR and compensated for the 3% decline in non-life premiums, which fell to US\$ 123 billion.

## GLOBAL REINSURANCE MARKET REPORT

---

**Graph I-15: Gross Reinsurance Premiums Assumed by Line of Business**

Source: IAIS



**... which represented more than one-third of world-wide gross premiums written**

Life reinsurance represented more than a third of the global market in gross premium terms; in 2006 it accounted for about a quarter. The increase could be due to financial innovation being introduced in an evolving regulatory and tax environment. The trend away from classic life insurance with capital protection and guaranteed interest towards products with limited capital protection continued, transferring investment risk from insurers to policy holders. Curtailment by the EU of the tax treatment of life insurance might have also contributed to increased demand for unit-linked life insurance products.

In non-life reinsurance, the overall 3% contraction in 2007 reflected mainly a 20% decline in liability reinsurance premiums. This drop could not be balanced by an 8% rise in property reinsurance premiums, or a 15% increase in financial reinsurance premiums, which occurred on a smaller nominal basis.

**... while in terms of net reinsurance, the above shifts were even more pronounced**

In 2007, net life reinsurance premiums assumed grew by almost 90% relative to 2006, to US\$ 47 billion. Due largely to price softening, they declined by 4% in non-life reinsurance as a whole – to US\$ 91 billion - with a 60% drop in liability reinsurance premiums and a 13% dip in property reinsurance premiums. The structure of the

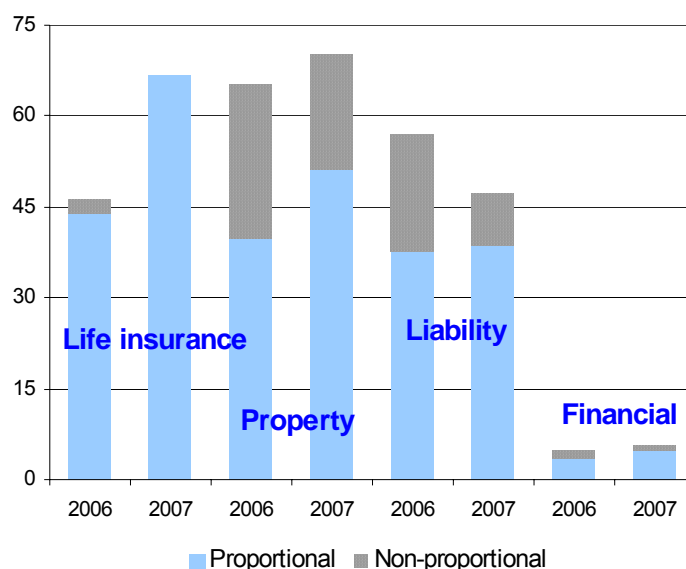
market changed accordingly. Whereas in 2006 net life reinsurance accounted for one-fifth of the global reinsurance market, in 2007 it made up more than one-third.

### Share of non-proportional contracts declines in favour of proportional contracts

As per **Graph I-16**, the reporting entities assumed life risks almost exclusively under proportional contracts. In non-life, in 2007 proportional treaties accounted for about three-quarters of gross premiums, an increase from two-thirds in 2006. For life and non-life combined, a comparison of proportional and non-proportional reinsurance coverage would not be meaningful.

**Graph I-16: Reinsurance Premiums Assumed by Class of Business and Contract Type (US\$ millions)**

Source: IAIS



### The use of premium figures explained

While risk may be defined as probability of an occurrence times its effect, there is no direct measure of risk in insurance or reinsurance. Indicators - proxies - have to be used to quantify risk. The most common risk indicators in reinsurance are premium figures, typically further broken down by gross/net premiums, by lines of business, by geographical region and by type of treaty (proportional vs. non-proportional).

After the fact, the level of claims may serve to assess the risk that had been assumed by reinsurers. Just as premiums can be affected by several factors extraneous

to risks assumed (e.g. market risk), claims may not be a sufficient predictor of future losses. They may, however, be useful for profiling – by extrapolation – the risk being assumed recognising that risk profiles can change very quickly, loss patterns may shift and new risks may emerge, for example in casualty lines. In reinsurance of low frequency/high severity events (e.g. natural catastrophe) claim statistics alone are of little value and need to be supplemented by further expertise (eg geosciences and actuarial calculations).

Furthermore, claim data may be ambiguous. Low claims provisions of a reinsurer could either point to a low level of incurred claims, claims which have a short tail, or an understatement of ultimate losses (that is later adjusted). While statistics on aggregated liabilities in the form of sums insured could be used as an indicator for certain risk types, sums insured are not, by themselves, an indicator of a reinsurer's exposure, as they do not take into account the probability that incurred losses will reach the layer covered by the reinsurance contract. In some cases reinsurance policy limits could be used as a measure of maximum loss.

### Synopsis of Chapter I

Overall, and in the light of current market instability, 2007 proved to be an active yet stable year for the global reinsurance market. The GRMR survey has revealed results indicative of healthy financial positions, resilient - with marginal exceptions - to the financial turmoil experienced in 2007. However, as most commentators expect the financial turmoil to evolve further difficult market and credit conditions are to be expected for 2009 and potentially beyond. Chapter III explores further the impact of the financial crisis on reinsurers, including the findings of a unique GRMR survey on the subprime crisis.

### Literature

**A.M. Best (2008)**, 2008 Special Report: Global Reinsurance – Market Review. Though Industry Balance Sheets are Healthy, Challenges Abound.

**Benfield Group (2008)**, “Global Reinsurance Market Review: Changing the Game.”

**Guy Carpenter (2008)**, “2008 Reinsurance Market Review: Near Misses Call for Caution.”

## GLOBAL REINSURANCE MARKET REPORT

---

**IMF (2008)**, “Global Financial Stability Report  
Financial Stress and Deleveraging  
Macro-Financial Implications and Policy”.

**Munich Re Group (2008)**, Topics Geo, “Natural  
Catastrophes 2007: analyses, assessments, positions.”

**Swiss Re (2008)**, Sigma No. 1, “Natural Catastrophes  
and Man-made Disasters in 2007: High Losses in  
Europe.”

**World Bank (2008)**, The Euromoney International Dept  
Capital Markets Handbook 2008, “Do capital markets  
have a role in making catastrophe insurance a new  
development tool?”

## CHAPTER II



## ASSESSING LINKAGES OF THE REINSURANCE SECTOR

## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

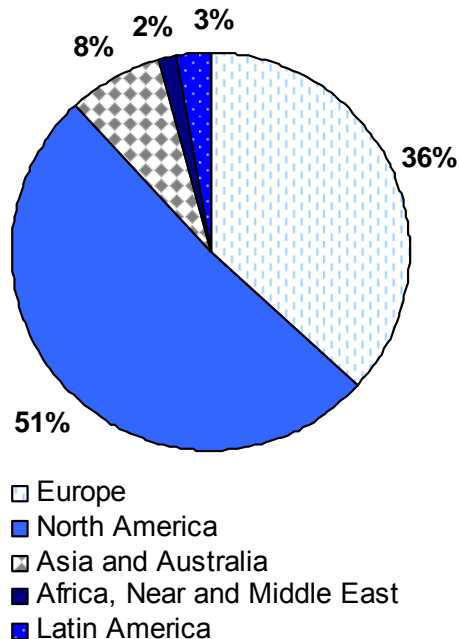
---

In this chapter, we discuss how and in what respects the reinsurance market cuts across other financial sectors, including through financial vehicles such as credit default swaps and insurance-linked securities. The IAIS, in large part through the GRMR, is committed to better understanding and making more transparent these linkages between financial sectors, particularly as it relates to the exposures of reinsurers. To that end, and in practical terms, we close the chapter with a brief description and status report on mutual recognition, one important way that many financial regulators are currently working towards to better grasp and respond to an increasingly integrated financial system.

A first, fundamental source of connectedness derives from regions of the world reinsurers accept risk.

**Graph II-1: Gross Premiums Assumed by Region of Ceding Insurer**

Source: IAIS



### **Emerging markets saw rapid growth in gross premiums ...**

While the global reinsurance market expanded by 10%, there were marked differences in regional growth. The Asia & Australia market rose 30% relative to 2006, although its share of the global market changed only from 6% to 8%. The Latin American market grew 25% and the Africa, Near and Middle East market grew 15%, but their share of the world market remained relatively flat.

## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

---

### ... while market share remained centred in developed regions

The North American and European markets grew 9% and 6% respectively. They accounted respectively, for one-half (US\$ 98 billion) and one-third (US\$ 69 billion) of the US\$ 190 billion world-wide reinsurance market.

Caution is counselled in attempts at assessing the total risk assumed by the reporting entities or by regions. Since the reporting entities deal with each other, sometimes in the same jurisdictions and often with their affiliates, when gross premiums written are used as a proxy of the risk assumed there may be multiple counting of the risk the reinsurance sector actually draws in from primary insurers. The actual initial risk that gets reinsured may thus be different from what the global statistics suggest. These problems would be alleviated if the global statistics were group-based but this could present other problems regarding the collection of data.

**Graph II-2: Premiums by region: gross, ceded and net positions**

Source: IAIS

US\$ Millions	(1) Gross assumed	(2) Gross ceded	(1)– (2) Net position
Europe	104,530	(69,371)	35,159
North America	82,939	(97,809)	(14,870)
Asia and Australia	2,356	(14,475)	(12,119)
Africa, Near & Middle East	-	(3,080)	(3,080)
Latin America	-	(5,088)	(5,088)

The above table shows in the 'Net position' column balances of gross written premiums assumed and ceded or the 'net risk positions'. Taken together, European reporting entities were a net recipient of risk, with the positive premium balance of US\$ 35.2 billion. In marked contrast, North American reporting entities were, as a whole, a net cedant of risk, with a negative premium balance of US\$ 14.9 billion. So were, combined, Asia and Australia – negative premium balance of US\$ 12.1 billion – and the rest of the world: negative US\$ 8.2 billion.

Overall, the table highlights that North American entities (including Bermuda), with their large combined premium deficit, actually assume almost the same volume of premiums as the combined European entities. Some tentative, preliminary conclusions can be drawn from the



## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

data discussed. To assess these findings one needs to consider additional aspects, including among other factors for example the market size in various regions, and specific levels of savings ratios in the respective economies.

One must caution that the above data may not show the actual extent of risk transfer across regional areas. Analysis of unaffiliated nationally-aggregated data (on a group basis) would be required to assess more accurately risk transfers among regions, assuming there is no risk transfer among reporting groups located in the same jurisdiction, which may not be a valid assumption.

We turn now to linkages between financial sectors created when reinsurers utilize financial vehicles to transfer or accept risk from other financial entities.

### Growth in credit risk transfer products continues at a rapid pace, but starts to slow down in 2008 ...

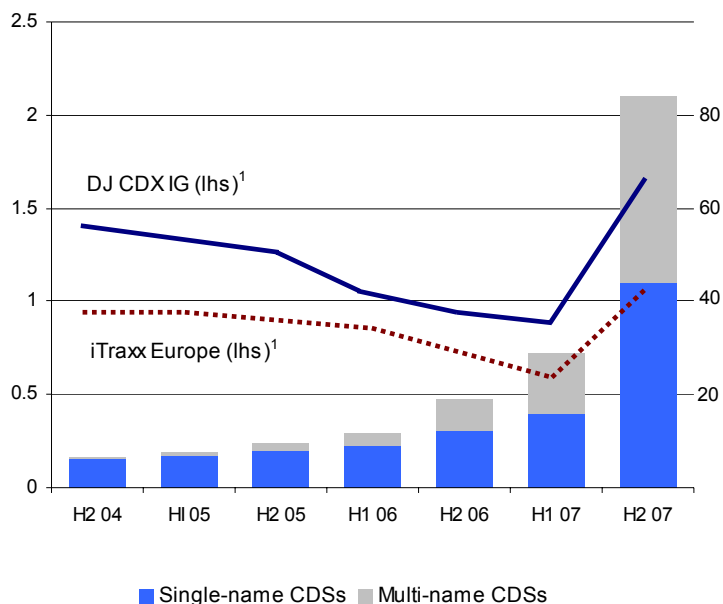
In 2007, the overall market for credit derivatives and other credit risk transfer products continued to grow rapidly amid the turmoil in global financial markets, although at a somewhat slower pace than in recent years.

**Graph II-3: Gross Market Values of CDSs**

Sources: JPMorgan Chase; BIS; adapted by IAIS staff

**Explanatory Notes:**

(1) investment grade CDS indices, five-year on-the-run mid spread, average of daily spread, in basis points.



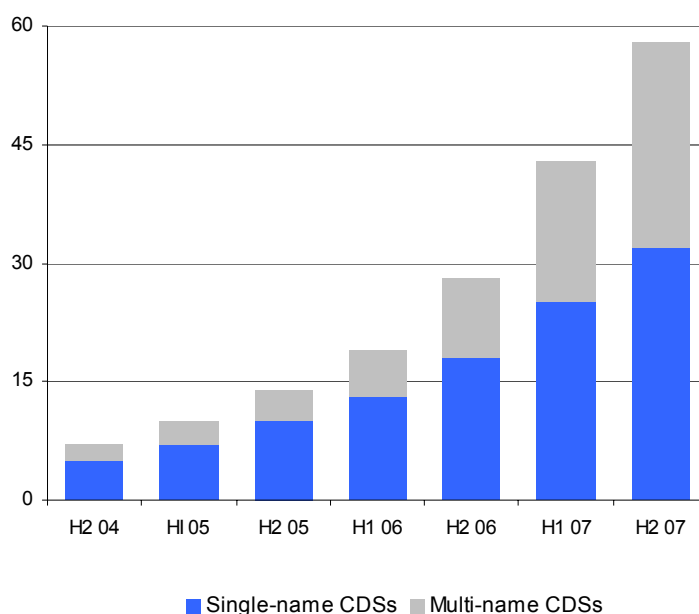
Market surveys by the BIS and the International Swaps and Derivatives Association (ISDA), while providing somewhat different aggregate figures, told a similar story in terms of growth rates (**Graph II-3**). For instance, ISDA

## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

reported that the notional amount outstanding of credit default swaps (CDS) - the most widely used credit derivative - grew 37% to US\$ 62.2 trillion in the second half of 2007 and 81% in the full year. This compares with annual growth rates of 101% in 2006 and 103% in 2005. But in the first half of 2008, according to the survey by ISDA, notional amount outstanding of CDS decreased by 12%, to US\$ 54.6 trillion, from US\$ 62.2 trillion at end-2007. This was the first time ever that notional amounts outstanding fell. This was seen at least partly as an attempt by the industry to reduce risk by tearing up economically offsetting transactions.

**Graph II-4: Notional Amounts Outstanding (US\$ trillions)**

Sources: JPMorgan Chase; BIS; adapted by IAIS staff



According to the BIS data, in 2007 notional amounts of CDSs outstanding increased by 102% to US\$ 58 trillion, slightly down from the increase by 107% in 2006 (Graph II-4). However, growth decelerated in the second half of the year, due to the multilateral terminations of CDS contracts, which almost doubled from US\$ 3.2 trillion in the first half to a cumulated US\$ 6 trillion in the second. In the first half of 2008, multilateral termination of outstanding contracts produced a decline in the volume of outstanding CDS also in the BIS data, by 1% since end-2007. The decline was driven by multiname CDS contracts, while single-name CDS contracts continued to grow also in 2008. In 2007, growth in nominal amounts outstanding came primarily from CDS contracts on firms with ratings below investment grade or without ratings, possibly reflecting concerns over credit quality deterioration.

## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

**Graph II-5: Credit Default Swaps (by institution)**

Source: BIS

<i>Breakdown by institution (end-June 08; USD\$ billions)</i>	Notional amounts outstanding		Gross market value
	Protection Bought	Protection Sold	
With reporting dealers	33,309	32,858	1,678
With other financial institutions	12,010	11,287	1,430
<i>Banks and securities firms</i>	6,985	6,698	737
<b><i>Insurance and financial guaranty firms</i></b>	<b>279</b>	<b>119</b>	<b>26</b>
<i>Other</i>	4,746	4,469	667
With non-financial customers	534	410	65
Total	45,853	44,555	3,172
<i>of which: multi-name CDSs (% of total CDSs)</i>			
Reporting dealers	42.5	42.1	42.8
Other financial institutions	41.2	41.6	37.6
<i>Banks and securities firms</i>	41.7	44.0	38.8
<b><i>Insurance and financial guaranty firms</i></b>	<b>47.7</b>	<b>19.3</b>	<b>30.8</b>
<i>Other</i>	40.1	38.5	36.3
Non-financial institutions	22.3	54.9	44.6
Total	42.0	42.1	40.4

The breakdown by counterparty also shows that, although CDS contracts with insurance firms recorded one of the highest growth rates (46%) in 2007, notional amount outstanding were broadly stable in June 2008 compared with a year earlier. Moreover, the share of insurance firms remained very small, at less than 1% of the total. According to the BIS survey, in the first half of 2008, insurance firms sold USD\$ 279 billion of the protection bought, and purchased USD\$ 119 billion of the protection sold by the reporting dealers (Graph II-5). In the second half of 2007, insurance firms' purchases of protection sold by reporting dealers showed a high growth rate (89%), while their sale of protection to the reporting dealers increased only moderately (31%). Turning to gross market values of CDSs, in 2007 they increased by 178% to \$2 trillion, and in the first half of 2008 by another 50%, to more than 3 trillions, mainly due

to a significant increase in prices of CDS contracts. By counterparty, the gross market value of CDS contracts with insurance firms expanded the most in 2007, by 597%, and it continued to grow, although by a substantially more moderate rate of around 30%, in the first half of 2008.

### ...use by reinsurers does not keep pace with the overall market



### GRMR HIGHLIGHT

The GRMR survey indicates much slower recent growth in reinsurance firms' use of credit risk transfer instruments than for the overall market, and a contraction in the provision of protection in favour of a rather sharp increase in the purchase of protection (Graph II-6).

A few conclusions can be drawn from these surveys. First, it appears that reinsurance firms' share of the market has fallen further. Second, although in the BIS data the insurance sector remains a net protection seller, the combination of a shift towards increased protection buying and the jump in the gross market value of CDS contracts with insurance firms points to an attempt by the insurance industry to reduce their exposure to risk.

**Graph II-6: Participation in CDs and CDOs (US\$ millions)**

Source: IAIS

Type of contract	2007 Total (notional amount)	2006 Total (notional amount)
Credit default swaps		
of which Protection bought	3,303	1,218
Protection sold	8,836	10,445
CDO investments		
of which Protection bought	66	66
Protection sold	1,473	1,521
<b>Total Protection bought</b>	<b>3,369</b>	<b>1,284</b>
<b>Total Protection sold</b>	<b>10,310</b>	<b>11,966</b>

However, some important caveats over the completeness of the data, as already mentioned in past issues of this report, should be borne in mind. First, the GRMR and BIS surveys do not necessarily cover all types of credit risk transfer instruments. Second, the complexities of some credit risk transfer products mean that notional values may not be an accurate measure of the credit risk involved. Gross market values, on the other hand, can be very volatile in strained market conditions such as the

present ones. Third, the insurance or reinsurance sector data collected in the surveys only cover the legal entities of insurance companies, rather than the wider groups to which insurance companies belong or off-balance-sheet related entities.

### **Adjustments in business model and risk management**

Going forward, it is important that key weaknesses are addressed by the insurance industry. Although a need to establish effective valuation and risk management practices apply to the financial sector as a whole, in the case of the insurance industry, wherever firms are exposed to risk via complex financial products, it is especially important that firms adequately provide for the potential costs stemming from these operations, upgrade their risk management systems and review the case for entering new and potentially riskier business lines. Although financial instruments for credit risk transfer remain a useful tool, the additional complexities that accompany them need to be carefully assessed and managed. At the same time, as insurance companies reassess the cost and benefits of riskier business lines, a reassessment of their profitability will be needed as well.

In addition, and not exclusively for the insurance industry, prompt adoption of best practices in the area of clearing and settling OTC derivatives is paramount.

Finally, the ongoing market turbulence has underlined the importance of enhancing credit risk transfer statistics, where possible, to cover risks more fully. This would benefit internal risk management, as well as contribute to reducing market uncertainty on key risk exposures.

### **Insurance Linked Securities (ILS) continue to take root as risk transfer devices ...**

The year 2007 showed a sustained growth for the insurance-linked securities (ILS). Total new issuances in 2007 amounted to US\$ 13.7 billion, up 36% from 2006 (US\$ 10.1 billion). Issuances in the non-life sector increased by 57% from 2006 to 2007 (US\$ 4.9 billion to US\$ 7.7 billion). Issuances in the life sector reached US\$ 6 billion, up 16% from 2006 (US\$ 5.2 billion).

The growth in ILS bonds took place despite turmoil in the financial markets, highlighting investors' attraction to this diversifying asset class with very limited credit risk and

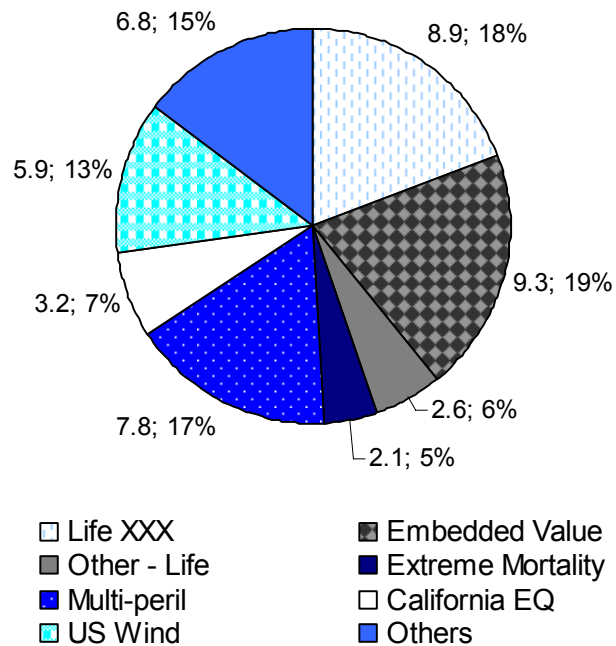
## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

low correlation to the broader financial markets.

2007 could have witnessed even greater life issuance, but, since many of these transactions contain wrapped tranches, several sponsors and underwriters decided to hold issuance until market turmoil settled.

**Graph II-7: ILS by risk type  
(in US\$ billions)**

Source: Swiss Re; adapted by  
IAIS staff



As shown in the figure above, the volume of securitizations issued over the last 10 years has reached US\$ 46.7 billion. Life XXX, multi-peril and US wind securitizations have been predominant. At the end of 2007, close to US\$ 38 billion of life and non-life ILS were outstanding.

**... but reinsurers and insurers assuming less of an investor stance toward the ILS market ...**



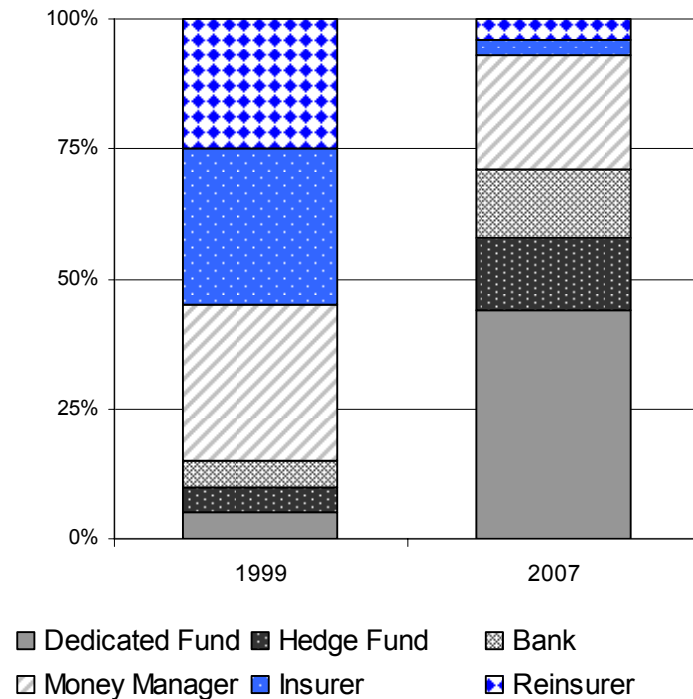
**GRMR  
HIGHLIGHT**

Compared to 1999, the share of capital provided by insurer and reinsurers decreased dramatically, while capital market investors with dedicated funds now dominate the cat ILS investor base, increasing therefore the available capacity for risk transfer. Besides investing in cat bonds, capital market investors also provide capacity for ILWs, contingent capital and sidecars. Insurers and reinsurers focus mainly on cat swaps, ILWs and contingent capital.

## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

**Graph II-8: ILS by investor profile**

Source: Swiss Re; adapted by IAIS staff



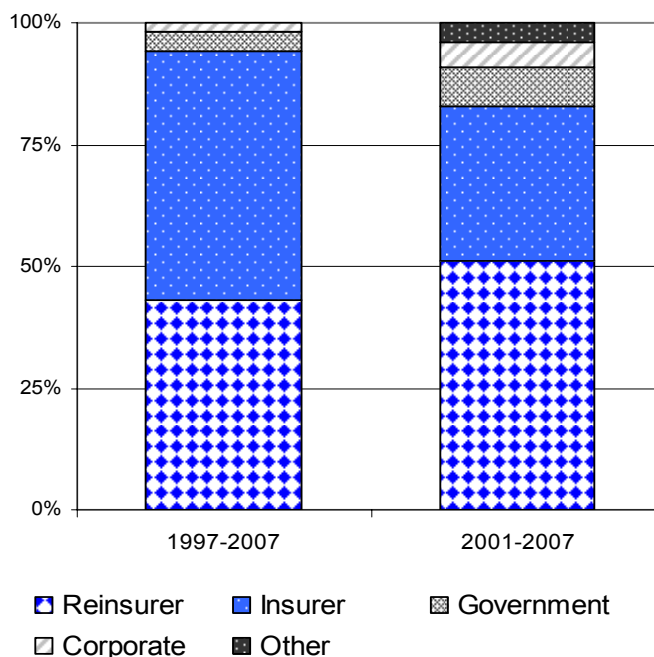
### ... while still dominating the position of the buyer

Over the last years, reinsurers have become the main buyers of protection, using the entire range of capital market transactions, from cat bonds to sidecars. Governments have bought protection mostly in the form of cat bonds and contingent capital, and finally, hedge funds have started to buy protection through ILWs.

## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

**Graph II-9: ILS by issuers/sponsors**

Source: Swiss Re; adapted by IAIS staff



Market observers expect the market to grow very rapidly over the next 10 years. The ILS market is still only contributing to a modest share of the total risk transfer capacity available, suggesting many growth opportunities.

### ILS affected little by market turmoil to date

Recent turbulence has confirmed that ILS have limited correlation with broader credit and financial market instruments, which makes them a particularly effective tool for diversifying risks. Product transparency is a precondition to avoid a dry-up of the market in a crisis.

A number of elements will influence the market growth going forward:

- More standardization of products and product structures;
- Better information about underlying hazards;
- Loss histories and price histories;
- Convergence of banking and insurance regulatory requirements.

Also, new indices are being created (e.g. European market loss index) to spur the tradability of insurance risks and liquidity will be improved by a broadening of sponsors/supply.



## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

---

In the short term, there is little risk that ILS, ILW and collateralized quota share and side car capacity will dry up – investors will be more sensitive to price. In the longer term, trend towards securitization will continue and may contribute to foster price discipline in traditional reinsurance market, which become more price conscious on alternative capacity.

### Securitization explained

Insurance and reinsurance players operate in a constantly evolving environment. Socio-political, technological and environmental trends represent challenges for the insurability of risks. Currently, some peak risks – such as global pandemic risk, Japanese earthquake risk, European windstorm and flooding risk, Florida windstorm risk, and California earthquake risk – are underinsured.

Key issues the (re-)insurance industry is confronted with range from major hurricanes and typhoons to storms and floods, climate change, terrorism, liability claims, demographic change/longevity, pandemics and finally financial market risks.

### Increasingly complex transfer of peak risks

The industry faces higher volatility and more complex risks, not only in their nature but also in their dependence structure with other risks, leading to growing cumulative potential. At the same time, demand for capacity increases.

In particular, the demand for catastrophe cover has been growing by almost 10% annually, more than most other lines of business and significant portions of the peak scenarios are increasingly passed on to the capital markets.

At the same time, the industry is challenged by investors, who expect risk-adequate and stable returns, as well as regulators and rating agencies requiring companies to manage risks based on more conservative estimates. This results in conflicting forces the industry is exposed to.

These changes in the risk landscape combined with higher expectations from stakeholders call for a systematic and integrated management of risks and

## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

capital at all levels, and risk mitigation and risk transfer are key elements thereof.

Benefits of risk transfer at a policyholder level is to have access to funds in case of an insured event. By reducing volatility and uncertainty, risk transfer allows policyholders to expand and take on economic risks without the need to set aside capital in liquid contingency funds. From a macro perspective, spreading large risks on many shoulders using the diversification effect to sustain these events (law of large numbers), results in increased economic stability.

### Capital market techniques developed over the last ten years ...

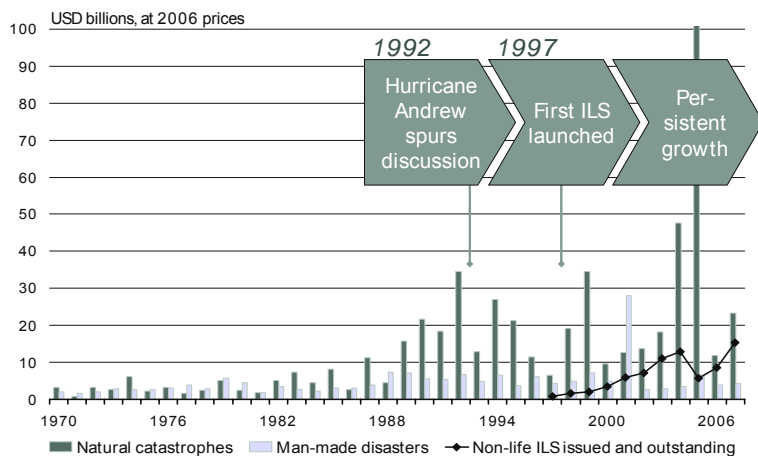
In answer to the current challenges, the industry has developed over the last decade a range of new techniques allowing the transfer of insurance risks to the capital markets. These solutions are commonly known under the generic term of financial market products or more specifically ILS.

ILS can potentially benefit from the huge scale of financial markets and therefore extend insurability in the longer run.

For the industry, ILS have the advantages of increasing capacity, improving profitability (return on equity), and reducing the volatility of earnings, while for capital market investors, ILS are an attractive investment vehicle to improve a portfolio's performance while diversifying its risk, as they are typically uncorrelated with the broader financial markets.

**Graph II-10: ILS growth (in US\$ billions)**

Source: Swiss Re



## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

The emergence of a market for ILS is relatively new. The first ILS was launched in 1997. As shown in Graph II-10, the market has maintained continued growth. Over the same time, catastrophe claims have trended on a similar growth curve (see the in-depth discussion of catastrophes in Chapter I.)

**Graph II-11: Matrix of Capital Market Solutions**

Source: Swiss Re; adapted by IAIS staff

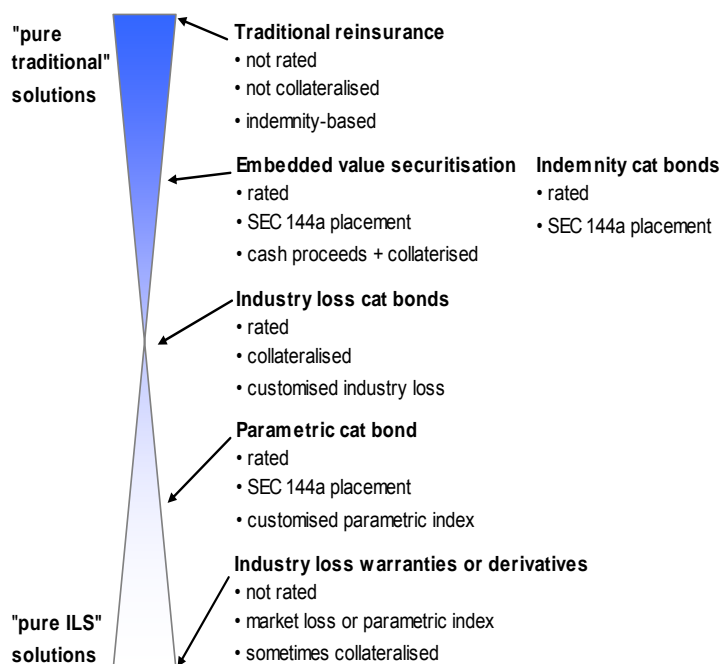
	Property & Casualty	Life
NON-CAT	<p><b>Mass risk protection</b></p> <ul style="list-style-type: none"> <li>• Motor insurance securitisation</li> </ul>	<p><b>Financing tool by turning future income into capital</b></p> <ul style="list-style-type: none"> <li>• Embedded value securitisation</li> <li>• Regulatory capital</li> </ul>
CAT (Peak risk transfer)	<p><b>Protection for extreme events (low-frequency, high severity)</b></p> <ul style="list-style-type: none"> <li>• Hurricane and earthquake cat bond</li> <li>• Sidecar</li> </ul>	<p><b>Extreme risk transfer</b></p> <ul style="list-style-type: none"> <li>• Morbidity bond</li> <li>• Longevity bond</li> </ul>
<b>Main Purposes/Benefits</b>		
<ul style="list-style-type: none"> <li>-Increase growth, by freeing up or accessing capital</li> <li>-Improve ROE</li> <li>-Reduce earning volatility</li> </ul>		

ILS are a means of ceding insurance-related risks to the capital markets. They are generally categorized in two ways: by risk type (P&C and Life) and by catastrophe (cat) and non-cat risk. P&C bonds typically provide protection for extreme events (low frequency – high severity), or newly mass risk protection, like motor insurance securitization. Life bonds have mostly provided financing backed by future premium flows, and lately transferred a diverse range of risks including extreme mortality. A cat bond usually transfers the risks of extreme events – such as hurricanes and earthquakes in densely populated areas or sharp increase in mortality – to the capital markets. A non-cat bond, usually for life insurance books of business, is more of a financing vehicle.

## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

**Graph II-12: Spectrum of ILS Solutions**

Source: Swiss Re; adapted by IAIS staff



The figure above shows that a continuous spectrum of solutions are available to market participants, reaching from 'traditional' solutions to 'pure ILS solutions' like parametric cat bond and Industry Loss Warranties.

### ... cat bonds ...

Catastrophe bonds, the primary P&C securitization approach to date, are a form of securitization to transfer natural catastrophe risks to the capital markets. They serve as collateralized protection for extreme event risk, which eliminates counterparty risk, at a multi-year fixed prices (*For more information on Cat bond triggers and their recent use see: Guy Carpenter, "The Catastrophe Bond Market at Year-end 2007: The Market goes Mainstream."*). In addition, they augment traditional capacity, since cat bond investors for the most part are now outside of the traditional (re-)insurance market.

To make the transaction worthwhile, the volume of a single issue is normally above US\$ 100 million. Smaller issuances are becoming more frequent with falling transaction costs. The basis and moral hazard risk depends on the trigger, as shown below. The regulatory and tax treatment varies in each jurisdiction.

Cat bonds can be distinguished by type of triggers:

## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

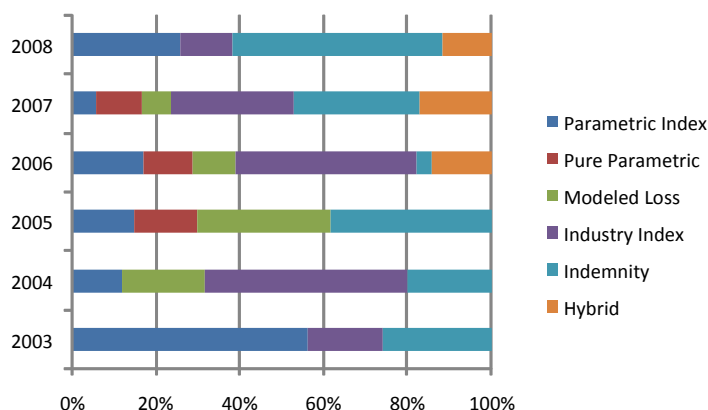
- An **indemnity** transaction is based on the actual losses of the sponsor.
- An **industry index** transaction is based on an industry-wide index of losses (e.g., Property Claim Services or “PCS” in the United States).
- A **pure parametric** trigger is based on the actual reported physical event (i.e., magnitude of earthquake or wind speed of hurricane).
- A **parametric index** is a more refined version of the pure parametric trigger using more complicated formulas and more detailed measuring locations.
- In a **modeled loss** transaction, losses are determined by inputting actual physical parameters into an escrow model (provided by a modeling agency) which then calculates the loss.

Varying trigger types allow to better manage the trade-off between transparency for investors and the basis risk for the issuer/sponsor.

The chart below shows the percentage of the respective trigger types in the annual Cat Bond issuance volume since 2003.

**Graph II-13: Cat Bond Issuance by Trigger Type**

**Source:** Munich Re, adopted by IAIS staff



Since 2007 the percentage of transactions based on indemnity triggers has grown considerably at the expense of non-indemnity transactions and recently represented nearly 50% of issuances during the first 11 months of 2008.

## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

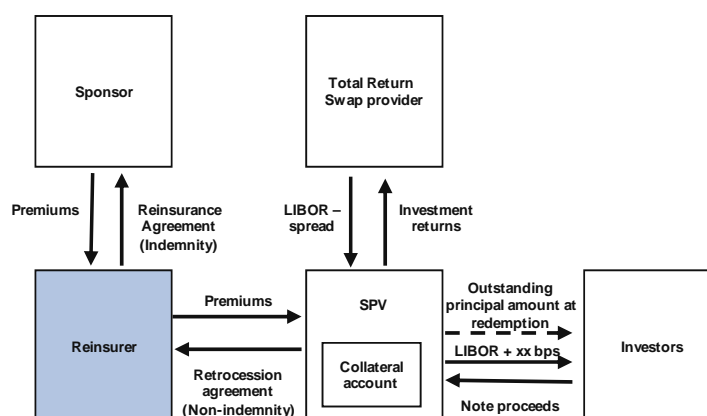
From a pure risk transfer perspective, sponsors prefer indemnity triggers. It contains no or only a small portion of basis risk compared to non-indemnity transactions, since the payout of the cat bond is linked directly to actual losses incurred.

In contrast many investors still have concerns over this trigger type. Since the payments are based on a sponsor's actual losses, the investor is exposed to moral hazard relating to the sponsor's actual underwriting and claims handling behavior. Moreover, indemnity based bonds come along with higher frictional costs and - in conjunction with their portfolio-individuality - impact market efficiency.

The observed trend towards indemnity transactions since 2007 could be attributed in large part to the underlying softened reinsurance market that brought along an increased bargaining power for sponsors to enforce their risk transfer preferences as well as a significant demand overhang on the investor side. The trend is likely to reverse with the next hard market phase.

**Graph II-14: Cat Bond Transaction diagram with reinsurer as transformer**

**Source:** Munich Re, adopted by IAIS staff



Reinsurers could play an important role in bridging the gap between sponsors' and investors' trigger preferences and thus reduce the impediments for the risk transfer to the capital markets: Due to their profound knowledge in risk analyzing and modeling combined with their risk capacity, reinsurers are in a position to assess and manage the basis risk for sponsors, inherent in non-indemnity triggers. The above transaction diagram shows a cat bond transactions in which a reinsurer acts as transformer and manages the basis risk for the sponsor.

The sponsor transfers the subject risk under an indemnity reinsurance contract to the reinsurer. The reinsurer in

turn acts as transformer to the transaction and retrocedes the risk on a non-indemnity basis to the capital market. The basis risk between the indemnity reinsurance contract and the non-indemnity retrocession contract is managed and warehoused by the reinsurer.

### ... insurance loss warranties ...

Industry loss warranties (ILWs) offer reinsurance protection. They feature two triggers – an insurance-loss trigger based on the actual loss incurred by the buyer, and a trigger linked to an industry loss metric. ILWs typically bear a significant basis risk, but low moral hazard risk for index based trigger. The counterparty risk can be minimized via collateralization. The regulatory and tax treatment of ILWs varies in each jurisdiction.

### ... cat swaps ...

Cat swaps are made-to-measure derivatives traded over-the-counter. They require less documentation and are usually triggered at a lower level of payouts than cat bonds. Mostly they are concluded under the ISDA (International Swap and Derivative Association) Standard Documentation. As described above the basis and moral hazard risk depends on trigger, and counterparty risk is present.

### ... contingent capital ...

Contingent capital provides financing on preset terms in case of loss. The instrument can be based on the mechanics of 'put options', providing the buyer with the right to issue and sell securities (equity, debt of some form of hybrid capital) at a prearranged fixed price for a fixed period of time if triggers is hit. The basis risk varies with trigger, but moral hazard risk is low as triggers are index based. The counterparty risk may be significant if the transaction is unfunded.

### ... sidecars

Sidecars are reinsurance companies that, unlike traditional reinsurers, are attached to one single client - the sponsor - by, usually, one quota share contract, covering catastrophic risks, and doing so for a limited period of time (i.e. not exceeding 36 months). Sidecars allow sponsors and capital markets investors to tailor-make the terms and conditions of the company and the

risks it takes, and to do so in an extraordinarily short period of time. Usually, sidecars' liabilities are fully collateralised and are set at an aggregate limit, although in some cases these are calculated at a multiple of the probable maximum loss (PML) or to a loss ratio cap. Sidecars contributed to approximately 17 per cent of capital raised after the US 2005 hurricane season (existing reinsurers contributed 31 per cent, new start-ups, 23 per cent and Cat bonds and ILS 16 per cent). Importantly, according to the IMF, sidecars contributed to countering the 2005 hard cycle.

### **Update on progress toward mutual recognition**

The IAIS's Mutual Recognition Subgroup is currently developing an international supervisory framework to outline minimum principles on cross-border recognition of reinsurance supervision. To support this effort, the Global Reinsurance Market Report serves an important purpose. By promoting the exchange of information among supervisors, it increases transparency – a vital component of any mutual recognition framework.

The purpose of mutual or other forms of supervisory recognition is to facilitate cross-border supply of reinsurance by fostering the development of a framework for efficient and effective international supervision. This aim could be achieved through unilateral, bilateral and multilateral approaches to recognition. All these recognitions are collectively referred to as “supervisory recognition”.

Any supervisory recognition approach should be sufficient to enable a supervisor to recognize the quality of the supervision exercised by another jurisdiction and thus remove significant amounts of unnecessary regulatory and supervisory requirements for reinsurers.

Mutual recognition implies privileges and obligations for both jurisdictions. All approaches to supervisory recognition rest on an assessment of the acceptability of the counterpart regime. Therefore recognition would only be given to a counterparty whose regulatory system is considered “equivalent”, “compatible” or, at least, “acceptable”.

### **Benefit of reinsurance supervisory recognition**

Reinsurance is one of the most important risk mitigating tools for insurers. Severe storms, earthquakes and other



## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

---

natural catastrophes as well as terror attacks are among the large risks for which reinsurance companies provide – mostly global - protection. This business adds value because of risk diversification.

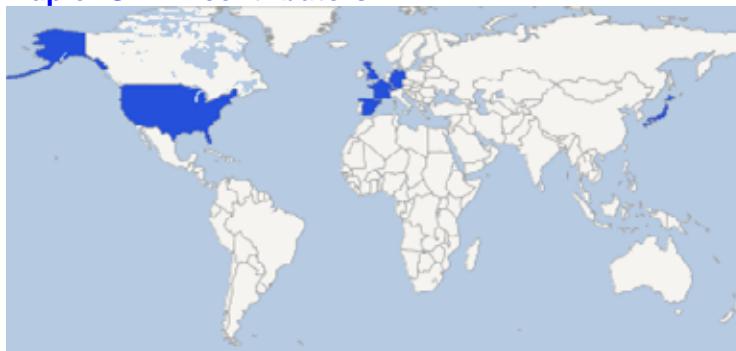
The business model of reinsurance companies are based on the widest possible distribution of risk, especially through geographic diversification. It is therefore crucial to enjoy open access to global markets, freedom of contract and transferability of resources. In this sense a proper system of supervisory recognition can be seen as a mechanism to facilitate market access and, in turn, enhance market efficiency.

**Graph II-15: Map of GRMR contributors**

**Highlighted:**

Bermuda  
France  
Germany  
Japan  
Spain  
Switzerland  
United Kingdom  
United States

**Map of GRMR contributors**



**Source:** 29Travels; adapted by IAIS staff

A stand-alone regulation does not reflect the economic realities of the way in which many reinsurance businesses operate in practice. As the reinsurance market becomes more complex and international in nature, an effective system of supervisory recognition could reduce duplication of efforts and could bring reduced compliance costs for the reinsurance industry. This would allow achieving benefits from economies of scale and making capital and cost saving from a reduction in the work necessary to comply with different supervisory requirements. Within a system of supervisory recognition reinsurers with cross-border activities would be able to comply with relatively homogenized standards of regulation and supervision.

### **Assessment of acceptability**

Any kind of supervisory recognition requires a basis of satisfactory information. To achieve this goal an

## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

---

assessment of the acceptability of the counterpart jurisdiction's regulatory regime should be carried out. The assessment should seek to establish the acceptability of a counterpart's regime by an analysis of the outcome it achieves by e.g. considering other jurisdiction's international assessment or self-assessment, an existing Memorandum of Understanding (MoU), the legal framework in the other jurisdiction, the technical competence, capabilities and efficiency, operational independence and maintenance of sufficient staff of the other jurisdiction. Also the findings of third parties (e.g. IMF/World Bank) may be helpful for evaluating a supervisory recognition process.

### Supervisory recognition agreements

No formal agreement is necessary, if supervisory authorities want to recognise each others work. But formal agreements have a number of benefits and should include some factors regarding clarifications of terms and obligations to facilitate the cooperation between jurisdictions. After some period of time the parties should assess whether the supervisory recognition agreement is operating as envisaged. This puts them into a position where the agreement could be modified.

### Benefit through the IAIS GRMR

Each jurisdiction will decide how it will evaluate other supervisory authorities on basis of its information. Any form of supervisory recognition requires transparency to gain satisfactory information. However, to this end, the GRMR could serve as a valuable source of information.

In addition to that, the IAIS could serve as a repository for all existing arrangements in order to facilitate supervisory recognition. By being a repository the IAIS could track the progress towards supervisory recognition.

### Synopsis of Chapter II

The reinsurance sector continued to develop linkages to other sectors of the economy and greater business ties to developing regions of the world. Correspondingly, national financial regulators are challenged to work cooperatively to reflect the international and multi-dimensional character of reinsurance business – mutual recognition is one practical way this is being carried forward. We've reviewed in this chapter that reinsurers were relatively small players in the credit derivatives and

## CHAPTER II: ASSESSING LINKAGES OF THE REINSURANCE SECTOR

---

other credit risk transfer products market, while their use of ILS continued to grow in 2007. In part because of these two facts, the reinsurance industry as a whole has withstood the financial crisis without major losses to date. The discussion of the financial crisis is now expanded on in Chapter III.

### Literature

**BIS (2008)**, “OTC derivatives market activity in the second half of 2007”.

**Guy Carpenter (2008)**, The Catastrophe Bond Market at Year-end 2007: The Market Goes Mainstream.”

**ISDA (2007)**, “Year-end 2007 Market Survey”

**ISDA (2008)**, “Mid-year 2008 Market Survey.”

**Michel-Kerjan and Morlaye (2007)**, “Extreme Events, Global Warming and Insurance-linked Securities: How to Trigger the ‘Tipping Point,’ Risk Managements and Decision Process Center, The Wharton School of the University of Pennsylvania.

**Munich Re (2008)**, “Insurance-linked securities (ILS) market update Q3 2008.”

**PartnerRe (2008)**, “A Balanced Discussion on Insurance-linked Securities.”

**Ramella and Madeiros (2007)**, “Bermuda Sidecars: Supervising Reinsurance Companies in Innovative Global Markets, The Geneva Papers on Risk and Insurance – Issues and Practice, Vol. 32(3), pp. 345-363.

**Swiss Re (2008)**, “Natural catastrophes and man-made disasters in 2007: high losses in Europe”, sigma 1/2008.

## **CHAPTER III**



### **MARKET TURMOIL AND REINSURANCE SECTOR**

The collapse of the US subprime mortgage market began in earnest in the summer of 2007 when the largest originator of subprime mortgages went out of business and the largest originator of mortgages narrowly avoided bankruptcy. The analysis of the current market environment that follows in this chapter starts from here, and considers the events, specifically their implications for the reinsurance sector, that have led to the now wider global financial crisis in 2008. Within this framework, we present the results of a special survey, undertaken in the spring of 2008, which asked reinsurers and regulators to identify the key impacts and adversities experienced to date from the credit crisis. Readers of this report should be aware that that this was a snapshot in time and that the financial turmoil has intensified considerably since then. Some market observers, including Standard & Poor's, a rating agency, have stated that the resilience of some reinsurer balance sheets has been tested in the second half of 2008 (*Standard & Poor's (2008), "Global Reinsurance: Excess Capital Absorbs the Shock to Date; But There is Limited Further Margin for Error", Ratings Direct, November 25, p. 2*).

Hurricane Ike (see Chapter I) affected the liability side and the ongoing financial turmoil has had an effect on the asset side.

Therefore, the current market turmoil is also viewed within the context of the wider reinsurance industry/sector where loss events can occur at any time. Looking beyond the episode of the present financial crisis, we consider forward looking tools and early reaction mechanisms that may improve the preparedness of the reinsurance industry against any potential stress situation caused by major catastrophes.

### **Effects of recent market conditions on the global reinsurance industry ...**

The ongoing market turmoil has primarily been an issue for banks and similar institutions, particularly those with significant exposures to housing markets in the US and elsewhere. The insurance and reinsurance industry has not, however, been completely isolated from events, although the effects to date have been much more modest in scope and scale.

There are a number of ways in which the "credit crunch" could have an impact on insurers and reinsurers:

- diminution of the value of assets held as capital resources or to meet technical provisions;
- increases in risk-based economic or regulatory capital requirements;
- claims arising through professional liability lines
- shortage of available capital in the event that recapitalisation is required following a major claim; and
- shortage of available capital to fund alternative reinsurance instruments such as catastrophe bonds.

### **... has caused significant but not widespread asset-side issues ...**

Insurers and reinsurers control significant amounts of investment funds. Depending on, *inter alia*, their own risk appetites and local regulatory requirements, these are invested in a variety of asset classes, which, in turn, expose insurers and reinsurers to market risk.

The last twelve months have seen reductions in the values of a number of asset classes, as the credit crunch fed through various parts of the financial system. In particular, asset-backed securities have been significantly impaired, along with bonds which are “wrapped” by financial guarantee insurers whose security has been called into question. More generally, there has been a decline in global equity markets throughout 2008.

(Re-)insurers’ generally conservative approaches are often manifested in high levels of diversification, meaning that exposures to any one counterparty are often relatively modest. As an example, a number of reinsurers disclosed exposure levels to Lehman Brothers following the commencement of bankruptcy protection proceedings in respect of the latter. Most were relatively modest in the context of their overall balance sheets.

Clearly if the turmoil persists, it is possible that further material losses will materialise and this should be starting to have an effect on reinsurers’ risk-based capital requirements. Whether in place for regulatory reasons, or for corporate economic capital planning purposes, risk-based capital calculations take into account perceptions

of the level of market (investment) risk being run by insurers and reinsurers, even if portfolios have not yet deteriorated in value. However, the investment-risk element of models tends to be relatively small (because of the conservative investment approach mentioned above) meaning that any effect on the total requirement may well be negligible, and far outweighed by any increases in capital requirements deriving from increased levels of underwriting risk caused by ongoing softening of the cycle.

### ... and a greater degree of unresolved liability-side issues



#### GRMR HIGHLIGHT

Standard & Poor's report estimated insured losses arising from current financial market issues at "between \$3 billion and \$9 billion" (*Standard & Poor's, op cit, page 5*). This range is wide, but represents relatively modest loss levels when compared with the cost of recent natural and man-made catastrophes. For instance, catastrophe modelling firm RMS currently estimates losses relating to Hurricane Ike at between US\$6 billion and US\$16 billion. It is not clear how much of this loss would flow into the reinsurance market. S&P go on to state that "very few reinsurers have seen the need to establish a material bespoke loss reserve", and cite a number of underwriting reasons which may mean that the exposures of reinsurers are relatively small. These include:

- the cessation of cover for US-based financial institutions by many reinsurers following Enron- and Worldcom-related losses;
- reduction in limits by those who have continued to offer cover;
- offering of cover only on a "side A" basis, meaning that it is triggered only by the insolvency of the institution concerned; and
- the fact that policies are generally written on a "claims made" basis, reducing the tail risk considerably.

Both the relatively modest size of expected total loss and underwriting actions taken following previous losses appear likely to mean that the credit crunch and issues arising from sub-prime lending will not lead to significant underwriting losses for the reinsurance industry. The

effects on reinsurers of any wider economic slowdown are, however, harder to judge.

### **Capital raising in anticipation of continued market challenges ...**

This is the hardest aspect to predict with any degree of confidence at this stage. Although 2008 has seen a relatively active Atlantic storm season, levels of catastrophe losses have been significantly lower to date than the previous peak catastrophe year of 2005, and this has meant that no reinsurers have needed to recapitalise to date. Reinsurance continues to represent a non-correlated (to other financial markets) investment, but shortages of funds in the money markets generally may mean reinsurers struggle when raising additional funds, should these be required.

Standard & Poor's note (*Standard & Poor's, op cit, page 4*) that, recently, reinsurers have increased the extent to which they are retaining excess capital, perhaps in anticipation of difficulties ahead in re-raising it if required. They also comment that this may exacerbate the soft part of the underwriting cycle (including lower prices for reinsurance protection), as reinsurers attempt to deploy excess capital they have retained.

### **Findings of the GRMR special survey on the subprime crisis and related effects ...**

In May 2008 the GRMR launched, in conjunction with its statistical survey, two additional questionnaires designed to assess the severity of the beginning of the financial crisis for the reinsurance industry. The surveys covered not only (re-)insurers' subprime-related asset exposure and asset deterioration, but also reactions by the respective supervisors and regulators.

### **...reveal serious and unprecedented concerns but more marginal actual impacts.**



### **GRMR HIGHLIGHT**

Overall, the developments in financial markets since July 1, 2007 were a source of serious concern for most of the respondents. Many viewed them as unprecedented and feared a negative impact on both the assets and technical provisions of insurers (In this text, `insurance` includes both direct insurance and reinsurance, unless indicated



## CHAPTER III: MARKET TURMOIL AND REINSURANCE SECTOR

---

otherwise). Some supervisors judged, nonetheless, that the developments affected mainly the banking sector and have reacted accordingly. Even for those supervisors, however, market pressure on monoline financial guarantee insurers prompted intense scrutiny during the period under review. The other main outcomes of the survey are:

- **Supervisors' concerns focused** on the heightened volatility in equity and debt markets and on the valuation of assets and liabilities (technical provisions) on insurer balance sheets. There were specific concerns over write downs of certain asset classes or instruments and the potential for widespread claims in professional liability and other classes of insurance.
- All supervisors have taken **measures to address the concerns** caused by financial market turbulence. Some deployed repeated surveys of insurer exposure to asset backed securities and of capital losses on financial markets. Others asked the most important insurers for periodic reports of changes in assets and liabilities. Yet others, where turbulence effects seemed marginal, held with their insurers in the normal course of supervision discussions of subprime exposure, potential rise in claims and of possible remedial measures.
- All supervisors identified, with varying degrees of precision, their **insurers' direct exposure to asset-backed securities and credit derivatives**. This exposure was, overall, small. Some supervisors required reporting on all financial products guaranteed by monoline insurers. They also required reinsurers to report factual data relating to structured instruments.
- In varying detail, all supervisors ascertained their **insurers' indirect exposure** to structured products through their positions in financial instruments based on such securities. Some supervisors required reports of exposure to SPVs and other off balance sheet

risks related to the subprime crisis. All supervisors required that their respective **insurers identify and quantify** the **actual or potential losses** from holding positions in such financial instruments. These losses were typically small.

- All supervisors also identified the **impact of the losses on the solvency** of their respective insurers. In all cases, re-insurer solvency was not affected by the losses: the share capital remained on average above the regulatory capital requirement.
- Some supervisors advised their insurers to take **corrective or preventative measures**, e.g. close monitoring and timely reporting of adverse development, focused risk assessment. Others did not deem such instructions necessary given limited re-insurer exposure to structured products.
- Where they had issued such instructions, supervisors monitored **compliance by the re-insurers**. In such cases, compliance has been extensive.
- There have been so far **no significant changes in supervision practices** in the wake of the subprime issues and the general market turbulence in recent months.
- In comparison with the above, **monoline financial guarantee insurance**, where it is being conducted, appears to raise significant issues. There continue to be serious pressures on monoline insurers' business models, caused by credit rating downgrades and other actions following mark-to-market losses.

### Most recent developments

Since the conclusion of the special GRMR survey (July 2008), market conditions have worsened, causing more serious concerns for the entire reinsurance sector. Specifically, a series of rescue packages totaling over USD150 billion was prescribed by the US treasury for troubled insurer AIG, the most notable and high profile event within the industry to date. Noting this exception,

the most severe consequences of the crisis have been borne out in the banking industry. After Lehman Brothers filed for bankruptcy on September 15, Morgan Stanley and Goldman Sachs opted to relinquish their investment bank status and become traditional deposit-taking institutions, while Washington Mutual, the largest savings and loan company in the US, was seized by officials and sold to JP Morgan Chase. Other major banks reported significant quarterly losses. Outside the US, several European central banks acted to extend emergency lending and recapitalisation packages to banking entities.

Amid the turbulence, the reinsurance sector continued to be comparably resilient, even when considering other recent stress events, including major (re-)insured catastrophes Hurricane Ike (2008) and Winter Storm Kyrill (2007).

### **IAIS facilitates forward looking tools ...**

Resilient major reinsurance companies are crucial in order to absorb any major external shock. Some of these shocks affect reinsurers in more than one jurisdiction. This has been the case, for example, with major Hurricanes (North America), Storms (Europe) and Typhoons (Asia), when reinsurers from around the world paid claims in the respectively affected jurisdiction(s). Some senior (re-)insurance supervisors (*For example, Steffen 2007*) recently considered the introduction of an early warning / early reaction mechanism at the IAIS to enable coordination efforts in case of major reinsured catastrophes (*An assessment of different early warning approaches is to be found in Berg / Borensztein / Patillo (2004), and in Goldstein / Kaminsky / Reinhart (2000) consider an application of early warning approaches at emerging markets*).

The IAIS and specifically the RTG are very well positioned to facilitate an early warning / early reaction mechanism regarding reinsured major catastrophes. In the aftermath of a catastrophe, GRMR data would be immediately available to assess the shock absorption capacity of the industry by providing an aggregated estimate of the total exposure. Moreover, the IAIS Secretariat is well positioned to approach RTG supervisors immediately after such an event, helping to facilitate mutual trust among market participants in the event's aftermath. In this respect such an early warning / early reaction system has the potential to contribute to

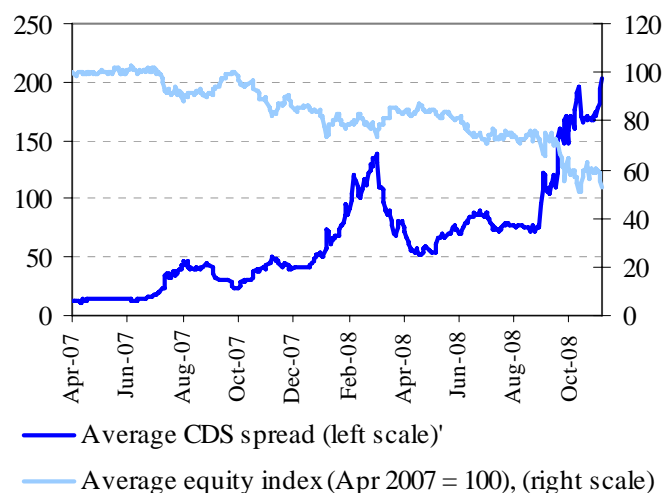
financial stability.

### Assessing Systemic Default Risk

The global financial system has experienced a period of unprecedented financial turmoil. Several financial institutions have failed while others had to be bailed out by governments, including the largest US insurance company. Credit quality, liquidity, and solvency concerns are broadening well beyond developed markets and banking groups to other financial institutions and emerging markets.

**Graph III-1: Equity and credit spreads**

Source: Bloomberg L. P.;  
IMF and IAIS staff estimates



While re-insurers have comparatively been less affected than other financial institutions, they have not come out unscathed from the financial crisis. Perception of default risks among large reinsurers have increased as shown by a seven-fold increase in their credit spreads and the 40 percent loss in their equity value (**Graph III-1**). Re-insurers have benefited from a tighter regulatory framework and more conservative investment policies than other financial institutions. This has helped in partially alleviating the impact on their balance sheets of falling asset prices and limiting their exposures to complex structured products.

To quantitatively gauge the systemic default risk in the reinsurance business, **Graph III-2** presents the market-implied probability of joint defaults obtained from a CDS basket containing seven of the world largest re-insurers. (See Box 2-1 in Chapter 1 of 2007 RTG, for a description of the methodology. See also IMF Working Paper 06/105

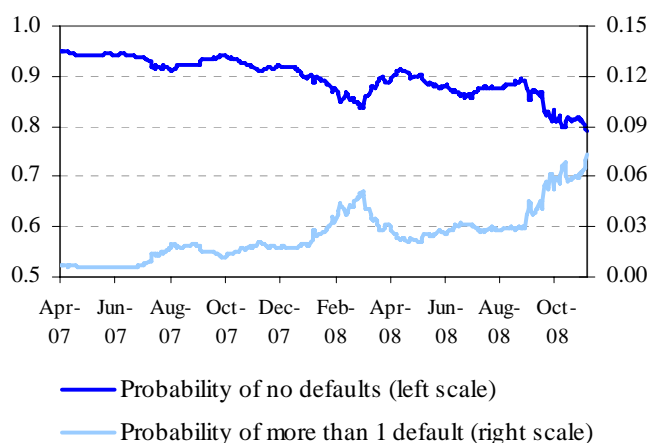
## CHAPTER III: MARKET TURMOIL AND REINSURANCE SECTOR

by Avesani, Garcia Pascual, and Li. The CDS basket includes five European companies, one North American/Caribbean company, and one Asian company.). Based on mid November 2008 data, the (risk neutral) forward-looking probability of observing no defaults, which prior to the crisis was above 95 percent, has dropped sharply to below 80 percent by November 2008.

### Graph III-2: Equity and credit spreads

Source: Bloomberg L. P.;  
IMF and IAIS staff estimates

More importantly, the probability of observing more than one default increased to about seven percent — over a 10 fold increase since the beginning of the crisis in July 2007. The increase in systemic risk is both the result of an increase in the individual risk profile of each re-insurer, as well as an increase in their equity correlations, from around 30 percent, prior to the crisis, to over 50 percent by November 2008.



### Synopsis of Chapter III

To date, the overall reinsurance industry has displayed considerable resistance to, and durability in, the ongoing financial crisis. As the GRMR special survey on subprime exposures strongly indicated, the impacts of the initial phases of the credit crisis were felt almost exclusively — within the reinsurance sector — among monoline insurers. As the crisis deepened and expanded, reinsurers, as all financial sector entities, continued to be exposed to deteriorating market conditions. As discussed in Chapters I and II, however, reinsurers' investment profile was largely insulated from credit concerns, while some, potentially significant liability issues remain. However, this GRMR also displays the finding that both sides of reinsurers' balance sheets were affected in the second half of 2008: Hurricane Ike (see Chapter I) has an impact on the liability side, and the unfolding financial turmoil has

an effect on the asset side. Finally, we placed these market concerns within the context of the broader reinsurance environment, where loss events may develop at any time without warning. In this respect, the IAIS and RTG, building on the data established by the GRMR, are working toward early warning / early reaction mechanisms that we think could be significant tools for reinsurance jurisdictions and enhance global financial stability.

### Literature

**Allianz (2008)**, “Economic Forecast 2009.”

**Berg / Borensztein / Patillo (2004)**, “Assessing early warning systems: how have they worked in practice?”, IMF Working Paper, WP/04/52.

**Goldstein / Kaminsky / Reinhart (2000)** “Assessing financial vulnerability: an early warning system for emerging markets”, Institute for International Economics, Washington D.C.

**IMF (2008)**, “Global Financial Stability Report: Financial Stress and Delivering Macro-Financial Implications and Policy.”

**Marsh (2008)**, “U.S. Insurance Market Report 2008.”

**PWC (2008)**, “European Insurance Digest.”

**Standard & Poor’s (2008)**, “Global Reinsurance: 2009 The Year of Reckoning.”

**Standard & Poor’s (2008)**, “Global Reinsurance: Excess Capital Absorbs The Shock To Date; But There Is Limited Further Margin For Error.”

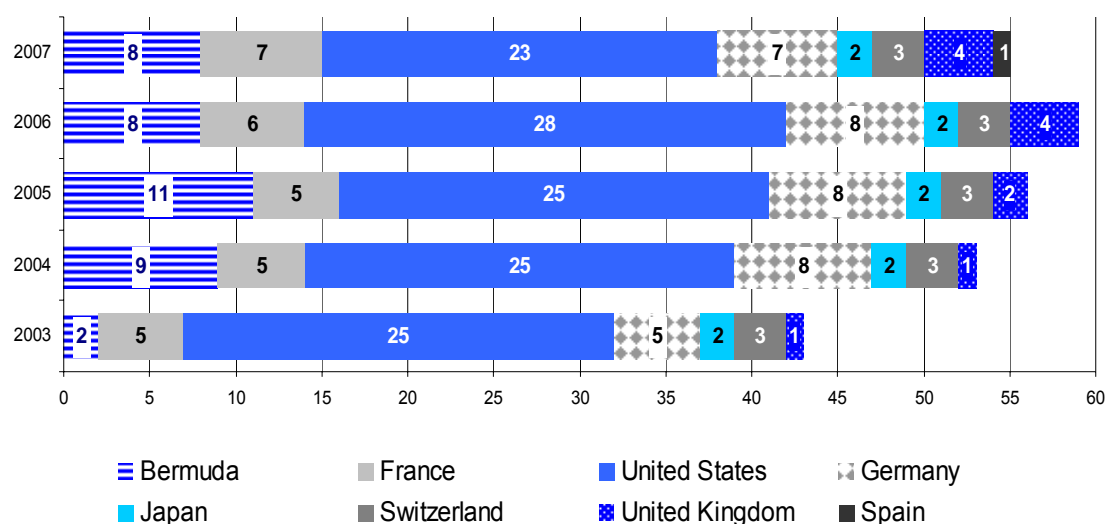
**Steffen (2007)**, “Interview on early warning / early reaction systems”, *in*: von Dahlen, “Early warning / early reaction systems - relating to major reinsured catastrophes”, Geneva Association on Risk and Insurance Economics, PROGRES 45.

# **APPENDICES**



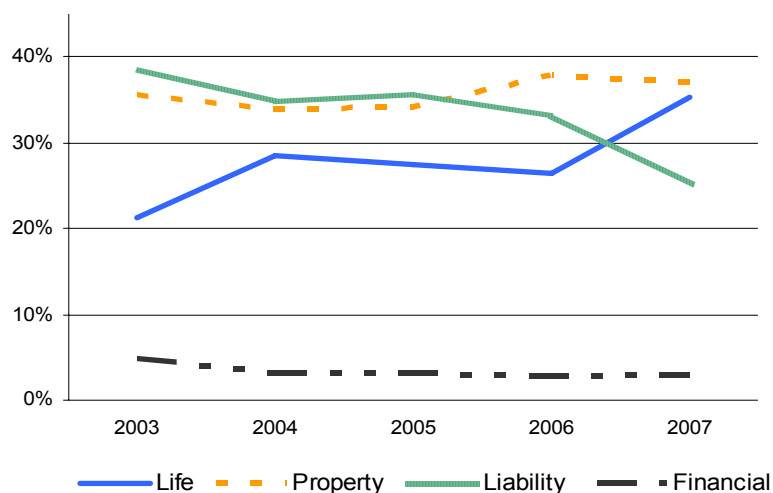
### Time Series Analysis

The 2008 edition of the GRMR marks its 5th anniversary. Demonstrated in the chart below, the GRMR survey depends on the active participation of eight jurisdictions, each with significant reinsurance presence. The current survey encapsulates 55 companies across these jurisdictions. In the appendix that follows we introduce several time series of some key data gathered over the course of the last 5 years, that we hope gives another aspect of transparency to the report. To facilitate reader-friendliness, the global reinsurance market statistical tables, the previous Appendix I, are now to be found in a separate document displayed on the IAIS website under Reinsurance Transparency Subgroup / Reference Documents ([www.iaisweb.org](http://www.iaisweb.org)). Please utilize the below illustration as a guide to the figures presented in time series.





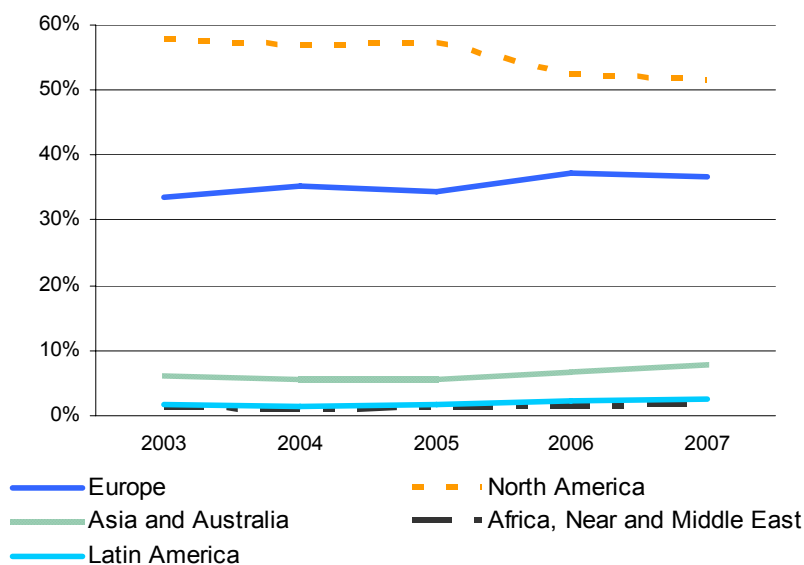
**Graph T-1: % Total Gross Reinsurance Premiums Assumed by Class of Business**



### T-1 Explanatory note

The GRMR survey shows that reinsurers primarily assume property and liability coverage. Recently, some movement can be observed: an increase in life reinsurance assumed and a decrease in liability business.

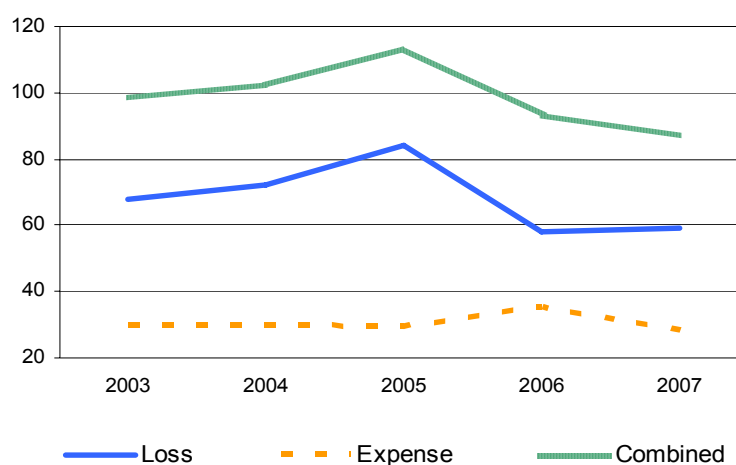
**Graph T-2: % Total Gross Reinsurance Premiums Assumed by Region of Ceding Insurer**



### T-2 Explanatory note

Business continues to originate predominately from advanced economies with correspondingly high levels of insurance cover. As worldwide economic development progresses the relative business shares of other regions will only increase, as already visible – on a minor scale – in recent trends.

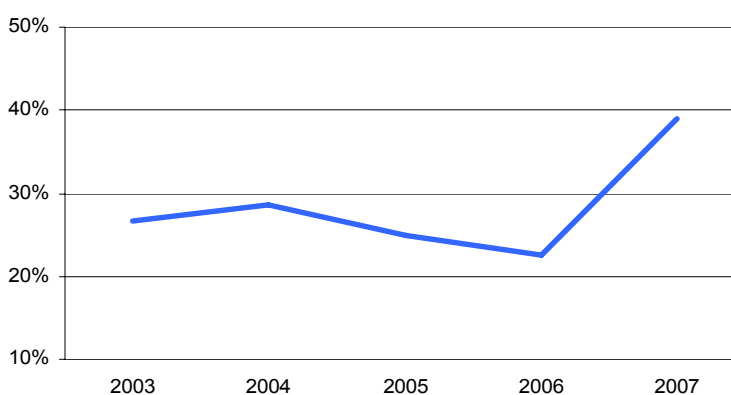
**Graph T-3:  
Profitability  
Indicators - Ratios**



### T-3 Explanatory Note

Profitability indicators follow a generally predictable path, underscoring the pivotal role catastrophes play in the stability of the reinsurance market. Relatively high ratios are observed in years with impact storms (2004; 2005) and in decline in the years following, which were characterized by calm environments.

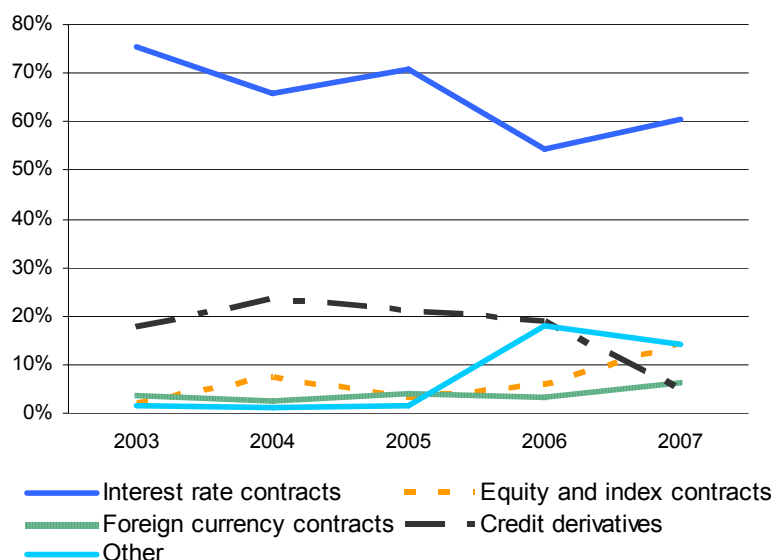
**Graph T-4: %  
Regulatory Required  
Capital to Total  
Available Capital**



### T-4 Explanatory Note

This ratio has been stable over years 2003-2006 with reinsurers holding available capital in amounts >3 times that which was regulatory required. This changed somewhat in 2007, influenced by more active capital management strategies.

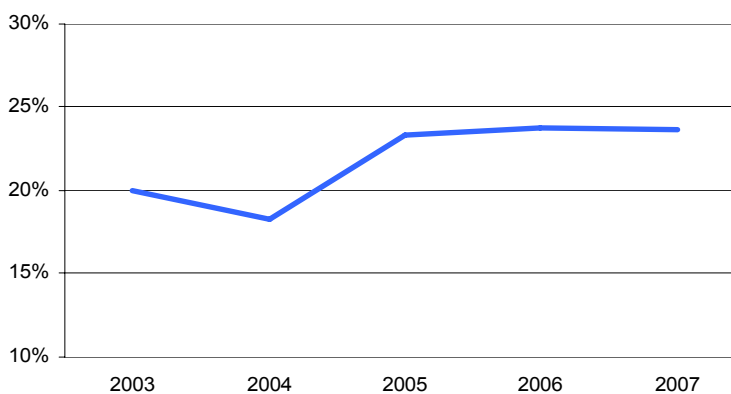
**Graph T-5: %  
Derivative Financial  
Instruments by  
Instrument Type**



#### T-5 Explanatory Note

Reinsurers continue to be largely involved in interest rate contracts and only role players in other derivatives. Of note in the current financial climate is the % decline in credit derivatives observed since 2004 and dropping sharply from 2006 to 2007.

**Graph T-6: %  
Investment Return to  
Net Premiums  
Earned**



#### T-6 Explanatory Note

This ratio indicates the importance of investment return to the profitability of reinsurers. Investment return is consistently one-fifth to one-quarter of underwriting income. It will be noteworthy to see how this figure stands next year as the brunt of the financial crises affects portfolios.

## Participants in Reinsurance Transparency Subgroup (RTG)

### Participating jurisdictions

Bermuda  
 France  
 Germany  
 Japan  
 Luxembourg (new) \*  
 Spain (new)  
 Switzerland  
 United Kingdom  
 United States

### Reinsurance Transparency Subgroup (RTG) members

Jeremy Cox (Chairman)	Bermuda Monetary Authority, Bermuda
Marcelo Ramella	Bermuda Monetary Authority, Bermuda
Fabrice Pesin	Ministère de l'Economie des Finances et de l'Industrie, France
Robert Meindl	Federal Financial Supervisory Authority (BaFin), Germany
Annick Felten	Commissariat aux Assurances, Luxembourg
Pablo Muelas García	Dirección General de Seguros y Fondos de Pensiones, Spain
Piotr Andrzejewski	Swiss Federal Office of Private Insurance, Switzerland
David Johnston	Financial Services Authority, United Kingdom
Todd Sells	NAIC, United States

### Representatives of RTG members

Traver Alexander	Bermuda Monetary Authority, Bermuda
Perrine Kaltwasser	Commission de Contrôle des Assurances, des Mutuelles et Institutions de Prévoyance, France
Maylis Coupet	Ministère de l'Economie des Finances et de l'Industrie, France
Christian Schneider	Federal Financial Supervisory Authority (BaFin), Germany
Aiko Tatsumi	Financial Services Agency, Japan
Jonathan Griffiths	Financial Services Authority, United Kingdom

\* in an observing capacity for this report - will report data for the next edition of the report.

Industry representatives

Brad Kading	Association of Bermuda Insurers and Reinsurers
Leila Medeiros	Association of Bermuda Insurers and Reinsurers
Hans-Jürgen Säglitz	GDV, Germany
Hildegard Stuke	Hannover Re, Germany
Klaus Schampel	General Re, Germany
Ralph Vogelgesang	Munich Re, Germany
Matthias Kubicek	Munich Re, Germany
Masaaki Nagamura	Tokio Marine & Nichido Fire Insurance Co. Ltd, Japan
Makoto Hori	Tokio Marine & Nichido Fire Insurance Co. Ltd, Japan
Katsuo Matsushita	General Insurance Association of Japan
Debra Hall	Swiss Re, Switzerland
Alastair Evans	Lloyd's, United Kingdom
Carolyn Cobb	Law Office of Carolyn Cobb, United States
Beth Grossman	ACORD, United States
Brad Smith	American Council of Life Insurers, United States
Tracy Laws	Reinsurance Association of America, United States
Martin Carus	AIG, United States
Philippe Brahin	Swiss Reinsurance Company, Switzerland
Michael Eves	IAA, Switzerland
Alessandro Iuppa	Zurich Financial Services, Switzerland
Morag Fullilove	Fullilove Consulting, United States

Secretariat

The IAIS Secretariat provides support to the Reinsurance Transparency Subgroup, with involvement, as necessary, from the FSF Secretariat and IMF staff, and staff of other financial stability organisations.

Economists & Publication Team

Sebastian von Dahlen (IAIS - lead)  
with  
Traver Alexander (BMA)\*  
Marcelo Ramella (BMA)\*  
David Johnston (FSA UK)  
Piotr Andrzejewski (FOPI)  
Patrizia Baudino (FSF)  
Antonio Garcia Pascual (IMF)  
Ian Tower (IMF)

\* Works in the office of the RTG Chair, Jeremy Cox

Special thanks go also to Sylvie Ellet (IAIS), Ann Neale (IAIS), Anne-Marie Kelly (IAIS).

## Methodology and list of reporting reinsurers

### *Structure of the statistics*

As for the previous report, the method of gathering, processing and releasing the data submitted by reporting reinsurers is based on a three-level approach, with each level of data requiring different treatment and confidentiality rules:

- A-level data (legal entity-based information)
- B-level data (nationally aggregated data)
- C-level data (global data).

Using reinsurer-specific information (A-level data), and using a consistent template, participating supervisors have compiled aggregate reports (B-level data) for their respective jurisdictions. Supervisors have then transmitted the aggregate reports (B-level data) for their respective jurisdictions to the IAIS Secretariat. Based on the aggregate reports received from the supervisors the IAIS Secretariat has compiled the data into global tables (C-level data).

### *Coverage and selection criteria*

To obtain a significant coverage of the global reinsurance market, criteria were agreed upon for the selection of globally significant reinsurers ('reporting reinsurers') to be included in the statistics.

The selection criteria, which are unchanged from the previous year, are based upon unaffiliated business only, to avoid the inclusion in the statistics of those reinsurers whose significant reinsurance transactions are intra-group only. The criteria are as follows:

- Gross unaffiliated reinsurance premiums assumed of US\$ 800 million (US\$ 20 million for monolines); or
- Gross unaffiliated technical reserves of US\$ 2 billion (not applied to monolines); with
- Discretion of the national authority to recommend certain entities to be excluded, with a final decision by the group.

This has resulted in a total of 56 major reinsurers from the 7 participating jurisdictions meeting the selection criteria for inclusion in the 2005 global reinsurance market statistics are as follows:

The information provided here displays the final list regarding the 2008 GRMR edition (based on the 2007 statistics).

Selection criteria are the same as for the previous statistics, as follows:

- Gross unaffiliated reinsurance premiums assumed of US\$800 million (US\$20 million for monolines); or
- Gross unaffiliated technical reserves of US\$2 billion (not applied to monolines); with
- Discretion of the national authority to recommend certain entities to be excluded, with a final decision by the group.

#### **Bermuda**

1. Allied World Assurance Company Ltd
2. Arch Reinsurance Ltd
3. Axis Specialty Ltd
4. Catlin Insurance Company Ltd (new)
5. Everest Reinsurance (Bermuda) Ltd
6. Partner Reinsurance Company Ltd
7. Renaissance Reinsurance Ltd
8. XL Re Ltd

#### **France**

1. Axa France Vie
2. Axa Re (Paris Ré)
3. Caisse Centrale de Reassurance
4. Partner Ré
5. Scor
6. Scor Global Life (new)
7. Scor P&C (new)

#### **Germany**

1. Converium Rückversicherung (Deutschland) AG
2. Swiss Re Frankona Rückversicherung AG
3. E&S Rückversicherung AG
4. Hannover Rückversicherungs-AG
5. Kölnische Rückversicherungs-Gesellschaft-AG
6. Münchener Rückversicherungs-Gesellschaft-AG
7. Swiss Re Germany AG

#### **Japan**

1. Toa Reinsurance Company Ltd
2. Tokio Marine & Nichido Fire Insurance Co. Ltd

**Spain (new)**

1. Mapfre Re (new)

**Switzerland**

1. European Reinsurance Company of Zurich
3. Swiss Reinsurance Company, Zurich
4. SCOR Switzerland AG (new)

**UK**

1. Aspen Insurance UK Ltd
2. Lloyd's
3. Swiss Reinsurance Company UK Limited
4. Swiss Re Life & Health Limited

**US**

1. Ace America Insurance Company
2. Ambac Assurance Corporation
3. American Agricultural Insurance Company
4. Employers Reassur Corporation
5. Everest Reinsurance Company
6. Firemans Funds Insurance Company
7. General Reinsurance Corporation
8. Hannover Life Reassur Co of America (new)
9. Lincoln National Life Insurance Company
10. Munich American Reassurance Company
11. Munich Reinsurance America Inc
12. National Indemnity Company
13. Odyssey American Reinsurance Corporation
14. Partner Reinsurance Company of the US
15. Radian Asset Assurance Inc
16. Reassure Amer Life Ins Co (new)
17. RGA Reinsurance Company
18. Scottish Re US Inc
19. Security Life of Denver Insurance Company
20. Swiss Reinsurance America Corporation
21. Swiss Re Life & Health America Inc
22. Transamerica Occidental Life Insurance Company
23. Transatlantic Reinsurance Company



## **Collection, aggregation and presentation of the data disseminated in this report**

Before using individual items of data from the tables, readers should be aware of some of the limitations which arise from the compilation of the information. These are issues of detail, and we do not believe that they detract in any material way from the broad conclusions that can be drawn from the data. For details on individual tables, please refer to the explanatory notes that accompany the final data sets in Appendix I.

First, it should be noted that the data is a composite of information provided by reinsurers based in different jurisdictions. This gives rise to issues relating to the accounting treatment of certain items (such as deferred acquisition costs), as well as posing difficulties because of different standards of disclosure in different countries. Wider international developments will hopefully lead to convergence of such accounting standards over time, but the extent of this issue at present should not be underestimated. It should also be noted that whilst in most reporting jurisdictions the accounting reference date is the calendar year end, in Japan it is 31 March.

Second, readers should be aware that the data is compiled on a legal entity basis. There are good reasons for doing this, including the fact that group failures are triggered by failures at legal entity level, insurers are supervised primarily on a legal entity basis, and this method facilitated the maintenance of confidentiality and addressed practical considerations around the gathering of data. However, doing so distorts the effect of intra-group reinsurance transactions, which may lead to greater stability at group level but possibly overstate levels of reinsurance dependency at entity level.

It should also be noted that approximations have been used in some parts of the data where the appropriate underlying information is unavailable or compiled on a different basis. Also, comparisons with previous years may provide some misleading results because of (a) changes from year to year in the population of reinsurers who qualify for inclusion; and (b) currency fluctuations.

Finally, it should be noted that the method of compilation of the data is designed to protect the confidentiality of the participating reinsurers at each stage. For this reason it is not possible for any one person to verify the data produced at each stage and, as such, there is greater potential for error than would normally be found in a report of this nature. Nevertheless, it is of course the case that all parties have endeavoured to produce valid data.

The remaining appendices can now be found on the IAIS website, in the area which is accessible to IAIS members and observers, under: Committees, Subcommittees and working parties, Reinsurance Transparency Subgroup, Reference documents.