WestLB

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Insurance & Sustainability

Playing with fire

Pan European Equity

Insurance

Strategy/SRI

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Foreword

We are pleased to be able to present our study 'Insurers & Sustainability - Playing with fire.' This study was initiated by the Asset Management Working Group of UNEP FI (Finance Initiatives of the United Nations Environment Programme). This group brings together 12 leading international asset management firms to explore and document the importance of sustainability topics in terms of how they relate to the portfolio management of mutual funds, pension funds, and other institutional funds.

Sustainable investment is of particular importance for the insurance sector. The insurers' dual role as fiduciaries and investment vehicles imposes a heavy responsibility on them to take account of sustainability topics such as climate change. These topics also affect insurers' economic balance sheets in a special and interdependent manner on both the asset and liability sides. The findings of a broadly-based survey we carried out among European insurers are a key element of our study. We would like to take this opportunity to extend our cordial thanks to the companies which took part.

Socially Responsible Investments (SRI) is one of the fastest-growing market segments. We are firmly convinced that Corporate Social Responsibility (CSR) as a 'lived' entrepreneurial mission is capable of creating shareholder value. Corporate strategies based on CSR can lead to significant competitive advantages via gains in efficiency and corporate reputation. Companies that are able to respond to these latest developments will ultimately be able to reap the economic benefits. As a result, we see SRI not merely as a niche segment for a specialised clientele, but as an investment approach for the mainstream institutionals.

WestLB Equity Markets has offered a full-service SRI product since 2002 and in the last two years it has come third in Extel's rankings for the best broker for SRI research.

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Executive summary

Insurance & Sustainability – Playing with fire

The accounting scandals in the US and in Europe have brought markets to focus more strongly on corporate governance as an investment topic. Transparency requirements have been noticeably on the rise since then. How a company deals with sustainability is increasingly interpreted as a signal of its governance quality.

Dual role of insurers

Given the dual role of insurance companies as investment vehicles and fiduciaries, their duty to take sustainability into account is particularly acute. The unique position that the insurance sector has in terms of sustainability topics is also revealed in insurers' balance sheets, as both assets and liabilities are affected in interdependent ways. Thus, the leverage insurance companies stand to gain by incorporating sustainability topics is considerable.

Survey among European insurers

Climate change, geopolitical risks (terror, SARS, emerging markets) and gene technology are the three focal sustainability topics we have identified for the insurance industry and which we used as the basis for our survey among European insurers. We approached 17 listed companies, and 10 answered our extensive questionnaire. The list of participants includes the primary insurers Allianz, AMB Generali, Generali, Nürnberger Beteiligungen, RAS and ZFS and the re-insurers Converium, Hannover Re, Munich Re and Swiss Re. (Wherever we refer to the results of our survey, you will see the following symbol: ☞.)

SRI performance: more gain than pain

Sustainability is a factor that can drive equity returns in its own right

Does it pay off financially to make sustainability a fundamental corporate governance principle? This question is a particularly important one for insurers given their dual role as investment vehicles and fiduciaries. A myriad of anecdotal examples, theoretical considerations about the drivers of shareholder value and, in particular, empirical analyses indicate that sustainability is a factor that can drive equity returns in its own right. Our conclusion that 'it pays to be good' can also be understood as an appeal to insurers to introduce a structured SRI approach into their asset management activities.

Triple bottom line rating: David beats Goliath

Insurers put main emphasis on Governance

Corporate social responsibility is first and foremost a qualitative concept. However, quantifiable indicators do exist that can help in assessing companies' sustainability performance (even though these are somewhat subjective). Based on data delivered by our research partner EIRIS, we have developed a structured approach that enables us to score companies in terms of: Governance, Environment and Products (our triple bottom line). We also differentiate between exposure and management quality. Our most important findings are:

(1) Overall the insurance sector's sustainability exposure is below par, whereas in terms of management quality, insurers are ranked above average.

(2) Insurers focus mainly on Governance; accordingly, on average they receive comparatively high scores in this area.

(3) Insurers apparently consider their impact on the environment as negligible; they see only little need for action; hence, it is no surprise that the sector's Environment Score is below average.

(4) The 'large cap effect' that is generally present in corporate sustainability ratings plays only a limited role in the insurance industry; small to medium-sized companies fill the top four places in our rankings.

Climate change – some like it hot

Underwriting losses and investments closely related

An increasing number of companies and investors are realising that climate change carries significant economic implications for shareholder value. The particular relevance for insurers is due to the close correlation between underwriting losses (due e.g. to weather anomalies) and losses in the value of capital market investments. Losses on the insurance side are becoming more frequent and more costly. In particular the major loss events, like Hurricane Andrew in 1992, harm the insurers' underwriting profitability. In our view, a systematic approach to risk management which incorporates pricing, selection and research is essential.

Expanding fiduciary duties

On the investment side, climate change is without doubt a threat to the market value of assets under management. In addition, fiduciary duties are being interpreted increasingly broadly, and this includes the need to consider climate change risks. Again, climate change constitutes a dual risk for insurers.

We conclude that climate change can have a significant impact on the net income of insurers and on dividends, which in turn affects the attractiveness of insurers' shares. However, there are also growth opportunities associated with new products and lines of business driven by climate change issues (e.g. in the field of emission trading markets).

Survey: companies believe they have the risks under control

Our survey results show that:

(1) Companies are in general well sensitized about their climate change exposure.

(2) Companies believe they have the economic risks comparatively well under control, as evidenced in the dominance of pricing and selection measures over exclusion.

(3) A link between underwriting and investment, i.e. holistic management of climate change risks, is barely discernible.

(4) Companies see growth opportunities in new products (emissions trading schemes, catastrophe bonds, etc.) and are partially exploiting these opportunities.

Gene technology – brave new world?

Risks are new and difficult to assess

Advances in gene technology harbour a broad spectrum of risks and opportunities for the insurance sector. One of the new business opportunities, for example, is liability insurance against the unintentional spread of genetically modified seeds. However, gene

tech-related underwriting risks are still relatively new and difficult to assess. Extensive research is clearly indispensable for adequate pricing. As it is becoming increasingly feasible for insurers to diagnose genetically conspicuous dispositions, they are able to exclude specific risks from personal policies. As a result, the insurability of risks is likely to increase, although insurers will be facing new challenges as gene technology may lead to sudden increases in life expectancy (longevity risk). On the investment side, stakes in companies that depend on society's acceptance of gene technology also harbour new risks and opportunities.

Survey: re-insurers leading the way, insurability of risks increasing

The main results of our survey are:

(1) Insurers are less able to estimate and grasp the economic implications of gene technology for their individual companies and for the insurance industry as a whole than they are in the field of climate change.

(2) Re-insurers are leading the way to a certain extent; they pay more attention to research and are more confident than primary insurers in selecting risks.

(3) Companies do not only see the downside risks of gene technology; e.g. assessments in life/pension insurance are predominantly positive, perhaps as a result of the improved risk selection offered by genetic testing. The growth potential of new products is recognised, which may also be due to the expanded insurability of risks offered by genetic testing.

Geopolitical risks – uncertain times

Terror is but one geopolitical risk

September 11 represented a watershed. Since then geopolitical risks have been more deeply rooted in our collective conscious than perhaps ever before. The insurance industry was hit from two sides: underwriting losses depleted actuarial reserves, while investment income and undisclosed reserves melted away with share prices. Here, too, the duality of the industry's exposure is apparent.

Terrorism is the most extreme of many different geopolitical risks. Globalisation has elevated epidemics like SARS and bird flu to global threats. The 'risks of infection' increased in a purely economic sense as well, as the Asian crisis of the late 1990s painfully demonstrated.

The results of our survey show two things. Firstly, companies struggle to assess terror risks effectively and therefore they exclude rather than price them. Secondly, with regard to Emerging Markets, companies focus on the overall high market potential that is driven by population growth and increasing prosperity.

Insurance & Sustainability – Playing with fire

The accounting scandals in the US and in Europe have made markets focus more strongly on corporate governance as an investment topic. Transparency requirements have been noticeably on the rise since then. How a company deals with sustainability is increasingly interpreted as a signal of its governance quality. Given the dual role of insurance companies as investment vehicles and fiduciaries, their duty to take sustainability into account is particularly acute. The unique position that the insurance sector has in terms of sustainability topics is also revealed in insurers' balance sheets, as both assets and liabilities are affected in interdependent ways. Thus, the leverage insurance companies stand to gain by incorporating sustainability topics is considerable.

Convergence of sustainability and corporate governance

Corporate governance has been a hot market topic since Enron

In the wake of the accounting scandals at Enron and WorldCom, corporate governance is high on the list of topics keeping the world's stock markets in suspense. It is true, that a certain habituation effect has occurred in the meantime, as some critics suggested recently after the Italy-based Parmalat Group went bankrupt. However, in our view this changes nothing with respect to the fundamental paradigm shift that is occurring.

Beyond the regulatory measures (already undertaken or at least proposed) and the debate surrounding their efficacy, it is undeniable that the quality requirements of the capital markets have changed. Greater transparency and a more effective control of managers is in demand. The way companies deal with sustainability topics/issues is regarded more and more as a signal of corporate governance quality in general. The line between corporate governance and corporate sustainability is becoming increasingly blurred.

Expanding fiduciary duties

One of the main drivers behind this development is the growing significance of private pension plans worldwide. The fiduciary duties of pension plan managers are being interpreted increasingly broadly, particularly in the USA. The Employee Retirement and Income Security Act (ERISA) sees two fundamental responsibilities:

- The duty of care: fiduciaries must act "prudently" and "reasonably".
- The duty of loyalty: they must act exclusively in the long-term interests of the plan's beneficiaries.

Given the liability associated with not discharging these duties, it is in the best interest of fiduciaries to place only the highest quality demands on the governance of the companies in which they invest.

Dual role of insurers

Insurers: investors and investment vehicles in one

There are two reasons why the dynamics of sustainability are particularly important to insurance companies. As investment vehicles, insurers are subject to today's stricter capital market requirements and have to act in the best interest of their shareholders (i.e. maximise shareholder value). However, as large financial intermediaries and asset managers, insurers find themselves having to formulate the capital market's requirements for all publicly traded companies.

Economic risks on both the underwriting and investment sides

It is precisely this duality in the role of insurers which makes it so rewarding to look at the sector from a sustainability perspective and this duality is the recurring theme throughout our report. It is also revealed in the level of the original financial risks rooted in their underwriting and investment businesses.

Although these risks are always present, they are not constantly perceived by markets. They tend to pop up on the investor's radar screens from time to time only (event-driven), whenever the crossover between the insurance business and major sustainability issues becomes spectacularly apparent, as is the case with the big loss events wreaked by natural or man-made disasters.

Natural disasters: a clear example

The US Department of Energy (2001) estimates that losses caused by natural disasters worldwide in the last 15 years totalled more than $1trn, about three-quarters of which are directly linked to climate and weather events. That represents a tenfold increase since the 1950s, with a doubling of losses in the 1990s alone.

The top 15 loss events – natural disasters and terror dominate

Event	Country	Date	Insured Losses*	Number of Victims
Hurricane Andrew	USA, Bahamas	23 Aug 1992	20,317	38
WTC and Pentagon attacks	USA	11 Sep 2001	19,301	approx. 3,000
Northridge earthquake	USA	17 Jan 1994	16,830	60
Typhoon Mireille	Japan	27 Sep 1991	7,385	51
Winter storm Daria	France, UK, Belgium, etc.	25 Jan 1990	6,259	95
Winter storm Lothar	Western Europe (esp. France, Switzerland)	25 Dec 1999	6,202	80
Hurricane Hugo	Puerto Rico, USA, etc.	15 Sep 1989	6,027	61
Storm and flooding	Europe	15 Oct 1987	4,705	22
Winter storm Vivian	Central/Western Europe	25 Feb 1990	4,349	64
Typhoon Bart	Japan	22 Sept 1999	4,320	26
Hurricane Georges	USA, Caribbean	20 Sept 1998	3,858	600
Piper Alpha oil rig explosion	UK	06 Jul 1988	3,012	167
Great Hanshin earthquake in Kobe	Japan	17 Jan 1995	2,890	6,425
Winter storm Martin	France, Spain, etc.	27 Dec 1999	2,566	45
Hurricane Floyd; torrential rains, flooding	USA, etc.	10 Sep 1999	2,524	70

* in $m

Source Swiss Re, WestLB Equity Markets

9/11 and its consequences for the insurance industry

9/11: insured losses of around $20bn

"Nothing will ever be the same again." This sentiment was repeatedly expressed in the days and weeks following the terrorist attacks of 11 September 2001. From a purely economic standpoint this was particularly true of the insurance industry. The estimated

insured losses resulting from the WTC attacks alone are around $20bn. Only Hurricane Andrew in 1992 and the Northridge earthquake of 1994 are in the same league.

Markets tend to overreact to spectacular loss events

Of course it is not really surprising that underwriting losses which exceed statistical expectations have led to a reduction in enterprise values and as a result to reductions in share prices as well.

This at least partly justifies what happened on the markets in the wake of September 11. However, typically under these kind of circumstances share prices tend to not only reflect the discounted value of expected losses. Rather, markets tends to overreact, as evidenced by the €60bn market cap loss experienced by seven major insurers affected by the attacks within just ten days of their occurrence. Hence, insurance companies saw their cost of capital skyrocket, at least temporarily. On the other hand, major loss events also present a welcome opportunity to increase insurance premiums.

Market cap of seven large insurers plummeted €60bn after WTC attacks

	Market cap in €m	
	10 Sep 2001	21 Sep 2001
ALLIANZ (XET)	70,177	54,550
MUNCH RE (XET)	48,360	42,291
HANNOVER RE (XET)	2,340	1,264
SCOR	1,935	1,111
SWISS RE R	29,610	26,099
AMER.INTL.GP.	192,487	170,648
ZURICH FINL SVS (FRA)	22,926	14,879
XL CAP.'A'	11,412	8,472
Total	**379,248**	**319,315**

Source Datastream

Terror, globalisation and sustainability – what is the link?

Social injustice as a breeding ground for terrorism

So what does an event like September 11 have to do with sustainability? The relationship becomes clear when examining terror's origins, which very quickly leads to the crux of the sustainability debate: the equitable global distribution of wealth and the adverse effects of globalisation. The deep-seated feeling of losing out as a result of globalisation is undoubtedly one of the roots of fundamentalism and terrorism. It took a long time before hatred of the West led to the events of September 11. And it will take even longer before the socio-economic causes of terror have been eradicated. There is no question that this will be one of the central tasks of sustainable development policy in the coming decades. A major risk is that the fight against terror will be at the expense of globalisation's positive effects and cause new geopolitical risks. The war in Iraq and the tendency of the US to act unilaterally are prime examples.

Identifying global trends and their implications is key for insurers

Accurately assessing the risks arising from global geopolitical trends and positioning their companies accordingly can be a matter of survival for insurers. A wait-and-see approach will, in our view, not suffice at all. Most insurance companies received a surprising amount of aid from their governments following September 11. In fact, Germany amended its Commercial Code and abolished the strict lower of cost or market principle. The eased rules allowed insurance companies for the first time to show negative valuation reserves (so-called 'hidden losses'). We believe that the introduction

of §341b to the German Commercial Code (Handelsgesetzbuch, HGB) saved some insurance companies from losing their licences. It is not clear what would have happened had the attacks occurred on 31 December. In our view, it is conceivable that, without political help, several German insurers would have been forced out of business.

Example: environmental liability

However, insurance companies cannot expect in future that their governments will bail them out of the precarious financial situations caused by major loss events. On the contrary: at least in Europe one can recognise a partial trend that politicians are trying to force private insurers to commit themselves. A recent example is the EU's polluter-pays principle, which Environment Commissioner Margot Wallström passed into law despite considerable resistance from the industry.

Compulsory insurance?

Still a point of contention in the implementation of the polluter-pays directive is the question of the insurance of liability losses. After the insurance industry rejected issuing polluter liability policies, the European Commission threatened to impose mandatory insurance schemes. For the time being, discussion about the topic appears to be closed, and the insurance sector has committed itself to investigating voluntary alternatives. In the meantime, Member States are required to encourage insurance companies to develop such instruments and to use them. If a solution has not been found by 2008, the Council has left it to the Commission to propose compulsory insurance schemes for companies. This shows, in principle, that insurers face substantial regulatory risks, and that their exposure is not only related to environmental liability, but also, for example, to liability in the medical field and in genetically modified foods.

Population growth and increased prosperity – opportunities and risks for the insurance industry

Steady increase in the frequency and extent of losses...

Climate change and terror, to stick to our examples, are only one side of the coin. They entail a shift and/or a widening of the probability distribution (see also page 60). The other side of the coin is the extent of losses. Of course, this depends on the event itself (how severe for example a storm is or what the target of the terrorist attack is), but it is also influenced by other, external factors such as demographics and the value of the property insured. Even if the frequency of loss events remained constant, the monetary value of losses incurred as a result of extreme events would continue to grow.

Global population growth means that the number of people that are potentially at risk from such events increases and that, as a result, the economic impact, as caused, for example, by the loss of life in a terrorist attack or flood, will escalate, too. Population growth also means that the infrastructure density will grow and with it the value of assets potentially destroyed, whether the cause is a terrorist attack or natural disaster. In addition, population explosion in some countries forces people to settle in areas with a high-risk of natural disasters.

Population growth – risk or opportunity for insurers?

	Population (in m)		Population in 2050 (in m)			
	1950	2000	Low	Medium	High	Constant
World	2,519	6,507	7,866	9,322	10,934	13,049
More developed regions	814	1,191	1,075	1,181	1,309	1,162
Less developed regions	1,706	4,865	6,791	8,141	9,625	11,887
Least developed countries	197	658	1,545	1,830	2,130	3,150
Other less developed countries	1,508	4,207	5,246	6,312	7,495	8,738
Africa	221	794	1,694	2,000	2,320	3,566
Asia	1,399	3,672	4,527	5,428	6,430	7,376
Latin America and Caribbean	167	519	657	806	975	1,025
Europe	548	727	556	603	654	580
Northern America	172	314	389	438	502	446
Oceania	13	31	42	47	53	56

Source United Nations Population Division

... but also in the demand for insurance

Insurance companies are in the business of underwriting risk. In this respect, the new perils emerging from the trends briefly described above represent more than just higher exposure. Certainly, they also represent enormous growth potential. The demand for insurance will definitely increase regardless of whether it is mandated by law or privately motivated.

Complex relationship between insurance and global trends spells heavy demands on management

In future insurers will be more dependent than ever on their ability to accurately assess the impact of major global trends on their businesses and to address such trends with appropriate measures. Insurers face this ambitious task for the management at a time when intangible assets play an increasingly greater role in how companies are valued. This is also occurring at a time when the economic success of companies depends more and more on reputation and public perception; and at a time when the capital markets' pressure on companies is growing, particularly with respect to transparency and good corporate governance. Insurance companies are no exception when it comes to earning, and re-earning, their 'social licence to do business.' After the accounting scandals of recent years, investors and customers are wary, and it would not take much to scare them off.

Investment income dominates insurers' operating business

'Insurance companies are investment firms that sell insurance by the way.'

'Insurance companies are investment firms that sell insurance by the way.' This was how one of our customers once put it, the point being that insurers' earnings are extremely dependent on their investment income – a trend that has left its mark on corporate operating policy, as recent history shows.

Booming stock markets drove combined ratios over 100%

Strong showings in investment income enticed insurers to accept combined ratios well above 100% in their non-life business, particularly in the boom of 1998/1999. The main justification, particularly from sales & marketing: cross-selling with life insurance, where the margins were better.

Stock market boom enticed insurers into accepting combined ratios over 100%

	Shareholders' Equity 2002 vs. 2000 (%)	Combined Ratio 1999	2000	2001	2002
Allianz	57.79	104.5	104.9	108.8	105.7
AXA	95.96	111.6	114.4	112.5	106.5
Generali	78.81	110.2	110.4	108.4	107.9
Munich Re	55.79	118.9	115.3	135.1	122.4
Swiss Re	73.43	121.9	117.5	123.7	104.1
Zurich Financial Services	77.35	106.1	104.2	110.9	111.5

Source Bloomberg

Sliding share prices destroyed results

As share prices plummeted, many insurers found themselves under strong pressure. Most were too late in adjusting the weightings of the stocks held in their portfolios. Companies reporting under International Accounting Standards (IAS) saw shareholders' equity disappear as unrealised gains melted away. Those insurers reporting under national accounting standards generally posted reductions in undisclosed reserves (see our publication "German Insurers – Farewell, hidden reserves" – October 2001).

IAS the source of higher earnings volatility

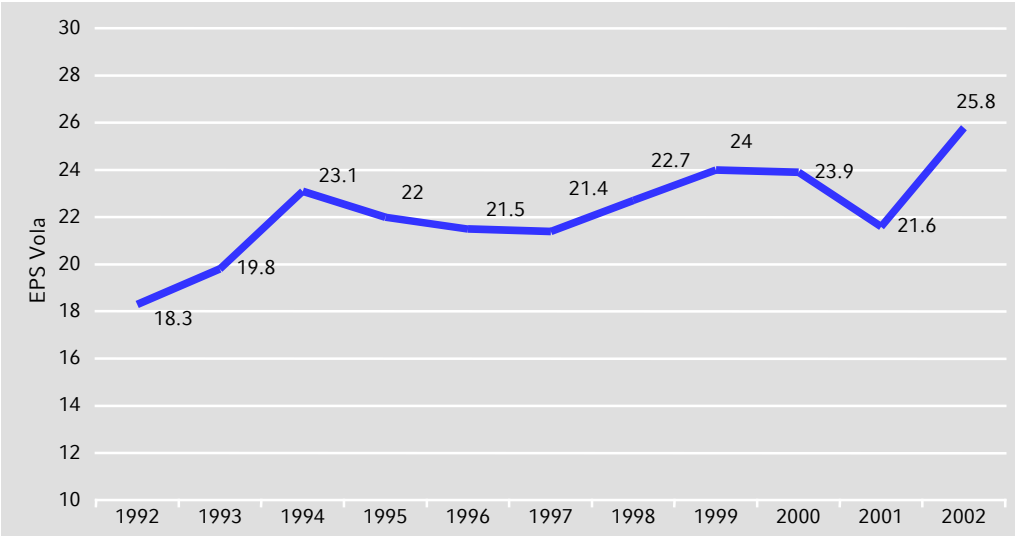
Under IAS, market fluctuations are fully reflected in shareholders' equity

Under IAS, the revaluation reserve is considered an integral part of shareholders' equity. With it, every market fluctuation is fully reflected there. Thus, for insurance companies who report under IAS, increased volatility on the stock markets means increased volatility in their shareholders' equity. In the end, the solvency criteria of the regulatory authorities and credit standing requirements of the rating agencies led to a greater need for capital and capital increases.

No more smoothing of big loss events

A volatile capital cover in the face of, for example, the increased incidence and expense of major loss events caused by climate change is certainly undesirable. In Germany, for example, the equalisation reserve currently permitted in non-life insurance will no longer be available under IAS rules. Thus, companies that report under IAS are not only exposed to market volatility, they are also more vulnerable to major loss events which can no longer be equalised.

Earnings volatility of selected European insurance companies



Source Datastream, WestLB Equity Markets

Squeezed from both sides

Sustainability issues affect assets and liabilities

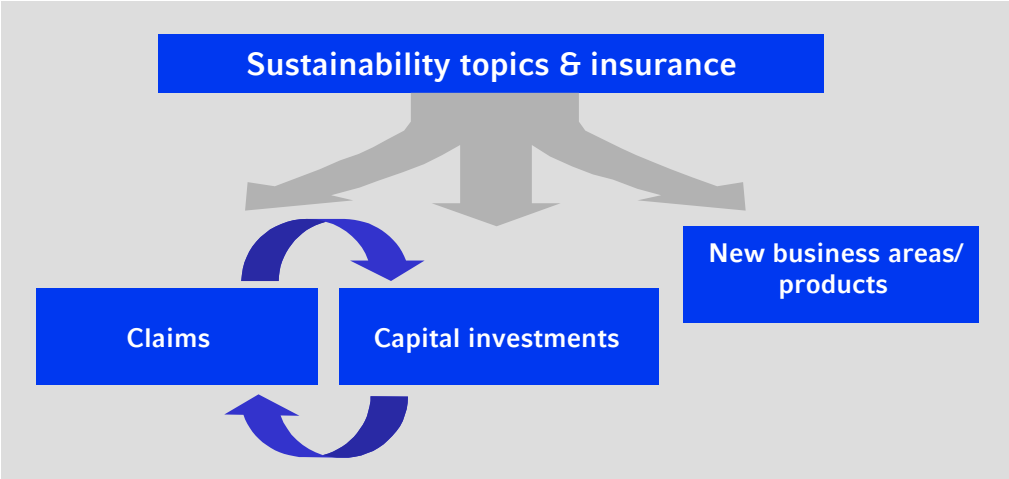
It is apparent, once again, that the insurance sector is unique in that both assets and liabilities are affected by sustainability topics in exceptional and interdependent ways. Thus, the WTC terror attack, for example, not only impacted insurers' underwriting results and own share prices, but also the value of the money they had invested in the stock markets (relative to the specific portfolio exposure, of course).

Leverage to be gained by taking sustainability issues into account is considerable

Insured losses that reduce underwriting reserves, i.e. that cause an operating loss, which result in the cut or suspension of dividends and thus reduce the attractiveness of shares, operate in much the same way as an exceptionally weak investment income does. The insured losses that are part of daily underwriting business and the 'downward volatility' of investment income are nearly identical in terms of their impact. Thus, faced with this dual role, the leverage insurance companies stand to gain by incorporating sustainability topics is considerable. Our study contributes in two ways:

- A detailed description of the sustainability profiles of European insurers, and
- An extensive discussion of these sustainability issues which we believe affect insurers the most, namely climate change, gene technology and geopolitical risks (terror, 'SARS-type' risks and emerging markets).

Triple-pillar structure & dual interdependent exposure



Source WestLB Equity Markets

Companies surveyed on three key issues

Survey of companies & structure of study

Our survey was distributed to a total of 17 companies, 5 of which are re-insurers and 12 of which are primary insurers. Ten companies finally participated (response rate of 59%): 4 out of the 5 re-insurers, and 6 out of the 12 primary insurers. The major primary and re-insurers replied to our survey.

WestLB Equity Markets survey: insurers and sustainability topics

	Took part	Did not take part
Primary Insurers	Allianz	Aegon
	AMB Generali	AGF
	Generali	Alleanza
	Nürnberger Beteiligungen	AXA
	RAS	CNP
	ZFS	Swiss Life Holding
Re-insurers	Converium	SCOR
	Hannover Re	
	Munich Re	
	Swiss Re	

Source WestLB Equity Markets

The survey posed 43 questions covering the three focal SRI topics emphasised in this study: climate change, gene technology and geopolitical risks. The triple pillar structure shown above was reflected in each group of questions.

Triple bottom line approach and...

...industry-specific analysis of focal topics

Our study is set up as follows: the first part deals with the sustainability ratings of European insurers. Using the data from EIRIS, we developed a system for rating companies on sustainability issues. Our assessment yielded a triple bottom line consisting of governance, the environment and products (all equally weighted). The second part of our study examines the specific sustainability topics of climate change, gene technology and geopolitical risks.

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SRI performance & benchmarks

SRI performance & benchmarks

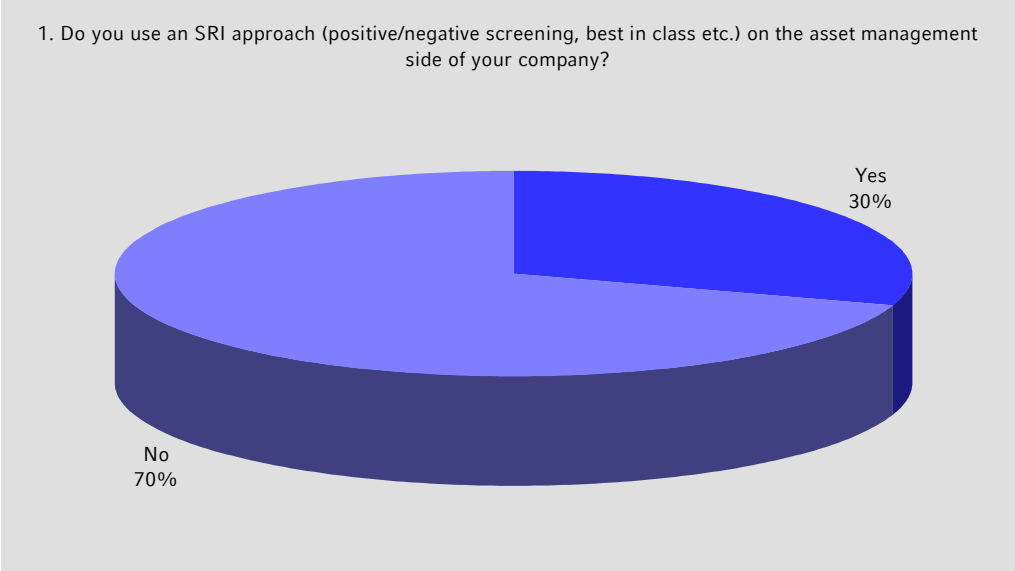
Does it pay off financially to make sustainability a fundamental corporate governance principle? This question is a particularly important one for insurers given their dual role as investment vehicles and fiduciaries. A myriad of anecdotal examples, theoretical considerations about the drivers of shareholder value and, in particular, empirical analyses indicate that sustainability is a factor that can drive equity returns in its own right. Our conclusion that 'it pays off to be good' can also be understood as an appeal to insurers to introduce a structured SRI approach into their asset management activities.

A plea for a structured SRI approach

Does sustainability pay off as a management strategy?

Before exploring sector-specific sustainability topics in detail, we would look at the question of whether sustainability really pays off as a corporate governance principle (in terms of having a positive impact on shareholder value). If it does, then it can also be understood as an appeal to insurers to introduce a structured SRI approach into their investment activities. Of the companies that we surveyed, three said they are already doing so: ZFS, Munich Re and another company that asked to remain anonymous.

Survey – Insurers & Sustainability*



* 10 companies answered this question (N = 10)

Source WestLB Equity Markets

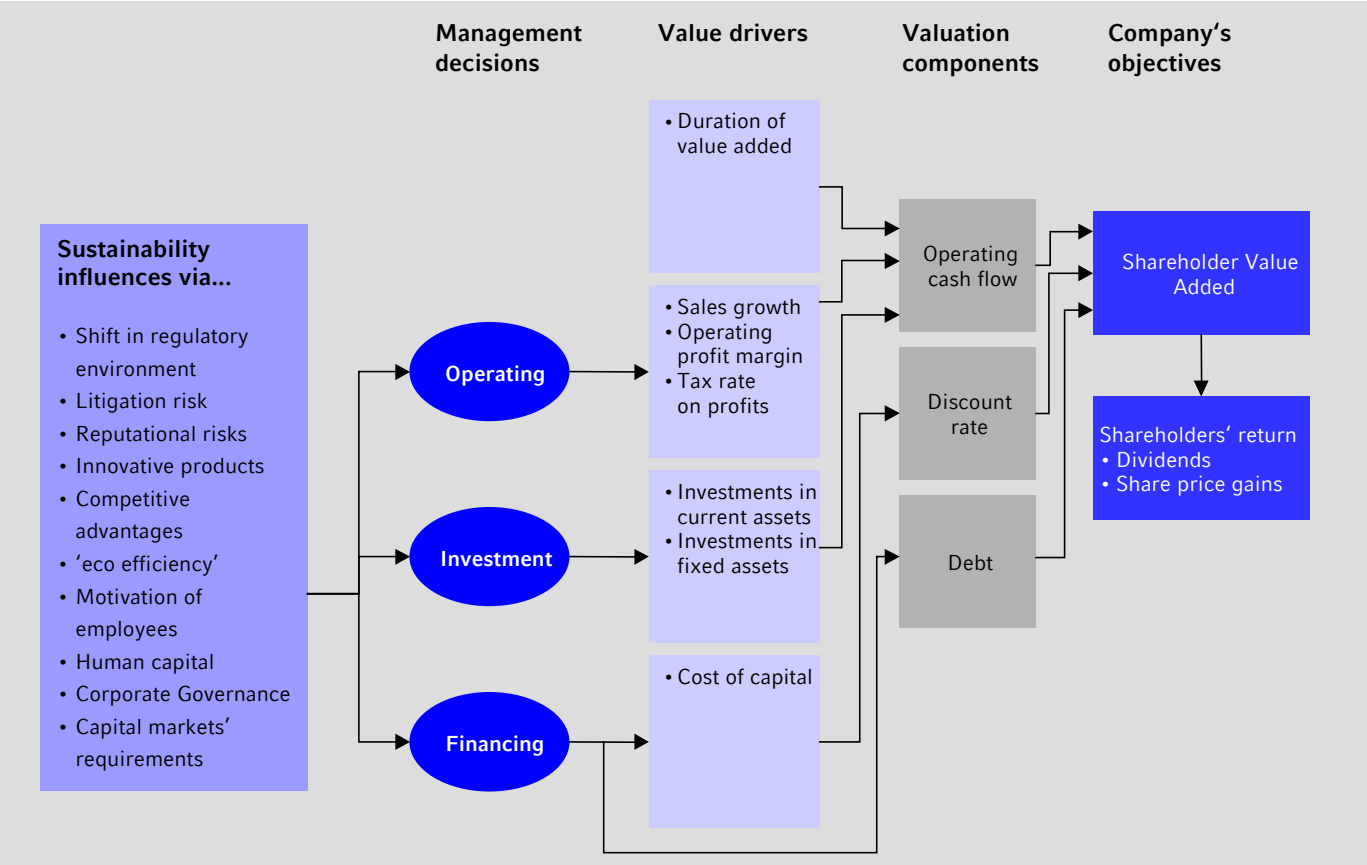
SRI – more gain than pain

Reputation is a key corporate value driver, particularly for large companies

The link between shareholder value and sustainability has been addressed in detail (see, e.g., ZEW, CERES, etc.), by us as well. In our study 'From Economics to Sustainomics' (April 2002) we examined the mechanisms through which sustainability issues affect corporate value drivers in general. For large companies, reputation – and this can be stated without any exception – is one of the most important factors. In a world where branding is a playing a decisive role for products sales and distribution it is essential not

to lose the 'social licence to do business.' A favourite example here is Royal Dutch/Shell's experience, with the attempted disposal of the Brent Spar oil-drilling platform. Within just one month, the company had lost one-third of its market share in Germany. There are plenty more such examples in the energy sector, but it is not the only industry affected.

The shareholder network and how sustainability topics affect a company's value drivers



Source WestLB Equity Markets, Rappaport (1999)

Commerzbank, for example, recently learned that the treatment of employees bears considerable reputation risks. The unilateral decision of the management board to cut company pensions demotivated employees, probably significantly driving down their productivity. Customers also reacted: many of them threatened to close their accounts if the bank did not shape up its behaviour.

Growing importance of intangible assets

All of these cases have one thing in common: the growing importance of intangible assets to a company's value. This is but one of many macro trends increasingly creating 'sustainability value added.'

Sustainability Value Added (SVA) and structural trends

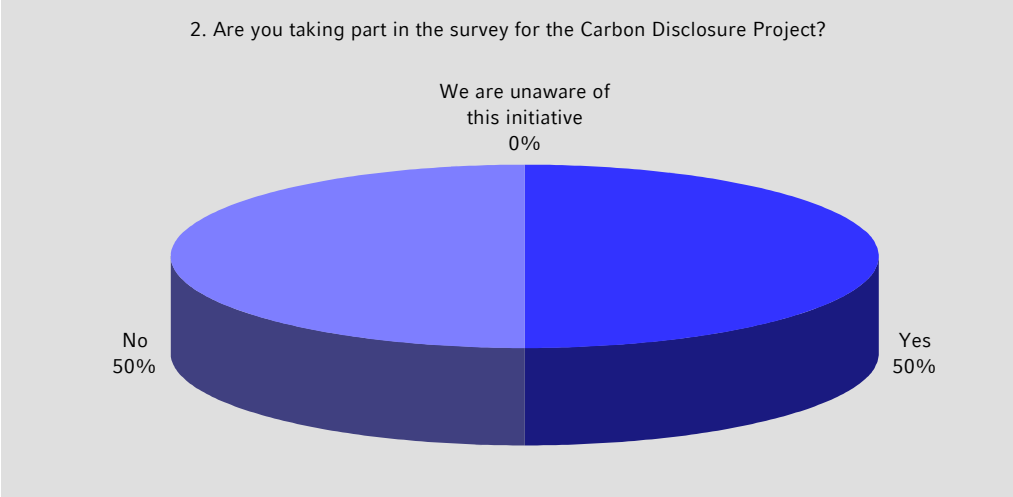
Source WestLB Equity Markets

Greater transparency is demanded

Fiduciary duties and shareholder activism

The pressure from investors is noticeably on the rise, as, for example, driven by an increasingly broad interpretation of fiduciary duties of pension funds. Furthermore, the general trend toward more shareholder activism is continuing. The result: companies with inadequate risk management systems are paying the price in the form of higher costs of capital, rising insurance premiums and lower credit ratings.

Survey – Insurers & Sustainability Topics*



* N = 10

Source WestLB Equity Markets

Climate change is one example: USS (Universities Superannuation Scheme), the UK's third largest pension fund, initiated a discussion on the subject of climate change and institutional investors back in 2001 and launched a 10-point action plan. At the end of May 2002, a group of investors representing $4bn in assets under management started the Carbon Disclosure Project (CDP, see page 82), which calls for large companies to disclose their greenhouse gas emissions. Half of the European insurers we surveyed said they participate in the CDP. The awareness of the project equalled even 100%.

Reporting standards for greenhouse gas emissions are being set by 'GHG Protocol Initiative,' among others, and when Netherlands-based ABP, Europe's largest pension fund, started two experimental stock portfolios of $100m each, they decided to consider the risks and opportunities associated with climate change when selecting which companies to buy. The percentage of shareholders in favour of implementing a climate strategy at Exxon grew from 8.9% in 2001 to 22% in 2003. The UN organisation UNEP FI is also committed to raising climate change awareness among financial institutions and investors.

Litigation risks

Class action suits in the USA: the bright and dark side

Historical or future conditional claims arising from product liability can have a major impact on a company's value. The tobacco industry is a classic example. In the US, disposal and compensation of damages can easily take on proportions that threaten a company's survival. Thus, it is no surprise that just the threat of a lawsuit can exert considerable pressure on a company's share price. US-based Halliburton and Dow Chemical, for example, recently lost up to 40% of their market capitalisation due to investor concerns about potential asbestos suits.

Class action lawsuits in the US might act quite well to apply pressure on companies to change their behaviour, but we must not forget about their dark side. To some extent, insurance companies no longer insure doctors and hospitals, with the result that some doctor's offices and hospitals were forced to close their doors. Thus, excessive payouts in the courtroom or around the arbitration table already hampered activity in some sectors of the economy.

Climate change: class action suits modelled after the tobacco cases conceivable

Various NGOs are currently exploring the possibility of filing lawsuits against companies or governments that disregard the need for climate protection and oppose the Kyoto Protocol. This poses serious financial risks, particularly in the US. Claros Consulting estimates that ExxonMobil could face claims in excess of $0.2b-$1bn per year.

Sustainability risks could be reflected in four types of costs:

- Costs of capital
- Direct operating costs (for example, ecotaxes, emissions trading schemes)
- Productivity (employee motivation)
- Products: profits/lost profits (opportunity costs)

Clearly, the link between shareholder value and sustainability is not a one-way street. Companies can gain a competitive edge in any of the areas mentioned above and, thus, positively impact their value drivers. Examples of this abound (see, for example, CERES/Innovest, 2003).

Empirical evidence

Is there an empirical link between financial and social performance?

The fact that in theory an economically plausible link can be established between Corporate Social Responsibility and Shareholder Value does not mean that an empirical link can be objectively identified which:

- would provide insight into whether managers really shape their CSR activities in the interests of the owners of the company, and that
- throws light on whether investing in companies with social responsibility can also be justified from a purely financial point of view.

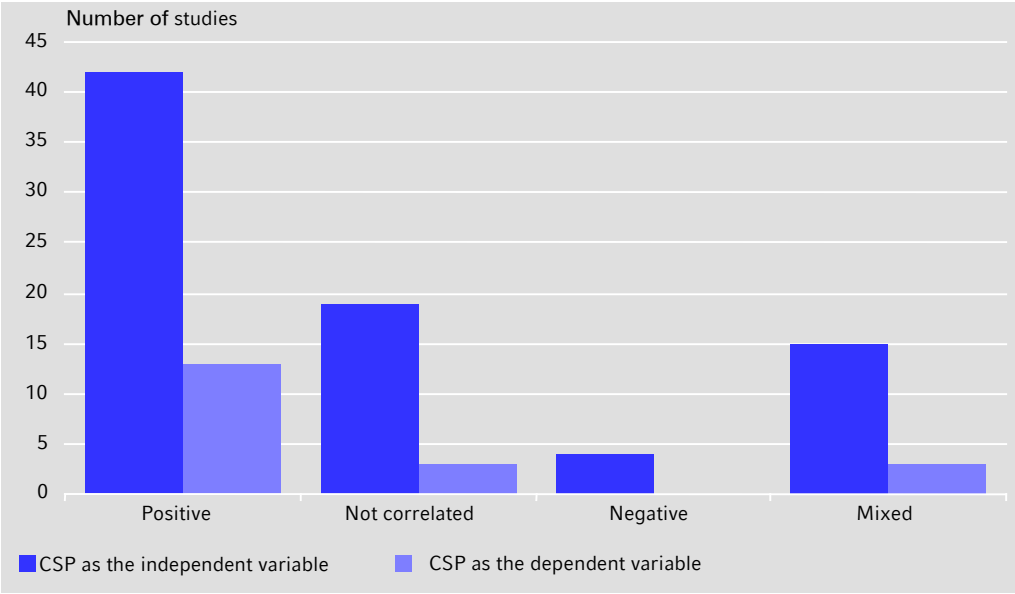
The latter undoubtedly has far-reaching implications as it would suggest that Socially Responsible Investments are not a niche segment for a very special clientele, but also an investment approach for 'normal' investors with an exclusively monetary motivation.

No systematic financial disadvantages to be expected

In the last few years the number of empirical studies has increased steeply along with the market volume for SRI and the generally greater public interest in the topic of the social responsibility of companies. Looking at the findings as a whole creates the impression that those investing in companies with social responsibility do not need to fear systematic financial disadvantages compared to 'normal' investors. The restriction of the investment universe, which implies a loss in portfolio efficiency, a fact which the SRI philosophy has been widely criticised for, is by no means specific to this approach. In fact, the SRI approach is in no respect different from most other asset management processes which concentrate on specific sectors, investment styles or regions.

Margolis and Walsh (2001), for example, provide an overview of 95 empirical studies carried out for the US equity markets since 1972. The results are summarised in the following graph.

Corporate social performance (CSP) and financial performance



Source Margolis/Walsh (2001)

Performance attribution is difficult

There is much to support the assumption that there is a positive correlation between the 'social' and the financial performance of companies. However, the findings should not be over-interpreted. It is often suggested that the use of CSP as an independent variable in itself suggests a causal relationship (CSP as a driver of financial performance). We warn against such an interpretation, however. The success of a corporate strategy, independent of whether it is based on CSR principles or not, depends on a host of factors that cannot be separated from each other. Company success depends on many factors. What contribution a corporate culture based on CSR principles makes to a company's ability to sell its products can at worst only be guessed at, but at least cannot be precisely quantified.

The empirical studies that have been done can be divided into three categories:

- Event studies: How, for example, does the equity market react to the announcement of toxic emissions?
- Cross sectional analyses: Do, for example, environmental ratings have a systematic influence on average returns?
- Performance of SRI funds and indexes

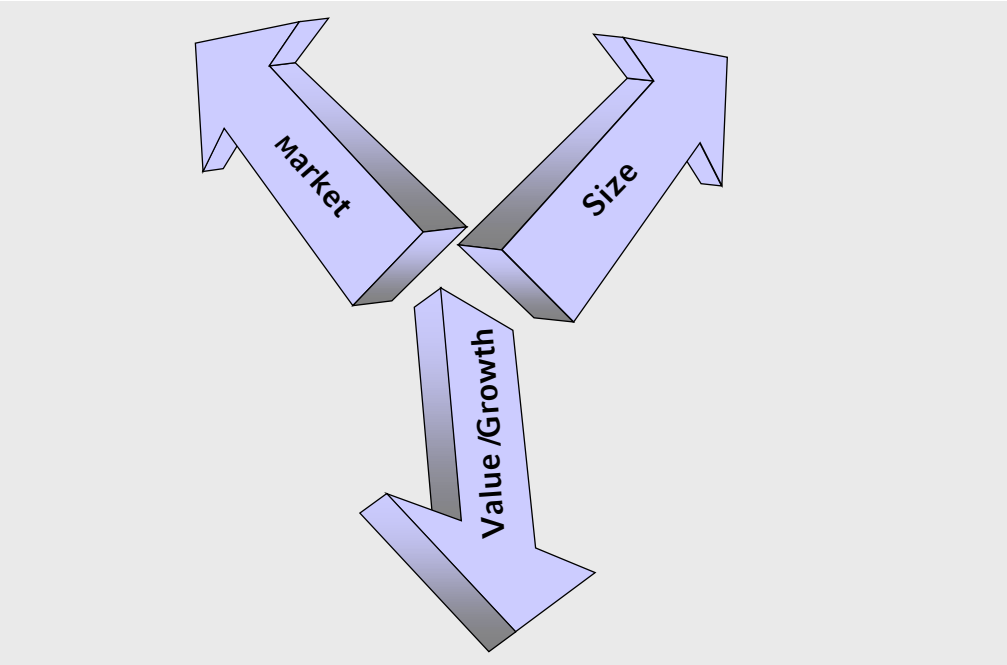
Determining a 'sustainability alpha'

In our note 'More gain than pain – Sustainability pays off' (November 2002, with an update in October 2003) we examined how the sustainability factor affected share price performance using Jensen's alpha. The basis for our analysis was a three-factor model (see Fama/French, 1996), which took into account other fundamental risk factors in addition to market risk and enabled the calculation of a multidimensional risk-adjusted excess return.

$$r_{P,t} - r_{f,t} = \alpha_P + \beta_{P,M} \cdot (r_{M,t} - r_{f,t}) + \beta_{P,Value} \cdot (r_{V,t} - r_{G,t}) + \beta_{P,Size} \cdot (r_{Small,t} - r_{Large,t}) + \varepsilon_{P,t}.$$

The alpha is interpreted here as the excess return adjusted for style, size and market risk factors. We estimated the model with the help of the OLS method. We used the monthly returns of the DJ STOXX index family and, as the risk-free rate, the three-month inter-bank rate (weighted average UK/euro-zone).

Risk dimensions of the three-factor model



Source WestLB Equity Markets

Risk-adjusted outperformance of 3.1% p.a.

The result is astonishingly robust and confirms the result of our earlier study. Taking the entire observation period (January 1999 to August 2003) as a basis, then the alpha of the DJSI is 0.2572% per month or around 3.1% p.a. which is significantly above our original result of 0.171% per month. In a generally very difficult equity market environment, with very different sub-regimes characterised by the different risk attitudes of market participants, the tested sustainability index was able to achieve a risk-adjusted outperformance. This time the result is statistically highly significant (1% level), of which only a part is attributable to the larger number of observations.

Regression result multi-factor model (OLS estimates, t-values in brackets)

	Old result (01/99 – 10/02)	Overall period (inc. retrospective bias) (01/99 – 08/03)	Since start of index (10/01 – 08/03)	Since peak of speculation bubble (03/00 – 08/03)
Alpha	0.1706*	0.2572***	0.2521**	0.3156***
	(1.736)	(2.989)	(2.507)	(2.817)
Market beta	1.0248	1.0361	1.0464	1.0404
	(68.925)	(80.781)	(85.275)	(72.615)
Size beta	-0.2436	-0.2299	-0.1543	-0.2423
	(-8.707)	(-9.023)	(-3.862)	(-7.833)
Value/growth beta	0.1020	0.0968	-0.0178	0.0661
	(5.594)	(5.488)	(-0.509)	(2.050)

* = 10% level, **= 5% level, ***= 1% level

Source WestLB Equity Markets

Another important reason is that the amount and consistency of the outperformance achieved has apparently tended to increase over time. For example, for the period after the speculation bubble on the equity markets peaked (March 2000) we arrived at an alpha of 0.3156% per month while the statistical significance is hardly reduced at all.

No upward bias induced through retrospective calculation

Our results thus deflate the criticism that the results of performance analyses of the DJSI are distorted on the upside because when using the entire period available one includes a period for which the index is only available as a retrospective calculation. After all, the alpha increased significantly in the period after the launch of the index in October 2001 compared to the overall period, from 0.171% to 0.252% per month (statistically significant at the 5% level).

QED study calculates outperformance of 180-440 bp/year

Empirical studies for the US had similar results. The research institute QED also took a time series approach and calculated an outperformance of 180-440 basis points per year (compared to the 303-379 bp/year we calculated for Europe). In addition to size and value factors, differences in interest-rate and oil-price sensitivity were considered. Thus, it is possible to speak once again of a 'purified' return on the sustainability factor.

Similar results in the study by Morgan Stanley and Oekom

Last but not least, we would like to mention a joint study by Morgan Stanley and Munich-based Oekom Research, which found that sustainability leaders clearly outperformed sustainability laggards over a four-year period. The study looked at 602 companies on the MSCI World Index that had received a sustainability rating from Oekom (the rating itself is based on 200 criteria). Altogether, the companies represented around 80% of the index's market capitalisation. Of the 602 companies rated, 186 were classified as sustainability leaders in their respective sectors and grouped together in a best-in-class portfolio. The remaining 416, whose CSR performance was weaker, were grouped in a second portfolio. The study examined the performance of the two portfolios in the time from 31 December 1999 to 27 October 2003. The best-in-class portfolio outperformed its peer by 23.39%.

We stick to our conclusion: 'it pays to be good'

The results show that sustainability is an independent return-driving factor that can have a positive impact on shareholder value beyond the influence of value, growth and size components. Our results disprove two preconceptions at the same time:

- Although the criticism that the 'Socially Responsible Investments' approach is basically to be rejected from a portfolio efficiency point of view is mathematically correct, it misses the reality of imperfect capital markets. The fact that the return/risk trade-off can be improved systematically is demonstrated by our empirical tests on the basis of the DJ STOXX Sustainability Index.

- The criticism that Corporate Social Responsibility (CSR) is solely to be viewed as a cost factor and thus as a burden on financial performance can be completely refuted on the basis of the presented results. CSR is obviously *not* a 'subversive doctrine', as Milton Friedman once put it in the seventies. Sustainability thinking on the part of managers, on average, seems to be in the best interest of shareholders.

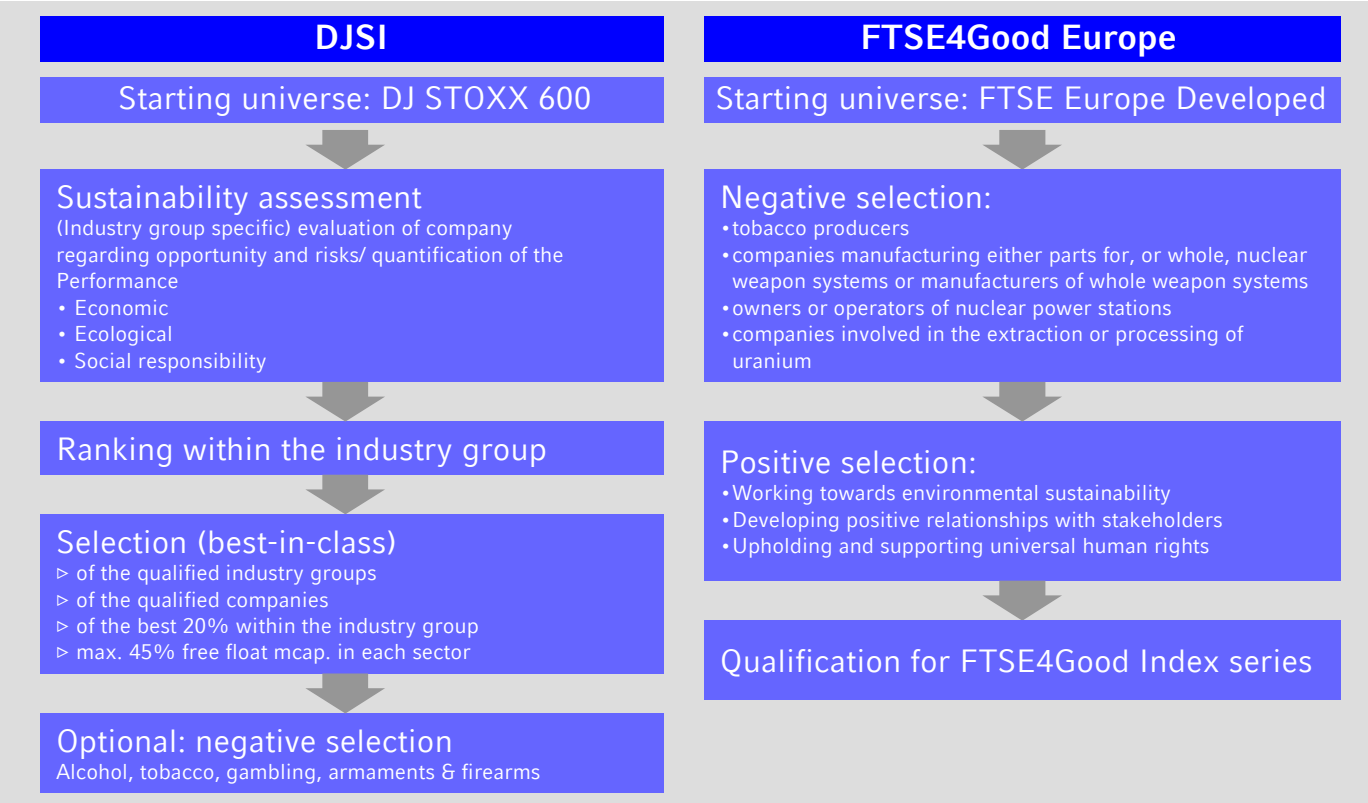
Benchmarking SRI

When transforming the SRI philosophy to real-life portfolios, sustainability indices help. They also show how individual insurers perform with respect to sustainability factors.

DJSI and FTSE4Good are Europe's key benchmarks

The most important European benchmark systems for sustainability investors are the DJ STOXX Sustainability Index family (DJSI) and the FTSE4Good Indices. The DJSI family strictly follows the best-in-class approach, i.e. those leading the way in sustainability within the relevant industry groups are included in the index. Negative selection is optional and represented in separate indices (e.g. DJSI ex alcohol, tobacco, gambling, armament & firearms). The basis universe for the DJSI family is formed by the DJ STOXX600. The sustainability research and rating is delivered by SAM (Sustainable Asset Management, Zurich). The FTSE4Good indices per se exclude (1) tobacco producers, (2) manufacturers of either parts for, or whole, nuclear weapon systems, (3) companies manufacturing whole weapon systems, (4) owners or operators of nuclear power stations and (5) companies involved in the extraction or processing of uranium. The second stage of the process involves a positive selection: to be included in the index companies from the reduced universe have to meet criteria requirements in three areas (environmental sustainability, stakeholder issues, human rights). The FTSE4Good Tradable Indices represent the largest 100 respective 50 companies (according to free float market cap) that have qualified. The basis universe for the FTSE4Good Europe family is formed by the FTSE Developed Europe Index. The sustainability research and screening is done by our research partner EIRIS.

Company Assessment Process DJSI vs. FTSE4Good



Source FTSE, SAM Indexes, WestLB Equity Markets

How is the insurance sector represented in the SRI indices?

9 out of the 35 insurance companies in the DJ STOXX also show up in the DJSI

Of the 35 insurance companies that are part of the DJ STOXX, only 9 are represented in the DJSI, but these represent 56% of the market cap of the entire sector. Except for AXA UAP, Assicurazioni Generali and Prudential, all major insurers (free float market cap >€10bn) in the DJ STOXX are also represented in the DJSI. AGF and Storebrand are the only insurers with a market cap below €10bn that qualified.

Insurance companies of the DJ STOXX, in DJSI and in FTSE4Good Europe

Name	Price (local)	MCap	DJSI		FTSE4Good	
	06/02/2004	(€ m)	Member	Weight	Member	Weight
ING GROEP	20.34	36,734.6	yes	1.38	yes	1.12
ALLIANZ	103.14	34,838.9	yes	1.33	yes	1.06
AXA UAP	17.93	25,153.3	no	n.a.	yes	0.77
ASSICURAZIONI GENERALI	21.64	23,843.5	no	n.a.	yes	0.73
SWISS RE*	92.25	18,964.5	yes	0.71	yes	0.58
AVIVA	5.36	17,563.4	yes	0.65	yes	0.53
MUENCHENER RUECKVER R	91.74	15,658.0	yes	0.60	yes	0.48
AEGON	11.94	15,967.9	yes	0.62	yes	0.49
ZURICH FINANCIAL SERVICES	186.25	17,120.7	yes	0.65	yes	0.52
PRUDENTIAL CORPORATION	4.9225	14,329.8	no	n.a.	yes	0.44
LEGAL + GENERAL GRP	1.01	9,543.4	no	n.a.	yes	0.29
OLD MUTUAL	0.925	4,747.7	no	n.a.	yes	0.14
RAS	14.75	4,396.0	no	n.a.	yes	0.13
ALLEANZA ASSICURAZIONI	9.31	4,152.5	no	n.a.	no	n.a.
ROYAL SUN ALLIANCE INS GR	0.96	4,017.6	no	n.a.	yes	0.12
IRISH LIFE + PERMANENT	13.5	3,632.8	no	n.a.	yes	0.11
FRIENDS PROVIDENT PLC	1.4225	3,559.4	no	n.a.	no	n.a.
SKANDIA FORSAKRINGS	32	3,325.1	no	n.a.	yes	0.10
SAMPO PLC	8.54	2,834.8	no	n.a.	yes	0.09
SWISS LIFE HOLDING	239.25	2,893.4	no	n.a.	yes	0.09
AGF	48.56	3,013.3	yes	0.11	yes	0.09
BALOISE	58.9	2,079.4	no	n.a.	yes	0.06
CNP ASSURANCES	46.1	1,731.8	no	n.a.	no	n.a.
CONVERIUM HLDG N	70.1	1,790.1	no	n.a.	no	n.a.
MEDIOLANUM	5.81	1,482.6	no	n.a.	no	n.a.
CATTOLICA ASSICURAZIONI	31.98	1,515.6	no	n.a.	no	n.a.
FONDIARIA – SAI	18.96	1,447.8	no	n.a.	no	n.a.
TOPDANMARK	328	1,117.6	no	n.a.	no	n.a.
JARDINE LLOYD THOMPSON GR	5.84	1,158.4	no	n.a.	no	n.a.
STOREBRAND	45.1	1,002.7	yes	0.04	yes	0.03
CORPORACION MAPFRE SA	12.07	982.2	no	n.a.	no	n.a.
BRIT INSURANCE HOLDINGS	0.7875	1,011.9	no	n.a.	no	n.a.
HANNOVER RUCK.	29.66	1,008.7	no	n.a.	no	n.a.
AMB GENERALI HOLDING	67.44	915.9	no	n.a.	yes	0.03
AMLIN	1.6	788.2	no	n.a.	no	n.a.
UNIPOL ASSICURAZIONI	3.59	691.3	no	n.a.	no	n.a.

* sector leader in DJSI

Source DJ STOXX, FTSE, WestLB Equity Markets

22 insurance companies in the FTSE4Good Europe

The situation with the FTSE4Good Europe is different. With 261 stocks, compared to the 167 stocks making up the DJSI, the FTSE4Good Europe is generally more diversified and includes 22 insurance companies. Among these are the 9 insurers represented in the DJSI, as well as the 3 large caps missing from the DJSI, namely AXA UAP, Assicurazioni Generali and Prudential. Legal & General and a number of other smaller companies

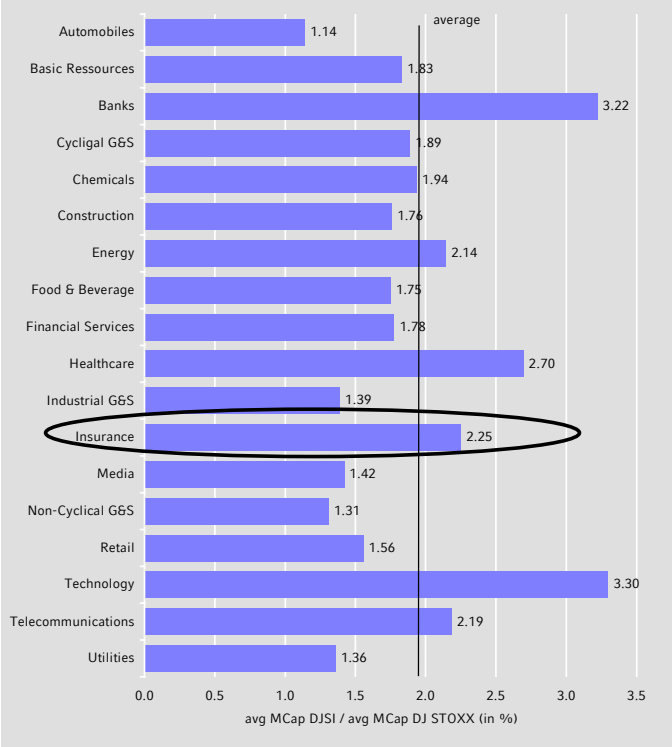
complete the list. As a result, not only is the nominal market cap of the insurance sector as represented in the FTSE4Good much higher than in the DJSI (€262bn vs. €160bn, as of 06/02/04), but also the sector weighting (8% vs. 6.1%). On the other hand, the average size of the insurers in the FTSE4Good is smaller than those in the DJSI (€11.9bn vs. €17.8bn).

A comparison of the DJSI and DJ STOXX

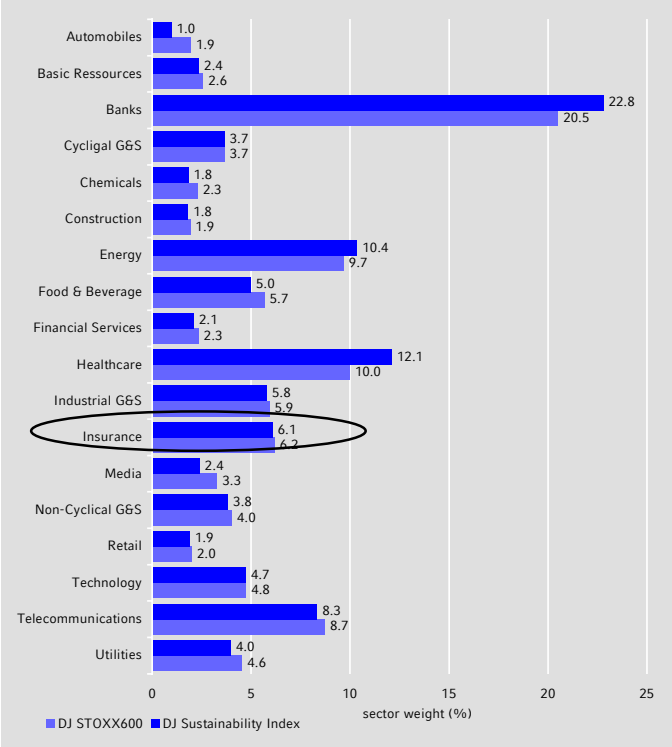
A comparison of the market cap of the individual sectors represented in the DJSI versus those in the DJ STOXX shows that the insurance companies in the DJSI are, on average, more than twice as big as those in the DJ STOXX (€67.8bn vs. €31.6bn). This size effect is more dramatic in only three other sectors: technology, banking and healthcare.

DJSI vs. DJ STOXX

Average Market capitalisation DJSI/DJSTOXX



Sector weights



Source WestLB Equity Markets, DJ STOXX

Insurance sector only slightly underweighted in the DJSI vs. DJ STOXX

Particularly with respect to passive portfolio management, it is of interest to compare the sector structures of the DJSI with those of the DJ STOXX600. The insurance sector makes up 6.1% of the DJSI, which is only slightly lower than the 6.2% it claims in the DJ STOXX. Accordingly, the tracking error with respect to the insurance sector is relatively small, whereas with healthcare, banking and energy, it is much greater. These three sectors are overweighted in the DJSI, while automobiles, media and chemicals are clearly under-represented.

WestLB

Triple bottom line rating

Triple bottom line rating: David beats Goliath

Corporate social responsibility is first and foremost a qualitative concept. However, quantifiable indicators do exist that can help in assessing companies' sustainability performance (even though these are somewhat subjective). Based on data delivered by our research partner EIRIS, we have developed a structured approach that enables us to score companies in terms of: Governance, Environment and Products (i.e. our triple bottom line). We also differentiate between exposure and management quality.

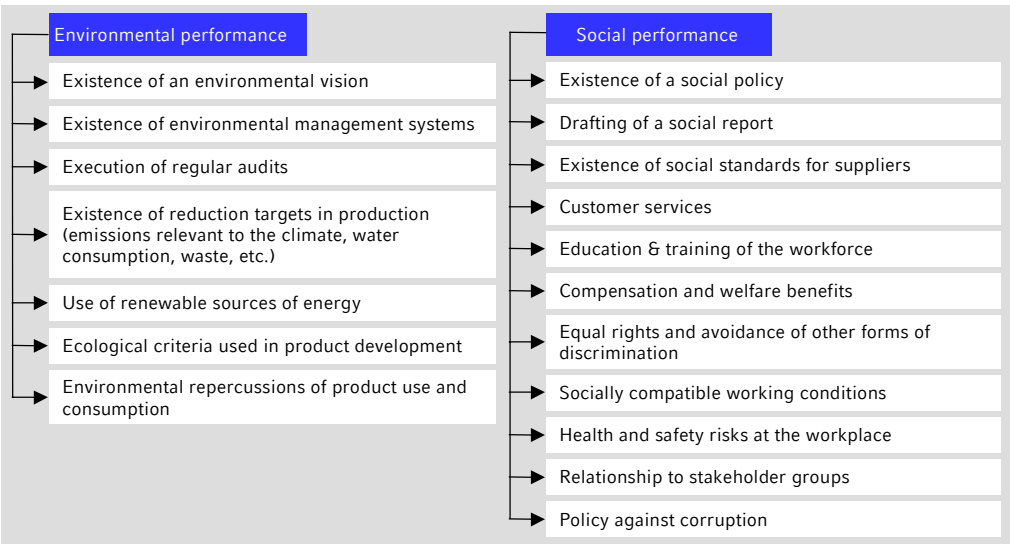
Our most important findings are: (1) Overall the insurance sector's sustainability exposure is below par, whereas in terms of management quality, insurers are ranked above average. (2) Insurers focus mainly on Governance; accordingly, on average they receive comparatively high scores in this area. (3) Insurers apparently consider their impact on the environment as negligible; they see only little need for action; hence, it is no surprise that the sector's Environment Score is below average. (4) The 'large cap effect' that is generally present in corporate sustainability ratings plays only a limited role in the insurance industry; small to medium-sized companies fill the top four places in our rankings.

Corporate Social Responsibility – Criteria

CSR is and remains primarily a qualitative concept

Corporate Social Responsibility is, and remains, a qualitative concept, even though quantitative indicators may exist that allow companies to be benchmarked against their competitors. Hence, a considerable amount of subjectivity will remain even if external ratings are used.

Corporate social performance – catalogue of criteria



Source ebs, Ökoinstitut, ZEW, WestLB Equity Markets

A look at the rating systems of agencies/consultants/asset managers specialised in CSR conveys an impression of what criteria can be used to assess companies' Corporate Social Performance. A study already cited above commissioned by the German Federal Ministry of Research (ebs/Ökoinstitut and ZEW, 2001) comes to the conclusion that both in the area of the environment as well as in that of social performance some criteria are polled by virtually all providers examined (see chart above).

Insurance – a 'clean' industry?

Insurance as 'clean' industry

So how does the insurance industry fare in such an analysis? At first glance, insurance appears to be a 'clean' industry. As a services business, it uses fewer natural resources than companies in the manufacturing sector, which means insurers' direct impact on the environment is comparatively small. The issue of working conditions in third world countries and emerging markets is certainly also less of a problem.

Oekom Research study: CSR not a top priority among insurers

In view of this, it is no surprise that most insurance companies assess themselves as 'clean' and do not believe that they cause any significant negative impact regarding social, ethical and environmental aspects. At least this is what the results of a study by Oekom Research suggests. The ratings agency asked 70 major insurance companies worldwide about their activities in the social and environmental areas. Forty-four of those surveyed, including all 26 from the US, gave either no information at all or insufficient information. Just a few companies demonstrated progress in reporting their social and environmental performance. Thus, it seems that CSR is not a top priority among insurers. Only the amount of assets invested according to SRI criteria and the degree of shareholder activism increased since the last survey.

EIRIS data convey a similar picture

The data from our research partner EIRIS (Ethical Investment Research Service), a global network of research institutes providing service in the field of CSR, paint a similar picture. According to this, too, insurance companies do not see the issue "environment" as a high priority for their businesses. With regard to social performance, however, their commitment seems to be stronger. In addition to general measures, like implementing codes of ethics, insurance companies are concerned about bribery & corruption, equal opportunities, investor relations and training & development. As in other industries, it appears to be particularly the large multinational corporates that have done their homework, at least partly. But overall, this size effect is less evident in the insurance industry than in other sectors of the economy (see page 32).

Sustainability rating

"Triple bottom line" system

Our "triple bottom line" is composed of governance, environment and products

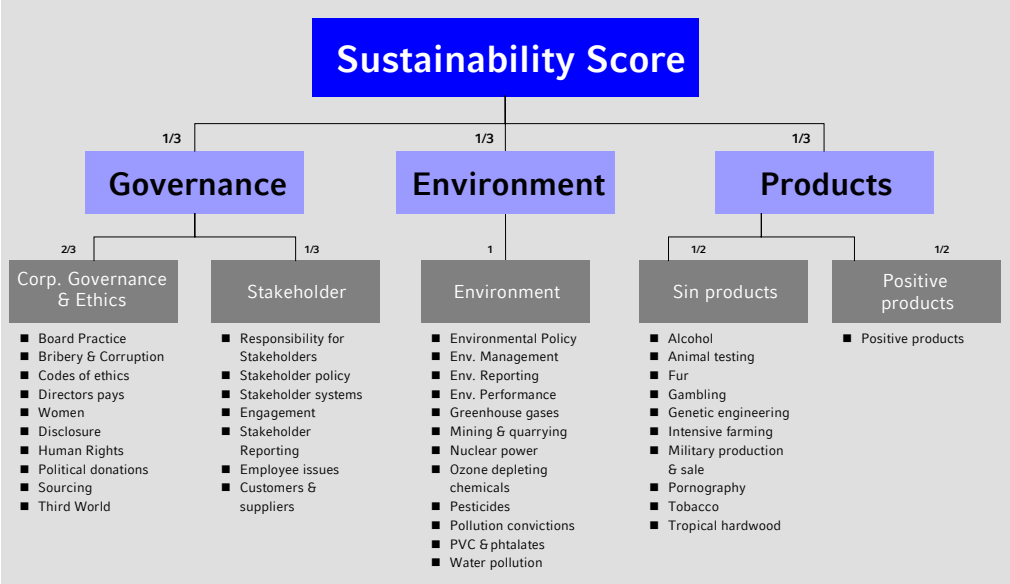
Based on the EIRIS data we have developed a system that allows us to rate companies from the sustainability point of view. Our company rating then takes the form of a "triple bottom line" consisting of the (equally-weighted) components Governance, Environment and Products.

Below this "triple bottom line" we have introduced a further (aggregation) level. This is sub-divided into five sub-sectors, which are in turn composed of various numbers of sub-components (see chart below). These sub-components are aggregated with equal weightings and shown as so-called z-scores on both levels, for the overall score as well

as at the second level of aggregation. Z-scores have the advantage that the results can be interpreted simply, directly and unambiguously. A zero score means that a company tallies precisely with the market average. Scores greater than +1 or smaller than -1, by contrast, suggest a significant divergence from the market average.

The Z-scores can also be interpreted directly as standard deviations. A score of +1 consequently means that the company is located one standard deviation above the market average. This in turn could be interpreted as a reason to either overweight the stock from a SRI perspective or to take it into consideration within a positive selection procedure.

Structure of our sustainability rating



Source WestLB Equity Markets, EIRIS

Exposure and management quality

Besides, we disclose two further scores, exposure and management quality (also as Z-scores) in order to improve transparency and to extend the latitude for interpretation. We understand exposure to represent the "original" sustainability risk, i.e. that part of a company's sustainability risk, which can only be changed by re-defining the company's business areas (e.g. "windmills instead of tanks"). Values greater than zero indicate an above-average risk and accordingly are to be interpreted negatively.

Conversely, we understand management quality to be the factors, which can affect the sustainability rating within a pre-defined class of companies (generally defined by sector or product). It is primarily this factor a portfolio manager should generally take account of when applying a best-in-class approach as described above.

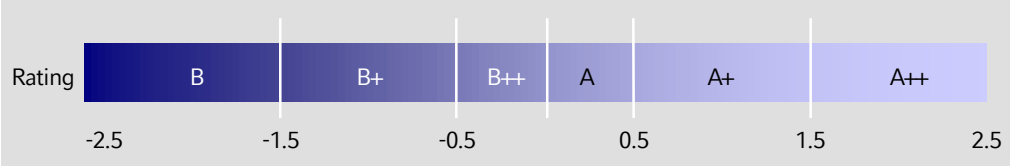
Definition of rating classes

Our objective is a high level of transparency

Our rating is based on a numerical scoring system (a short description can be found below). In order to allow an intuitive and simple interpretation of the results, we have supplemented the Z-scores with an alphanumerical rating, which we have derived from examples in the field of credit ratings. Overall, we have defined six rating classes:

- **A++:** excellent sustainability performance; z-score ≥1.5
- **A+:** very good sustainability performance; z-score range: [0.5; 1.5)
- **A:** good sustainability performance; z-score range: [0.0; 1.5)
- **B++:** adequate sustainability performance; z-score range: [-0.5; 0.0)
- **B+:** questionable sustainability performance; z-score range: [-1.5; -0.5)
- **B:** poor sustainability performance; z-score < -1.5.

Range of the alphanumerical ratings



Source WestLB Equity Markets

How does the insurance industry compare to other industries?

Overall sustainability rating

For our initial industry comparison, we used only the companies represented in the STOXX600. In one analysis, the companies were equally weighted; in another, market cap weighted. Such a method yields a rough idea of any size effects.

SRI Rating for DJ STOXX Market Sector Indices: Equally weighted vs. MCap weighted*

DJ STOXX Sector		SRI rating (z-score)							
		Equally weighted				MCap weighted			
		Total	Gov.	Env.	Prod.	Total	Gov.	Env.	Prod.
Defensive Sector									
Food & Beverages	FOB	0.30	0.37	0.34	-0.65	1.00	0.95	1.07	-0.65
Healthcare	HCR	0.35	-0.10	0.21	2.25	1.20	0.64	1.00	2.33
Non-Cyclical Goods & Services	NCG	0.31	0.24	0.25	0.24	0.56	0.45	0.59	0.03
Retail	RTS	0.05	0.12	-0.11	0.04	0.53	0.57	0.29	0.03
Utilities	UTI	0.52	0.20	0.80	0.45	0.33	0.17	0.54	-0.03
Financial Sector									
Banks	BNK	-0.06	0.22	-0.45	-0.25	0.70	0.86	0.36	-0.35
Financial Services	FSV	-0.32	-0.20	-0.37	-0.21	-0.11	0.10	-0.40	-0.15
Insurance	INS	0.22	0.40	-0.09	-0.22	0.42	0.58	0.13	-0.26
Basic Materials Sector									
Basic Resources	BAS	0.33	0.24	0.52	-0.32	0.86	0.87	0.74	-0.32
Energy	ENE	0.47	0.53	0.42	-0.48	1.03	1.15	0.84	-0.77
TMT Sector									
Media	MDI	-0.24	-0.08	-0.36	-0.28	0.08	0.28	-0.18	-0.33
Technology	TEC	-0.48	-0.50	-0.24	-0.24	0.27	0.09	0.63	-0.31
Telecommunications	TLS	0.24	0.38	0.09	-0.39	0.67	0.90	0.28	-0.53
Cyclical Sector									
Automobiles	ATO	0.01	-0.49	0.99	-0.20	0.27	-0.26	1.34	-0.51
Chemicals	CHM	0.11	0.00	0.29	-0.02	0.50	0.46	0.37	0.16
Construction	CNS	-0.21	-0.23	-0.20	0.23	-0.08	-0.06	-0.16	0.14
Cyclical Goods & Services	CGS	-0.35	-0.24	-0.27	-0.51	0.04	0.06	0.23	-0.62
Industrial Goods & Services	IGS	-0.14	-0.24	0.07	0.03	0.17	0.11	0.34	-0.23
Average						**0.47**	**0.44**	**0.44**	**-0.13**

* all calculations based on EIRIS data, prices as of 12.01.2004

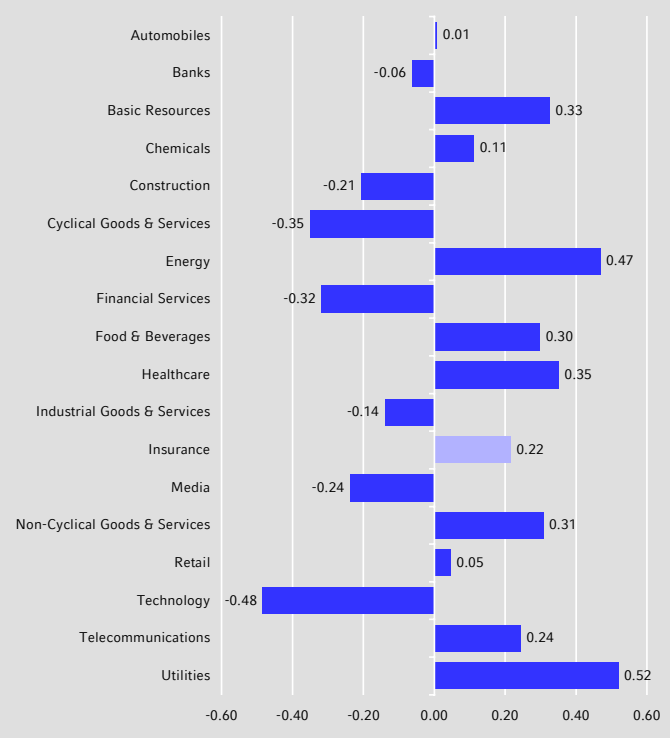
Source WestLB Equity Markets

Overall, the insurance sector rates slightly above average; size effect less pronounced than in other industries

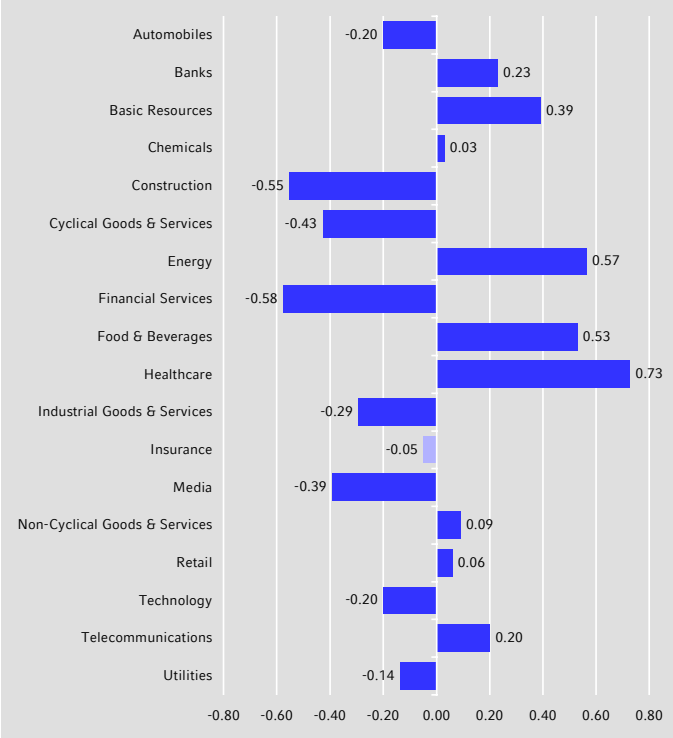
Equally weighted, the insurance sector's overall score of 0.22 is only slightly above average. On a market cap weighted basis the score is 0.42, which implies that the large, generally multinational insurers seem to be better positioned than the smaller, more regional operating companies. However, this size effect is not as strong as in most of the other sectors (compare, for example, with banks). This can be seen by the market cap weighted market average score of 0.47, which puts the insurance sector slightly below average.

DJ STOXX Market Sector Indices – Total Scores*:

Equally weighted Aggregation



MCap weighted Aggregation (Dev. from average)



* all calculations based on EIRIS data, prices as of 12.01.2004

Source WestLB Equity Markets

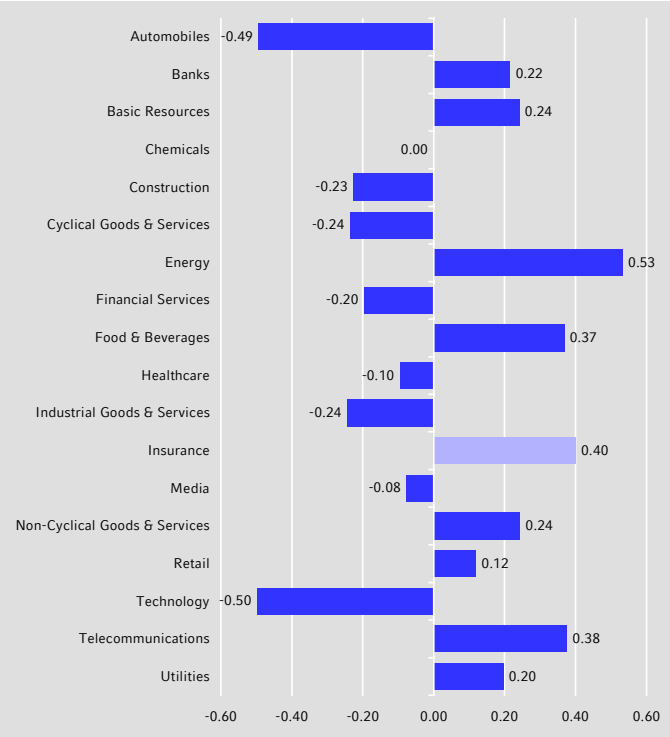
Governance

Governance apparently most important issue for insurers

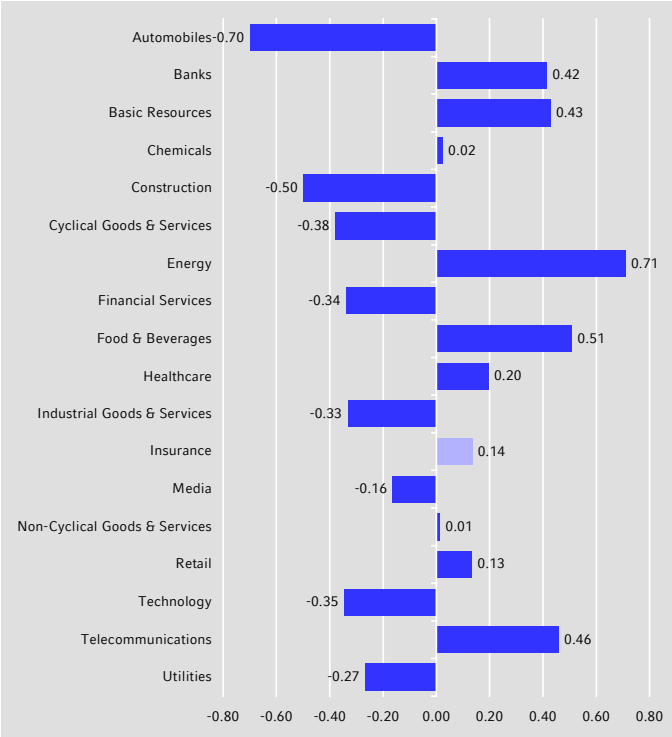
When we analyse the sub-components of our sustainability rating, we see striking differences with respect to the value that insurers attach to the individual sub-components of our sustainability rating. Insurers perform better in the area of governance than in the areas 'environment' or 'products'. At 0.40 (equally weighted), the insurance sector had one of the highest governance scores among all 18 sectors in the STOXX, second only to energy. Here too, however, the large insurance companies underperformed the heavyweights in other industries. Adjusting for market cap, the insurance sector's 0.58 governance score can be found in the 'upper mid-range' only.

DJ STOXX Market Sector Indices – Governance Scores*:

Equally weighted Aggregation



MCap weighted Aggregation (Dev. from average)



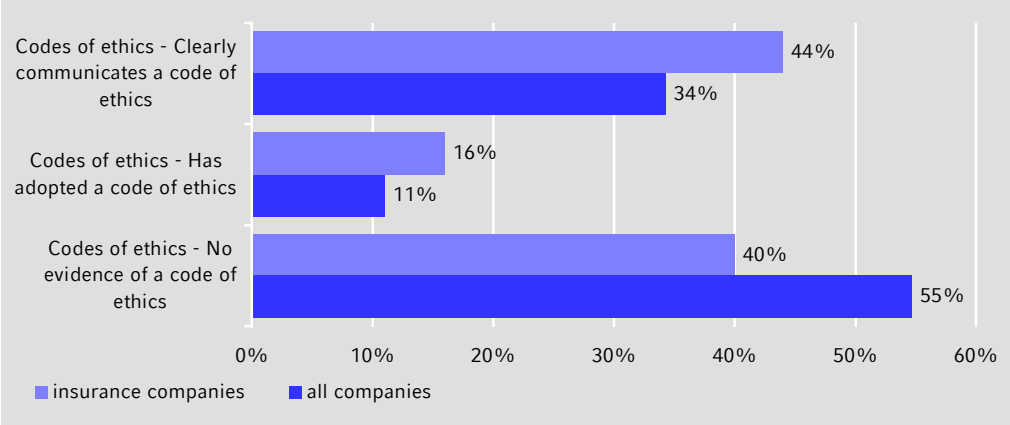
* all calculations based on EIRIS data, prices as of 12.01.2004

Source WestLB Equity Markets

Many insurers have adopted a code of ethics

Upon closer examination, the governance profiles of insurance companies have some focal points, one being that having a code of ethics clearly plays a more important role in insurance than in other industries.

Corporate Governance – selected sub-components: "Codes of Ethics"



Source WestLB Equity Markets, EIRIS

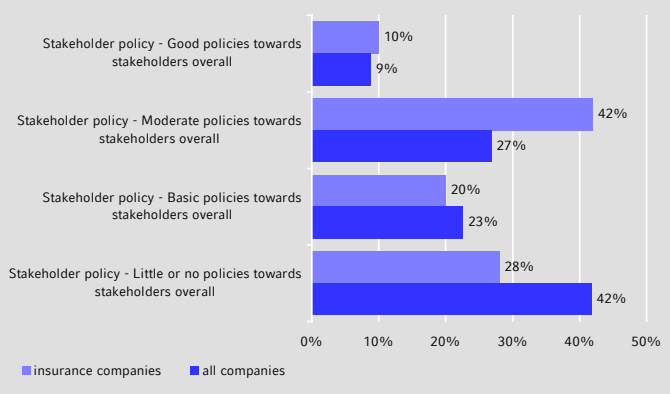
Other areas of importance include stakeholder issues, ...

The insurance industry also attaches great importance to stakeholder relationship. Clearly, insurance has recognised the sign of the times, more so than other industries. As mentioned previously, the pressure from investors is noticeably on the rise, as, for example, the fiduciary duties of pension funds are interpreted increasingly broadly. In addition to this the trend toward more shareholder activism continues. Besides, the

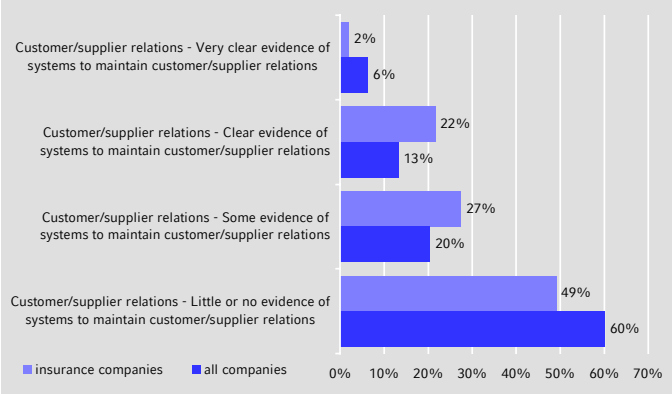
growing number of consumer action groups and non-governmental organisations (NGOs) keeping a closer eye on the activities of multinational corporations, in particular, are putting pressure on these companies as well as on politicians. Establishing a dialogue with these groups makes it easier for companies to discern trends and may also help them prepare for attacks on their reputational capital.

Customer and supplier relations are also important in this respect, and here again, the insurance industry is one step ahead of the game in implementing the appropriate management systems. A good 50% of the insurers analysed had at least a basic customer/supplier management system in place; the figure among all companies (the market average) is only 40%.

Stakeholder Policy



Customer/Supplier Relations

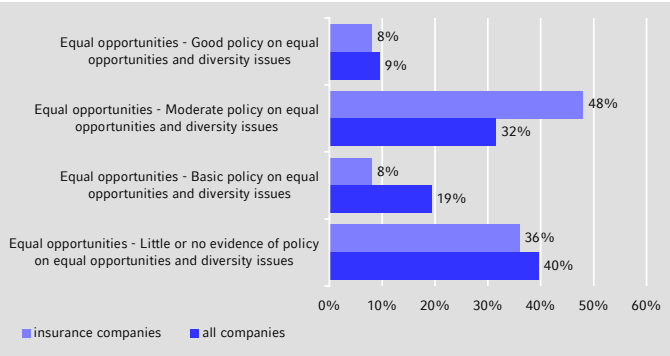


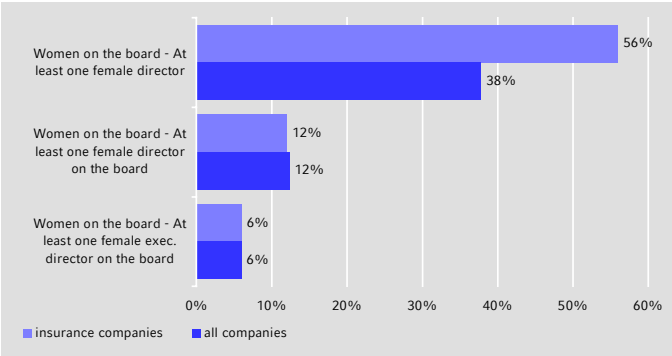
Source WestLB Equity Markets

...equal opportunities,...

Another topic that the insurance industry obviously takes seriously is equal opportunities. The percentage of insurers that promote equal opportunities within their companies is 64%, which is slightly above the 60% observed among all companies. The subtle difference, however, is the number of women in management. Fifty-six percent of the insurers analysed have at least one woman on their boards; the figure among all companies is only 38%.

Equal Opportunities





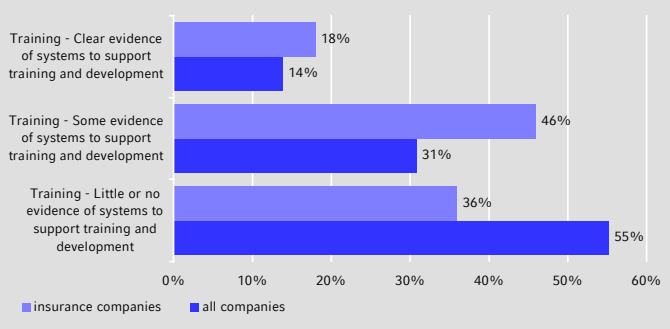
Source WestLB Equity Markets

...training & development..

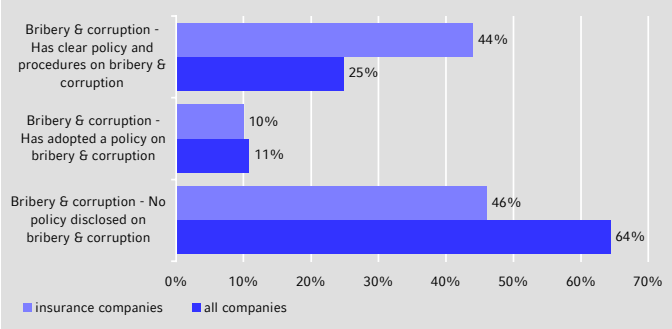
Given the evolution of our society into a knowledge society where employee know-how is vital, training & development is an area that gives an indication of the importance companies attribute to this issue. Well directed training not only enhances knowledge

potential and gives employees the skills to operate in an increasingly complex business world, react to the growing demands of customers and be innovative. It also improves their motivation and, in turn, the company's appeal to potential employees. Once again, the insurance industry appears to be more committed than other industries. The percentage of all companies that demonstrated a commitment to training & development was only 45%. Among insurers it was 64%.

Training & Development



Bribery & Corruption



Source WestLB Equity Markets

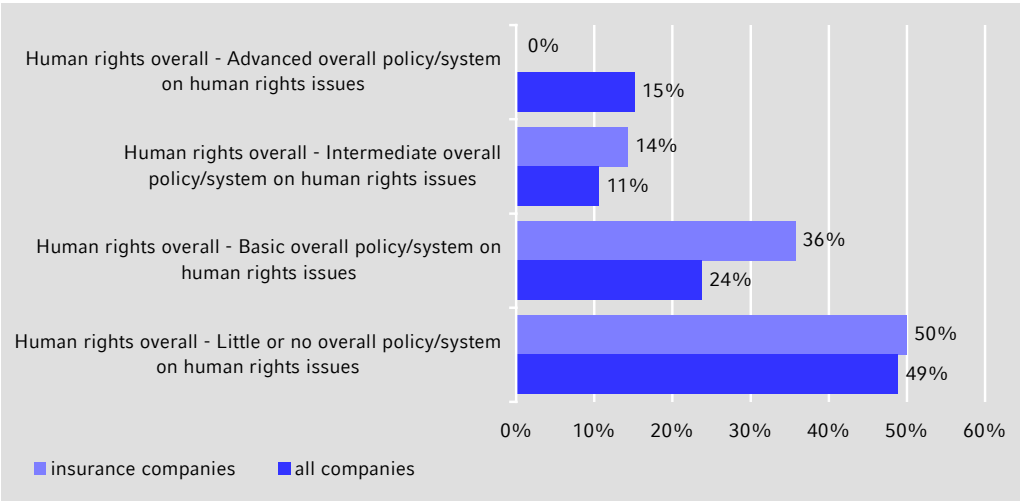
...and bribery & corruption

Bribery & corruption is yet another topic that the insurance industry appears more receptive to addressing. While 54% of the insurers analysed had implemented a policy on bribery & corruption, only 36% of all companies had done so.

The issue of human rights plays a smaller role

The data show that human rights issues apparently play a smaller role for insurers. Of the 14 insurers surveyed that do business in what EIRIS calls Category A countries (i.e., countries classified as 'not free' on the basis of reports from Freedom House, Human Rights Watch and Amnesty International), only 7 have a basic system or policy on dealing with human rights issues. UK-based Aviva and Netherlands-based ING Groep were the only companies in the insurance sector with an at least intermediate human rights policy/system (compared to 26% of all companies).

Human Rights Issues



Source WestLB Equity Markets

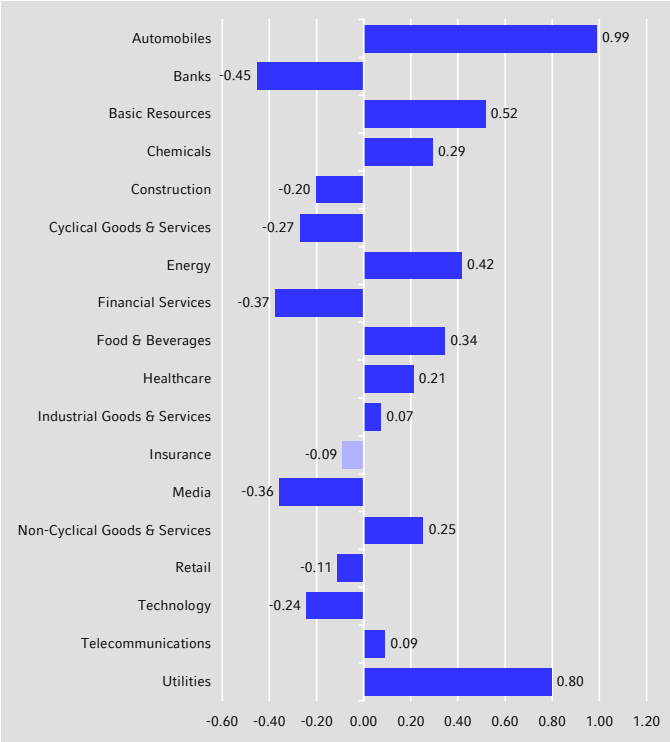
Environment

Below-average environmental rating

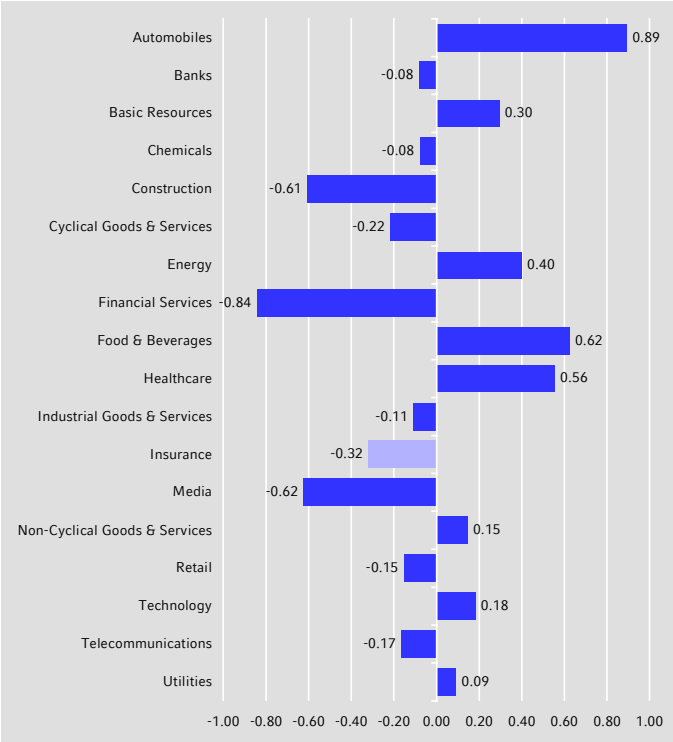
The environmental rating of insurers is below the market average. Company size seems to play less of a role in insurance than in other industries. Ignoring market cap, the insurance industry scored in the 'lower mid-range'. Adjusting for market cap, insurers fared even worse. Only three industries had a lower mcap-weighted environmental rating: construction, financial services and media.

DJ STOXX Market Sector Indices – Environment Scores*:

Equally weighted Aggregation



MCap weighted Aggregation (Dev. from average)



* all calculations based on EIRIS data, prices as of 12.01.2004

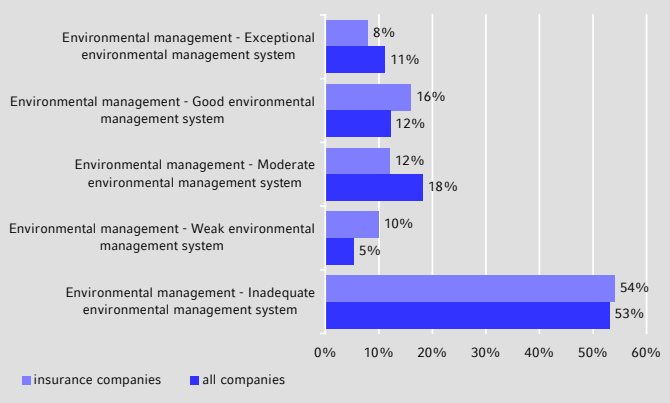
Source WestLB Equity Markets

Insurers apparently see little need to act

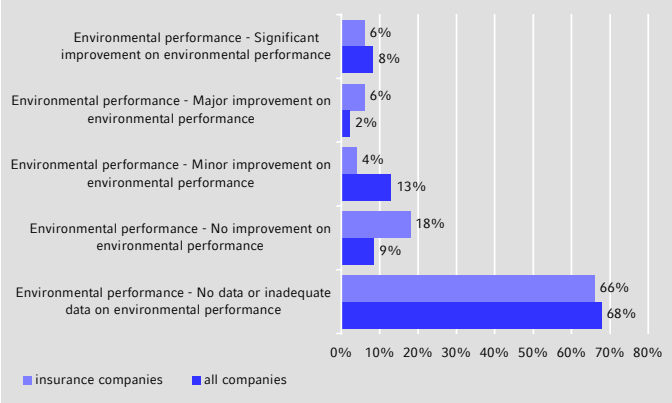
These results confirm the impressions of the Oekom Research study: insurance companies see little room and/or need to act with respect to the environment. With regard to the sub-components making up the rating, only 16% of insurers have improved their environmental performance (vs. 23% of all companies) and only 10% demonstrate an at least moderate environmental reporting quality (vs. 19% of all companies).

Environment – Selected Sub-Components

Environmental Management



Environmental Performance



Source WestLB Equity Markets

Products

'Product' ratings has restrained explanatory power

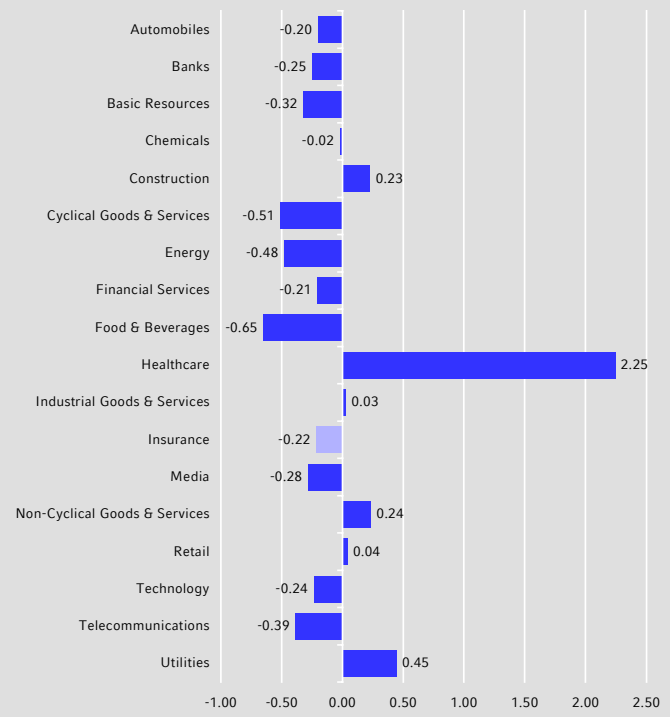
The insurance industry fared comparatively poorly in the area of products as well (equally weighted Z score: -0.22). Admittedly, the questions that EIRIS poses do not (yet) cover all areas which are relevant with respect to SRI. Rather, they are geared toward 'sin products & services,' such as alcohol, tobacco, arms, pornography and gambling, and 'positive products & services,' e.g., environmental technologies, basic care products (food, clothing, housing and healthcare), safety equipment, waste disposal and public transport.

No data on use of SRI products collected

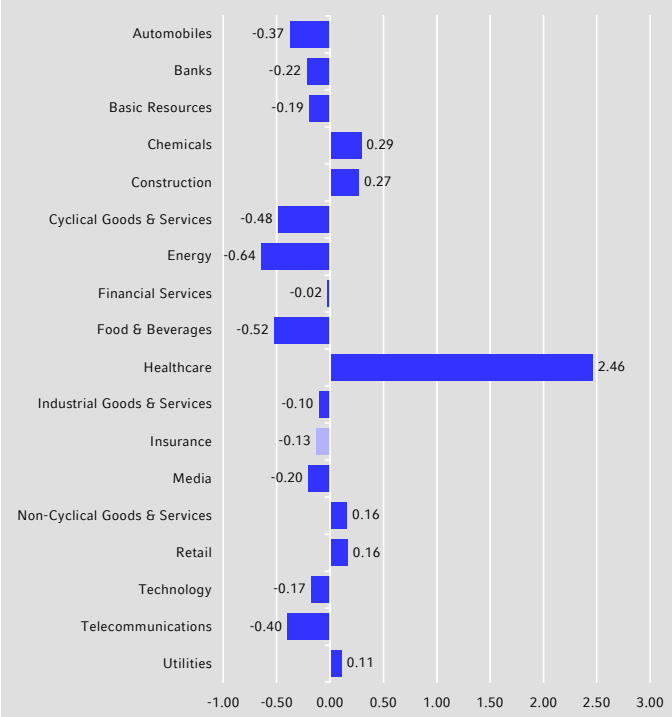
Offering and/or using SRI products, an issue that is of particular importance to the financial sector, is not addressed. The only thing considered are large stakes in industrial companies that have sin or positive product portfolios. This explains why insurance's mcap-weighted rating is even worse (-0.26): predominantly large insurance companies have these kinds of stakes, e.g. in companies active in the arms industry.

DJ STOXX Market Sector Indices – Products Scores*:

Equally weighted Aggregation



MCap weighted Aggregation (Dev. from average)



* all calculations based on EIRIS data, prices as of 12.01.2004

Source WestLB Equity Markets

Exposure and management quality

In general, strong correlation between exposure and management quality

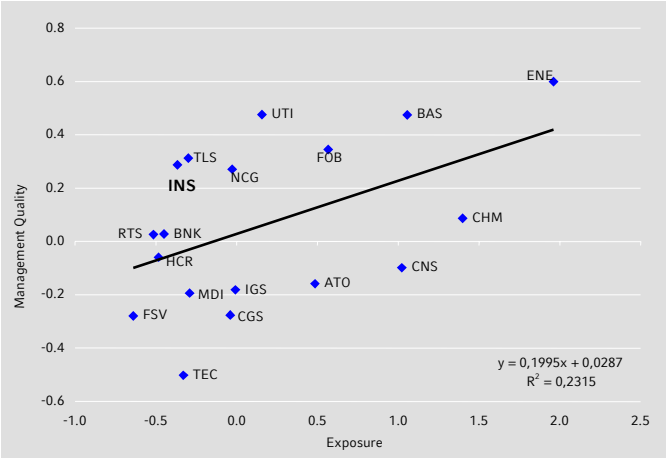
A look at our exposure and management quality variables shows that there is a strong positive correlation between the two at the industry level. In other words, companies that are more exposed to sustainability risks tend to demonstrate above-average quality in their management of these risks. Here, too, the size effect plays a role. The average industry score for exposure and management quality is much higher when adjusting for market cap (exposure: 0.68 vs. 0.18, management quality: 0.50 vs. 0.06).

Insurance sector: below-average exposure, but relatively good management quality

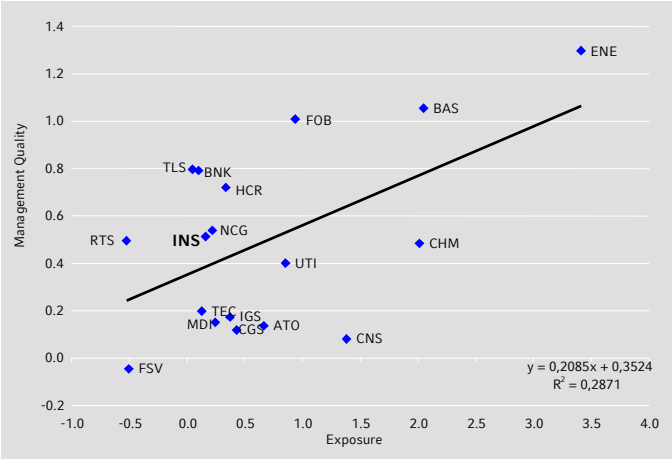
As expected, the insurance sector shows below-average exposure, with large insurers more exposed than small insurers (Z score: 0.16 vs. -0.37). In contrast, the management quality (MQ), particularly that of the small insurers, ranks comparatively high. With a Z score of 0.29 (equally weighted), insurance ranked sixth, behind the high exposed sectors energy, basic resources and utilities and behind telecoms and food & beverage. Mcap weighted, the score for insurance is 0.51, which is practically equal to the market average of 0.50.

Exposure and Management Quality for DJ STOXX Market Sector Indices*:

Equally Weighted Aggregation



MCap Weighted Aggregation



* all calculations based on EIRIS data, prices as of 12.01.2004

Source WestLB Equity Markets

Again, size effect plays only a subordinate role

As with the overall rating, that for exposure and management quality shows, once again, that the size effect plays less of a role in insurance than other industries on average. It also reiterates that, apparently, many smaller insurers seem to be 'on the right track' when it comes to sustainability.

A comparison with banking is of interest here, as well. The level of exposure in banking and insurance is comparable. Yet banking lags behind insurance in its management quality when market cap is ignored. When market cap is accounted for, the situation is the reverse.

Are there any significant differences across countries?

Universe too small to draw conclusions on differences across countries

The universe examined is too small to draw any conclusions about differences across countries. In addition, the distribution of companies among countries is unequal. At best, only rough trends can be reported.

SRI Rating of the Insurance Sector on a Country Level*

Country	No of Insurers	Average Z-score					
		Total	Governance	Environment	Product	Exposure	MQ
Norway	1	1.26	1.31	0.90	-0.19	-0.75	1.29
Netherlands	2	0.99	1.23	0.37	-0.19	-0.31	1.06
Ireland	1	0.95	1.22	0.28	-0.19	-0.75	1.03
Switzerland	4	0.58	0.51	0.66	-0.26	-0.42	0.59
Sweden	1	0.32	0.34	0.28	-0.19	-0.57	0.32
Finland	1	0.23	0.21	0.28	-0.19	-0.75	0.17
UK	22	-0.18	-0.03	-0.34	-0.19	-0.64	-0.14
Germany	5	-0.24	0.00	-0.50	-0.27	0.13	-0.13
France	4	-0.48	-0.07	-1.00	-0.22	-0.13	-0.35
Denmark	2	-0.86	-0.43	-1.33	-0.19	-0.75	-0.74
Italy	5	-0.98	-0.69	-1.16	-0.19	-0.55	-0.90
Austria	1	-1.31	-1.07	-1.33	-0.19	-0.75	-1.29
Greece	1	-1.50	-1.33	-1.33	-0.19	-0.75	-1.47

* all calculations based on EIRIS data, prices as of 12.01.2004

Source WestLB Equity Markets

How do the insurance companies fare individually?

Smaller companies are leading the way

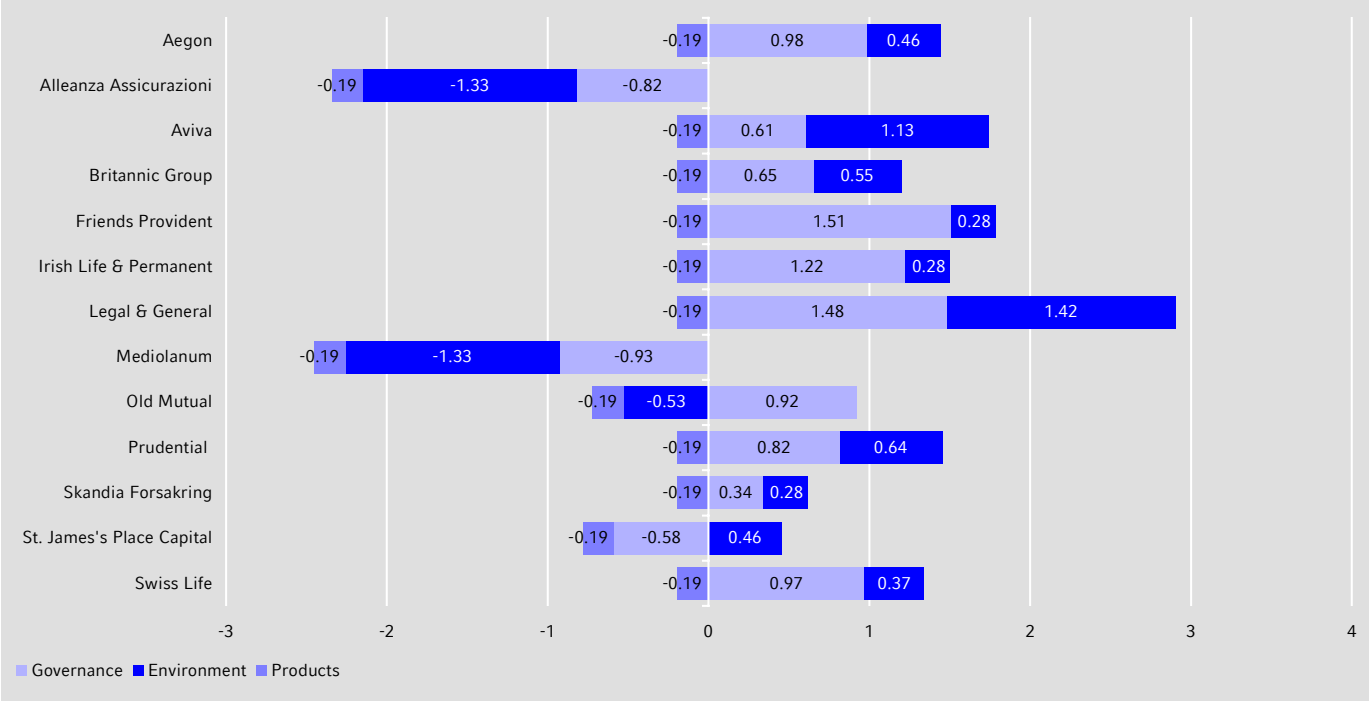
Small insurers get the best rating

A close look at the sustainability ratings of individual insurers confirms the results of our sector analysis: except for Generali and AXA, all large insurers analysed earned at least an A rating, which means that they are heading in the 'right' direction. Nevertheless, the highest scores among insurers were earned by the smaller companies. Legal & General is the only insurer (and one out of only 37 of the total 1190 companies analysed) to get an A++ rating (Z score: 1.58). With Royal Sun & Alliance, Storebrand and Friends Provident, which earned 1.28, 1.26 and 1.15 points respectively, another three smaller insurers beat out the top scorers among the large caps, ING Groep (1.12), Swiss Re (1.05), Aviva and Aegon (0.85 each).

Life insurers rate surprisingly high

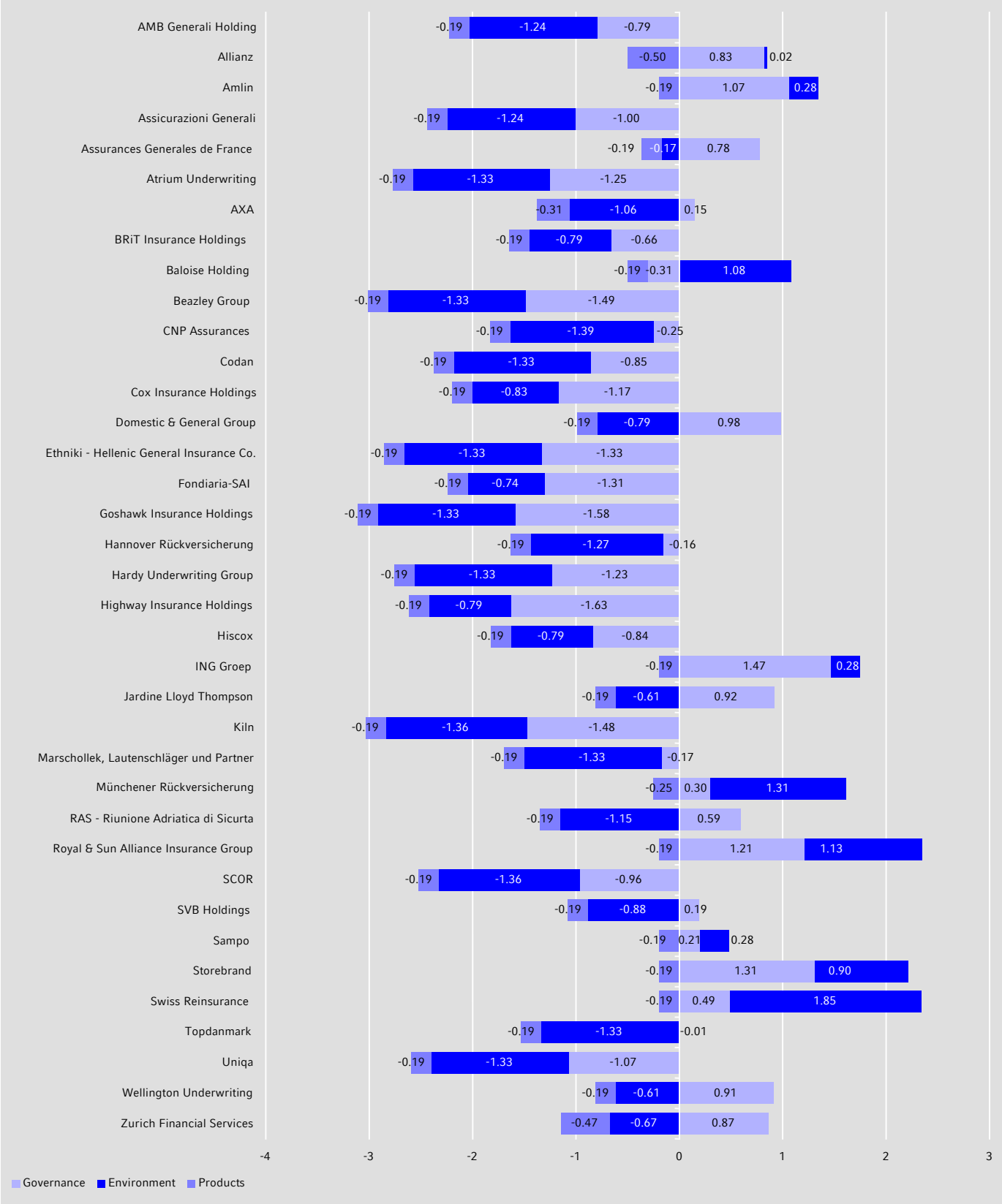
Interestingly, life insurers fared quite well. They earned above-average scores in governance (Friends Provident and Legal & General, in particular) and in environment, and thereby also overall, while the picture is mixed for other types of insurers. In fact, not a few earned significantly negative ratings.

Triple-Bottom-Line-Rating – Life Insurance Companies



Source WestLB Equity Markets, EIRIS

Triple-Bottom-Line-Rating – Insurance Companies (Non-Life)



Source WestLB Equity Markets, EIRIS

Re-insurers positioned well in terms of SRI criteria

The top scorer in the environment area is Swiss Re, which received 1.85 points, but it was a life insurance company, Legal & General (1.42 points), that overtook the second largest re-insurer, Munich Re (1.31), to take second place. Comparatively positive environmental performances can also be reported for Aviva, Royal Sun & Alliance (each with a score of 1.13), Baloise (1.08) and Storebrand (0.90). A total of 31 of the 50 insurers analysed earned environmental ratings below the average for all companies. Of those 31, only 3 were life insurance companies.

'Product' rating is driven by investment policy

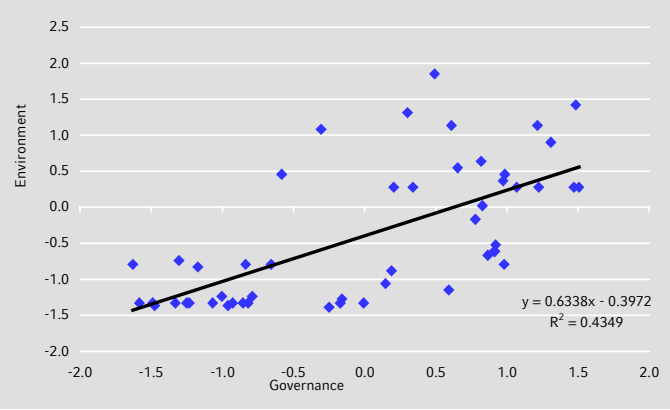
As demonstrated in the industry analysis, there are barely any differences among individual insurers in the area of products. Allianz, AXA, Munich Re and Zurich Financial Services were the only insurance companies to earn a negative score, which can be explained by their stakes in companies active in the arms industry.

Positive correlation between governance and environmental rating

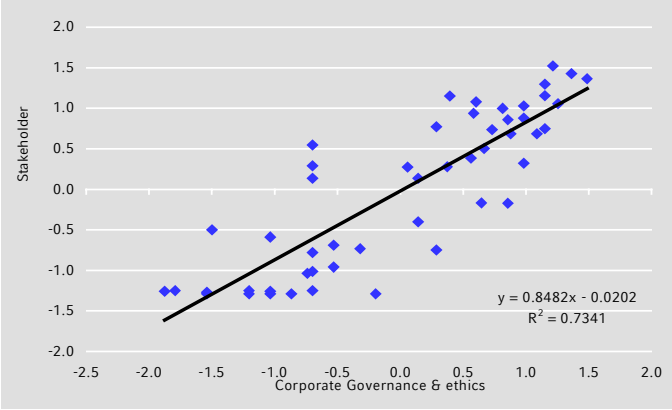
Of note is the strong positive correlation between governance ratings and environmental ratings. This indicates that companies with a sound commitment to governance at least tend to attach greater importance to environmental concerns, which, in turn, suggests a high awareness of sustainability risks. Less surprising is the positive correlation between the sub-components corporate governance & ethics and stakeholder.

Correlation between Sustainability Ratings (second resp. third level) within the Insurance Sector

Governance vs. Environment



Corporate Governance & Ethics vs. Stakeholder



Source WestLB Equity Markets, EIRIS

Exposure and management quality

Exposure generally low, while management qualities vary strongly

A look at exposure and management quality shows that most insurers display little exposure, while their management qualities vary strongly. Generally speaking, large multinational insurers are the ones that evidence higher exposure because of their investment portfolios. Allianz stands out here with a Z score of 2.76. Although most of the highly exposed insurers tend to compensate with good management, the companies with the best management quality scores, however, were the two with minimal exposure: Legal & General (exposure Z score: -0.75, MQ: 1.55) and Storebrand (exposure: -0.75, MQ: 1.29). The highest MQ scores delivered by companies with a high exposure are from Royal Sun & Alliance, which came in third (exposure: 0.22, MQ: 1.27), followed by ING Groep (exposure: 1.13, MQ: 1.25) and Friends Provident (exposure: -0.75, MQ: 1.25).

Climate change

Climate change – some like it hot

An increasing number of companies and investors are realising that climate change carries significant economic implications for shareholder value. The particular relevance for insurers is due to the close correlation between underwriting losses (due e.g. to weather anomalies) and losses in the value of capital market investments.

Losses on the insurance side are becoming more frequent and more costly. In particular the major loss events, like Hurricane Andrew in 1992, harm the insurers' underwriting profitability. In our view, a systematic approach to risk management which incorporates pricing, selection and research is essential.

On the investment side, climate change is without doubt a threat to the market value of assets under management. In addition, fiduciary duties are being interpreted increasingly broadly, and this includes the need to consider climate change risks. Again, climate change constitutes a dual risk for insurers.

We conclude that climate change can have a significant impact on the net income of insurers and on dividends, which in turn affects the attractiveness of insurers' shares. However, there are also growth opportunities associated with new products and lines of business driven by climate change issues (e.g. in the field of emission trading markets).

Survey: companies believe they have the risks under control

Our survey results show that:

(1) Companies are in general well sensitized about their climate change exposure.

(2) Companies believe they have the economic risks comparatively well under control, as evidenced in the dominance of pricing and selection measures over exclusion.

(3) A link between underwriting and investment, i.e. holistic management of climate change risks, is barely discernible.

(4) Companies see growth opportunities in new products (emissions trading schemes, catastrophe bonds, etc.) and are partially exploiting these opportunities.

No longer a side issue...

"Greatest challenge of the 21st Century"

Since the Rio Conference held in 1992, attitudes to climate change have experienced truly breathtaking transformation, and the subject is now undoubtedly far from being perceived as a niche area for "eco-fundamentalists". This conclusion can also be drawn from the high level of consensus among leading personalities in the fields of business and research. At the World Economic Forum in Davos, for example, business leaders stated that climate change was the greatest challenge of the 21st Century. The OECD also declared that climate change represents one of the biggest problems to be faced in the 21st Century, with serious implications for the economy, society and the environment.

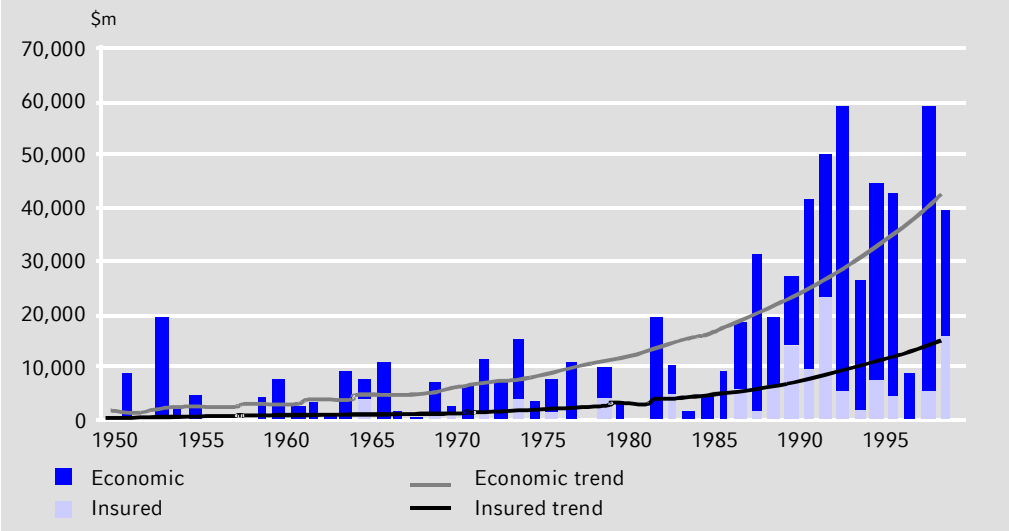
Not just a question of the size of claims

Over the past 50 years, there has been a tenfold increase in the size of claims resulting from natural catastrophes

According to the US Department of Energy (2001), the losses incurred in the past 15 years due to natural catastrophes amount to more than $1trn, roughly one third of which is directly related to climatic and weather-related events. The claims incurred as a result of natural catastrophes have increased more than tenfold since the 1950s, and have doubled in the 1990s alone.

"It is hard to think of a bigger issue to address than climate change and whilst there may be different opinions about the ethics and some of the science of this issue, few would disagree with the statement that climate change has the potential to be a source of significant opportunity and risk for the corporate sector." (Peter Moon, Chief investment officer, USS Ltd.)

Catastrophic weather-related losses increased 10-fold from 1950s



Source IPCC (2001)

Admittedly, the figures may well overstate the economic effect of climate change itself. Inflation and generally rising standards of living would alone cause a rise in the level of claims, even if the climate were not to change.

Besides climatic phenomena, inflationary effects and population growth are also driving rising claims levels

Of the often strikingly quoted doubling of climate-related claims per decade, one quarter can be attributed to inflationary effects alone. With rising living standards in the industrialised nations, comes an increase in insurance density, and insured real estate density and therefore the insured amounts. The rising population has also led to a dramatic increase in the settlement of swathes of land that are exposed to geological and meteorological risks. Climatic phenomena, like El Niño, therefore cause considerably more damage to property than similar events only a hundred years ago.

Are insurers the group most "affected" by climate change?

Underwriting claims are certainly on the rise, ...

Focusing on the claims statistics led many observers immediately to consider insurance the sector most economically "affected" by climate change. This is both "right" and "wrong". It is correct to say that climate change could undoubtedly have significant repercussions on the size of future underwriting claims.

... but there are also opportunities

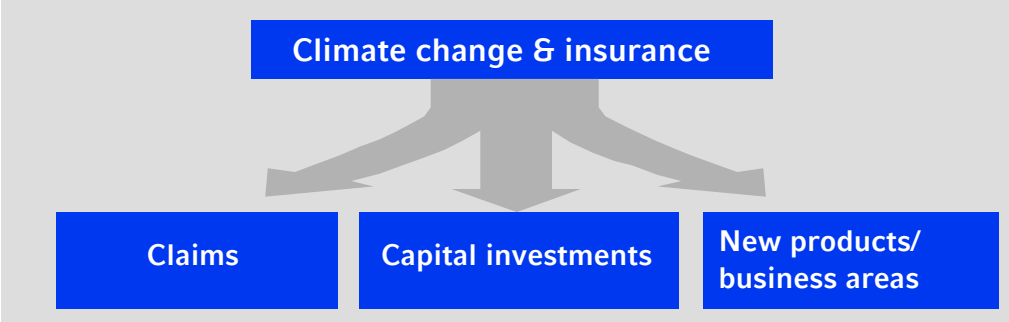
However, it is wrong to assume that the insurers will automatically be among those to lose out from climate change. Taking on elementary risks is a part of normal insurance business. Increasing climate change risks should therefore increase the demand for insurance services and could drive future growth in premiums. Furthermore, insurers

have welcomed the opportunity presented by major claims in the recent past to exclude certain risks and hike premiums.

Detailed analysis is therefore essential for investment decisions

It can therefore be generally said that climate change presents the insurers equally with risks and opportunities. We therefore do not aim to advance another spectacular forecast of claims trends, and therefore subliminally suggest that investors should simply steer away from insurers because of the effects of climate change on investment returns. We are far more interested in presenting different facets of the subject of climate change and its effects on the insurance industry. The objective is to sketch out the multifaceted mechanisms linking climate change, primary insurance business and the value of insurance companies' assets.

Opportunity and risk in three areas ...



Source WestLB Equity Markets

Is the climate really changing?

The mean global temperature is predicted to rise 1.4-5.8°C between 1990-2100. The sea level is expected to rise 9-88cm, and the risk of extreme climate phenomena and weather anomalies such as droughts and floods will increase in many regions. The significant increase in GHGs in the atmosphere lends credence to the theory that global warming is largely the result of human activity. CO_2 concentrations have increased 31% since 1750. Roughly three-quarters of the anthropogenic CO_2 emissions generated in the last 20 years can be attributed to the burning of fossil fuels. Estimates indicate that emissions would have to be reduced 70-80% worldwide just to stabilise CO_2 concentrations at their current levels.

Climate change controversial

There is hardly a topic that is so complex, so hotly disputed among scientists, and so riddled with uncertainties and knowledge gaps as climate change. But this is clearly no reason to give way to the myopic mentality of the markets and simply ignore it. Considerable risks – and also some opportunities – do exist and companies have to be prepared for these to affect their bottom lines and market valuations.

Trends

Global warming more intense than previously assumed

Recent studies suggest that global warming may be more intense than previously assumed. They also support the theory that human interference with nature bears a large share of the responsibility for climate change. Most discussions about political measures related to climate change are based on reports prepared by the Intergovernmental Panel

on Climate Change (IPCC), a panel of experts that was established by the United Nations more than ten years ago. The IPCC is considered the 'world's most reliable source of information on climate change and its sources' (according to a statement by 17 national academies of sciences, including those of Germany, France, Italy, the UK, Australia and Canada published in Science, 17 May 2001). The IPCC analyses and evaluates all relevant sources of scientific information on climate change and offers a broad range of models and perspectives on the topic. IPCC's third report, published in 2001, is the basis of this study.

"Uncertainty does not mean that the world cannot position itself better to cope with the broad range of possible climate outcomes, or protect against potentially costly future outcome." (Robert Watson, Chief Scientist of the World Bank and Chairman of the IPCC)

Two aspects must be considered when assessing the IPCC forecasts. Firstly, they are, if anything, more cautious than the forecasts from the major players in reinsurance like Munich Re or Swiss Re. Secondly, forecasts about climate change are of course associated with a high degree of uncertainty. However, the uncertainty relates to specifics (exact temperature rise, sea level, etc.) and the effects of the countermeasures undertaken, although the greatest uncertainty is precisely which regulatory standards will be enforced in future. Nevertheless, the phenomenon of climate change and its fundamental repercussions are undisputed. Sceptics pointing out the high degree of uncertainty must confront the possibility that "not acting" could result in catastrophic, irreversible ecological and economic damage.

The major findings of the IPCC's third report are:

- The global **average surface temperature** increased approximately 0.6°C in the 20th century. The 1990s were the warmest decade – and 1998 the warmest year – since measurements began in 1861. The increase in surface temperature in the 20th century is likely to have been greater than in any other century in over 1,000 years.

  Forecast: The global average surface temperature (implying regional variation) will rise by 1.4°C – 5.8°C between 1990 and 2100. The maximum and minimum temperatures will rise; the number of hot days will increase; and the number of cold days and frost days is very likely to decrease over nearly all land areas.

- **Snow cover** has decreased approximately 10% since the late 1960s. Non-polar glaciers have retreated considerably and Arctic sea ice has thinned about 40% on average in the summer months over the last decade.

  Forecast: The retreat of snow cover and sea ice in the Northern Hemisphere, of glaciers and ice caps will continue. In the most extreme case, the Greenland ice sheet and the ice of the western Antarctic would melt.

- **Global average sea levels** rose by 10cm-20cm in the last century.

  Forecast: Sea level will rise by 9cm-88cm in the 21st century.

- **The amount of precipitation** and the frequency of heavy precipitation events increased significantly in most regions of the Northern Hemisphere, while the frequency and intensity of droughts increased in the lower-latitude regions of Africa and Asia.

Forecast: The variability of dry periods and amounts of precipitation will increase, as will the variability of monsoon precipitation intensity. The intensity of tropical cyclones (cyclones, hurricanes and typhoons) will increase, as will the risk of extreme climate phenomena and weather anomalies such as droughts and floods in many regions. An intensification of the El Niño effect and a change in the North Atlantic Oscillation, which determines the weather in Europe, are likely.

Not just extreme weather...

Extreme weather events can occur unexpectedly, at almost any time and any place, and can cause tremendous, sometimes irreversible damage. It is exceedingly difficult to forecast individual weather extremes and their effects, but it is even more difficult to predict sequences of weather anomalies.

... even 'harmless' changes can have a major impact

But climate changes involve not only a higher frequency of severe weather anomalies like floods and storms. They also include an increase in the frequency of what appear to be harmless phenomena, such as the unusually warm summer in England and Wales in 1995. The average temperature between November 1994 and October 1995 was around 1.5°C higher than the average for the years from 1961 to 1990. In the summer months of July and August, the average was around 3°C higher. Improved harvests in some areas stood in contrast to considerable losses elsewhere, particularly in livestock farming. In the UK the agricultural sector as a whole registered a total of £180m in losses. Net losses in the energy industry were around £355m, due to lower heating requirements and despite the increased need for air conditioning in summer.

The clothing industry took in around £380m less revenues and the insurance industry incurred additional losses of around £350m. In total, the warm summer of 1995 in the UK caused more than £1.5bn in losses and damage (source: Swiss Re, 2002).

Causes of climate change

The assumption that the global warming seen over the past 50 years is largely a result of human activities is supported by the significant increase of greenhouse gases (CO_2, CH_4, N_2O, SF_6, halocarbons, ozone, etc.) and aerosols in the atmosphere since the start of industrialisation and particularly by the increase in the last 60 years.

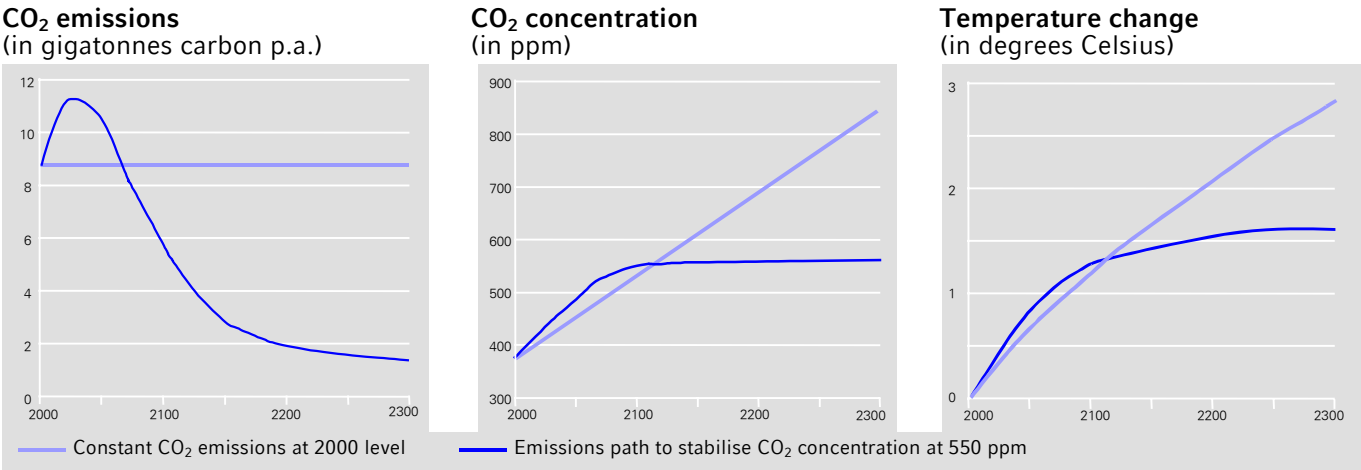
Anthropogenic greenhouse effect

Greenhouse gases are the primary cause of the anthropogenic (i.e. human-caused) greenhouse effect. They reflect some of the heat radiated by the earth's surface, thus causing an additional increase in temperatures. Atmospheric CO_2 concentrations have increased 31% since 1750. Around three-quarters of anthropogenic CO_2 emissions in the past 20 years can be attributed to the burning of fossil fuels. The remaining 25% are predominantly due to changes in land use, with deforestation being the main contributing factor.

Effects are persistent

The effects of greenhouse gases that have long lifetimes, such as CO_2, N_2O, PFCs and SF_6, can also have a long-term impact on the composition of the atmosphere and, thus, on the climate. The lower the level at which CO_2 emissions can be stabilised, the less global temperatures will rise. However, according to the IPCC, emissions would have to be reduced 70-80% worldwide just to stabilise CO_2 concentrations at their current level.

Effect of stabilising CO_2 emissions and CO_2 concentration on temperatures



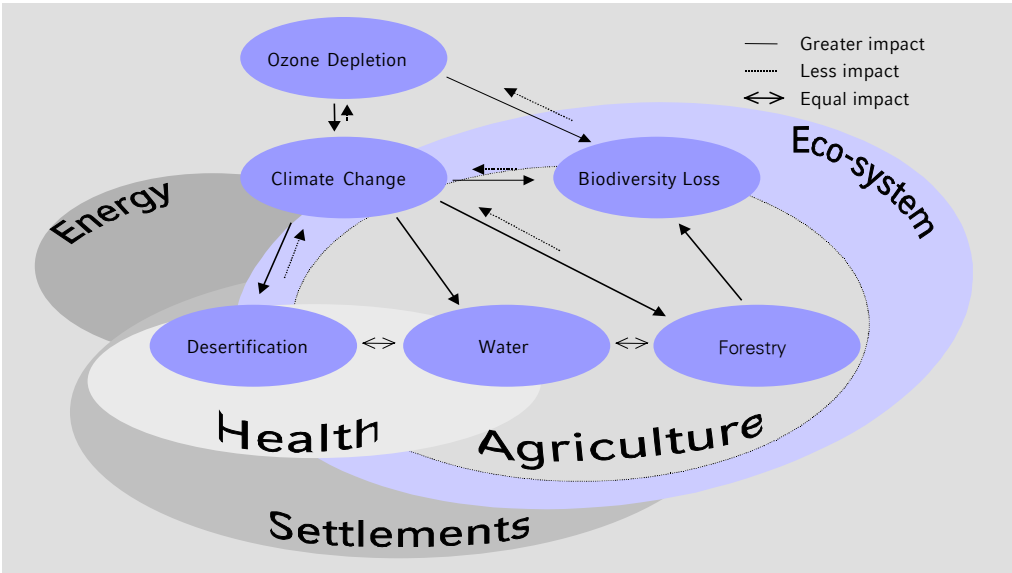
Source IPCC (2001)

Impacts at the sector level

A variety of interactions

As we stressed at the beginning, climate change is an extremely complex system. In assessing first-order effects, one has to bear in mind that there are a variety of interactions with other environmental problems, which can potentially intensify or lessen the economic effects of climate change.

The relationship of various environmental problems and their effects



Source WestLB based on Watson et al (1998)

Water resources

☹	**Risk:**	Water accessibility and availability may decrease in arid and semi-arid regions (especially in the subtropics) – with rising danger of regional conflicts; threat of ground water salinisation in coastal zones; more than 1bn people already live without access to safe drinking water, according to WHO estimates.
☺	**Opportunity:**	Improved water availability, primarily in arid and semi-arid regions of northern Asia.

Sectors particularly affected are: agriculture and forestry, food, energy, utilities, tourism, semiconductor industry, paper industry, etc.

Ecosystems

☹	**Risk:**	Reduction of biodiversity; increased damage to sensitive (coastal) eco-systems such as coral reefs, mangroves, etc.; spread of pests and pathogens.
☺	**Opportunity:**	Lengthening of growing season in mid- and northern latitudes and higher altitudes, increase in biomass.

Sectors particularly affected are: tourism.

Agriculture and forestry

☹	**Risk:**	Reduction in potential crop yields in nearly all tropical and subtropical regions; a temperature increase of several degrees Celsius would present a similar risk for most regions in the mid-latitudes; greater soil erosion due to increased precipitation intensities; rising danger of forest fires in arid zones; spread of pests.
☺	**Opportunity:**	If temperature increases are modest, potentially higher crop yields are possible, particularly in northern latitudes.

Sectors particularly affected are: food & beverages, paper industry, agrochemicals.

Effects subject of great dispute

Here the specific effects are particularly controversial. Higher CO_2 concentration can, for example, stimulate crop growth and yields because of the higher fertilising effect. The time of day and the season when the temperature increase predominantly occurs is also a relevant factor. The temperature increase in the second half of the 20th century was primarily due to higher lows in the winter months. Recent studies show that crop yields increase approximately 7-8% when the temperature increases at night (see Lomborg, 2002). Another important factor, that is hard to assess, is the effect of adaptations (such as modified production methods or use of more resistant plant varieties). Industrialised countries will probably have more adaptive capacities than developing countries, especially because the latter are likely to be more severely affected by the negative consequences of climate change (particularly water stress) and are, therefore, more vulnerable.

Health

☹	**Risk:**	Spread of various vector-borne and other infectious diseases spread either by organisms (e.g., malaria, dengue fever) or by water (e.g. cholera; diarrhoea) – in temperate latitudes as well; increased heat stress mortality, especially among the elderly and the (urban) poor; increase in illness caused by degraded air quality; increased life and health risk due to extreme weather phenomena (tornadoes, floods, etc.).
☺	**Opportunity:**	Lower winter mortality in mid- and high- latitudes.

Sectors particularly affected are: Insurance, healthcare

Industrialised nations less affected

Here, too, additional factors such as access to clean drinking water and sanitary facilities, medical care, technological progress, etc. play a decisive role. Developing countries will once again be more vulnerable than industrialised countries, but even in the latter the preventive costs and the consequential costs will probably climb. Historical data provide a starting point for estimating future costs. The cost of the 1994 dengue fever epidemic in Thailand, for example, is estimated at $19m – $51m (IPCC, 2001).

Energy

☹	**Risk:**	Increased energy demand for cooling, especially in summer and for irrigation in low-precipitation areas.
☺	**Opportunity:**	Lower energy demand for heating in winter months.

Focus on energy efficiency

Key factors of uncertainty here are the growth in energy efficiency and the speed with which fossil fuels are replaced by renewable energy sources.

Residential areas, industries and infrastructure

☹	**Risk:**	Increased danger of residential flooding, particularly in coastal areas (estimates indicate tens of millions affected); increased danger that buildings and infrastructure will be damaged – also from heightened (forest) fire danger.

Sectors particularly affected are: tourism, construction, agriculture.

Estimates of flood exposure and incidence for Europe's coast in 1990 and the 2080s

Region		Flood Incidence	
	1990	1990	2080s
	exposed population (millions)	Average number of people experiencing flooding (thousands/year)	Increase due to Sea-Level Rise, assuming no adaption (%)
Atlantic Coast	19.0	19	50 to 9,000
Baltic Coast	1.4	1	0 to 3,000
Mediterranean Coast	4.1	3	260 to 12,000

Source IPCC (2001)

Consequences depend on adaptability

The specific effects depend largely on the actual climate change in a given region, but also on the adaptive capacity of the particular systems. (In addition to ability, the will to take a proactive role, seen in what steps are being taken up front to limit potential damage, is also a key factor.) Developing countries and socially disadvantaged groups will feel the impact of the negative consequences of climate change more strongly than will industrialised countries and medium to high-income groups. If the burdens on individual groups become too heavy, social tensions are inevitable, and could lead to outright conflicts over such issues as water resources. In extreme cases, this could destabilise entire regions.

Climate change politics & Kyoto Protocol

Reducing greenhouse gases, especially CO_2, is a focal point of climate policy. The Kyoto Protocol was the first to define a legal and institutional framework for future international climate policy.

Climate change timeline

Date	Event
1824	Fourier first describes the greenhouse effect
1938	Callendar makes quantitative calculations of warming from anthropogenic CO_2
1969	MIT study of Critical Environmental Problems (SCEP)
1972	First UN Conference on Human Environment in Stockholm
1972	Club of Rome study "Limits to growth"
1979	First World Climate Conference held in Geneva
1980	First WMO/UNEP/ICSU meeting on CO_2-induced climate change held in Villach
1988	WMO and UNEP establish the Intergovernmental Panel on Climate Change
1988	Toronto Conference on Changing Atmosphere calls for a 20% reduction of global CO_2 emissions by 2005
1992	The Framework Convention on Climate Change is signed at UN Conference on Environment and Development in Rio
1997	The 3rd Conference of Parties of the Convention in Kyoto adopts legally binding targets for all greenhouse gases
1998	The EU Environment Council adopts the formal political agreement on burden sharing
2001	Commission proposals to fight global warming
2002	Environment Council agrees to ratify the Kyoto Protocol
2002	The EU officially ratifies the Kyoto Protocol

Source MIT, EurActiv, WestLB Equity Markets

Still very uncertain whether it will come into effect

A key element of the Protocol is the commitment of the Annex 1 countries to reduce their greenhouse gas emissions by an average of 5% below 1990 levels between 2008 and 2012. To date, 32 Annex 1 countries and 87 non-Annex 1 countries have ratified the Protocol (Source: UNFCCC, 16 February 2004). This covers 44.2% of the CO_2 volume emitted by Annex 1 countries in the base year 1990. However, a total volume of 55% is required for Protocol implementation. If the Russian Federation ratifies the Protocol in the near future, as it has announced, the covered share of Annex 1 countries' emissions volume would rise to 61.6%, and the Protocol would take effect. However, it is currently unclear whether this will actually occur.

EU draft guidelines for implementing the Kyoto Protocol

EU draft guidelines

The Kyoto Protocol regulates greenhouse gas emissions at the international level. The signatory countries are responsible for actually implementing the Protocol nationally. The European Commission presented a proposal for a framework directive on greenhouse gas emissions trading within the European Community in October 2001. The proposal was endorsed a year later in a first reading by the European Parliament. The proposal aims to create a market for permits authorising emissions from industrial installations. Under this scheme, Member States will set from 2005 a maximum limit on the amount of CO_2 that an industry installation can emit.

Burden Sharing Agreement determines allocation of emission allowances

At present, the framework directive includes around 5,000 companies in the energy sector (incinerators with a rated thermal input exceeding 20 MW – excluding facilities that burn hazardous or municipal waste), the production and processing of ferrous metals (ironworks, steel manufacturers, etc.), the mineral industry (cement, glass, ceramic products, bricks), and other industrial plants for the production of pulp, paper and board. A decision regarding additional activities (for instance, chemical industry and waste incineration facilities) has not yet been reached; proposals are due by the end of 2004. 1990 was chosen as the base year. The allocation of emission allowances within

the EU is regulated by the Burden Sharing Agreement, which stipulates, for example, that Germany must reduce emissions 21% below 1990 levels. If a country exceeds its emissions target in the first stage (2005-2007), it will be charged a penalty of €40 per tonne of CO_2 equivalent. From 2008 onward, the penalty will be €100.

EU greenhouse gas emissions and targets

Country	reduction target for 2008-2012 in % from base year emissions	% change in emission levels, base year – 2001	% change in emission 2000-2001	Distance-to-target for EU Member States in 2001
Austria	-13.0	9.6	4.8	16.8
Belgium	-7.5	6.3	0.2	10.5
Denmark	-21.0	-0.2	1.8	11.4
Finland	0.0	4.7	7.3	4.7
France	0.0	0.4	0.5	0.4
Germany	-21.0	-18.3	1.2	-6.8
Greece	25.0	23.5	1.9	9.8
Ireland	13.0	31.1	2.7	23.9
Italy	-6.5	7.1	0.3	10.7
Luxembourg	-28.0	-44.2	1.3	-28.8
Netherlands	-6.0	4.1	1.3	7.4
Portugal	27.0	36.4	1.9	21.6
Spain	15.0	32.1	-1.1	23.8
Sweden	4.0	-3.3	2.2	-5.5
United Kingdom	-12.5	-12.0	1.3	-5.2
EU Total	-8.0	-2.3	1.0	2.1

* The distance-to-target indicator measures the deviation of emissions in 2001 from a hypothetical, linear reduction path for 1990 – 2010

Source EEA 2003

The fight for the national allocation plans

The national allocation plans (NAPs) will determine what the sectoral reduction targets look like and what costs will be imposed on the plants within each EU country covered by the EU regulations. The national governments must submit these NAPs to the EU commission by 31 March 2004. The ten accession countries have until the end of May. The NAPs reflect the views held by the members of the EU's Environmental Council on the introduction and definition of a European emissions trading system.

Quite a large difference in the state of preparedness

There is still quite a large gap between the different nations' state of preparedness. To date, only the British government has published a NAP draft. According to Point Carbon reports, the Scandinavian countries are already quite well advanced, but Spain, Portugal, Greece and Poland are experiencing great difficulties in meeting the submission deadline.

Schedule for the national allocation plans

31-Dec-03	Deadline for the European Commission to publish guidelines on implementing the criteria for the national plans
6-Jan-04	Actual date of EC adoption of NAP guidelines
3-Feb-04	A conference on finalising and implementing the NAPs is being held by the European Commission and the Irish EU Presidency
31-Mar-04	Deadline for the current 15 EU member states to submit their NAPs to the Commission
31-May-04	Deadline for the ten acceding countries to submit their NAPs to the Commission
30-Jun-04	Within three months of a Member State submitting its NAP, the Commission must address whether the NAP is in keeping with the guidelines. It may reject it in whole or in part. NAPs submitted before 31 March must be responded to before 30 June
30-Aug-04	Deadline for Commission assessment of acceding countries' NAPs (earlier if submitted earlier, the three months rule applies)
1-Oct-04	Member States must take a final decision on their NAPs
1-Jan-05	Start of the first phase of the emissions trading scheme
1-Jan-07	Deadline for Member States to adopt the NAP for the second phase
1-Jan-08	Start of the second phase of the EU ETS

Source UNFCCC

UK the first member state to submit an NAP

The draft NAP the British government submitted at the end of January covers the following points:

- The distribution of certificates for 714.5m tonnes of CO_2 in the first phase of the pan-European emissions trading system. This is equivalent to reducing emissions by 16.3% by 2010, which represents a sharper reduction than the obligation specified in the Kyoto Protocol of 12.5%. 94.3% will be allocated to existing plants and 34.7m tonnes are to be held as a reserve for new plants.

- The reduction obligations cover all sectors, so (unlike the Kyoto obligations) this includes private households and the transportation sector. This takes a little pressure off the utilities.

- The obligation to reduce outputs by 5.5m tonnes of CO_2 by 2010 specified in the European ETS directives is thereby completely imposed upon the energy sector. This sector is obliged to cut its CO_2 output from 162.4m tonnes in 2002 by a total of 16.4m tonnes to 146m tonnes between 2005 and 2007. A major part of these reduction obligations is already covered by other regulations (e.g. the obligation to develop renewable sources of energy). Consequently, based on the NAP, outputs will still have to be cut by a further 5.5m tonnes by 2010 (2.75m tonnes by 2007).

- "Banking", i.e., the transferring of EU rights from the first allocation period to the second is not permitted.

- "Early actions", i.e., investments in modern power stations or in particularly environmentally friendly combined heat and power stations in the 1990s, are not dealt with separately in the NAP. However, the fixing of the emissions rights is based on the average emissions produced in the period from 1998 to 2002, although the year with the least emissions is omitted.

- "Pooling", i.e., the merger of different plants is only permissible for incineration plants with a calorific output of between 20 MW and 50 MW.

By 31 March, the final version of the NAP will be passed on to the European Commission, which then has until 30 June to accept or reject the NAP. The final allocation of rights will take place on 1 October.

Germany: NAP still facing crucial test

In Germany, the dispute between the interests of industry, the environment ministry and the economics ministry is still in full swing so there is a danger the scheduled deadline will be missed. At the start of the year, the Federal ministry for the Environment, Nature Conservation and Nuclear safety (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit – BMU) published a list of 2,631 plants whose operators were to participate in the emissions trading system as of 2005. The planned allocation of rights for these plants is based on data from the period 2000 to 2002, which permits the calculation of the actual emissions. According to these calculations, the industrial and energy-related emitters produced a total output of 505m tonnes of CO_2 in this period.

At the end of January, the Environment Minister Jurgen Trittin presented an initial draft with specific figures. It aims to reduce the CO_2 output for the period 2005 to 2007 to 488m tonnes and for the period 2008 to 2012 to 480m tonnes. This is not going beyond the Kyoto obligation to reduce emissions by 21% compared to 1990. The draft proposes:

- for both obligatory periods, emissions rights are issued at no charge,
- the number of certificates will be cut by around 7.5% by 2007,
- a part of the available rights will be retained in a fund, in order to be available for new plants and for special purposes. These special purposes include:
  - The exemption of the cement industry from the reduction obligations
  - The issuing of extra emissions rights amounting to 10m tonnes of CO_2 for so-called "early actions", so that these plants in fact do not have to achieve any reductions,
- The complete transfer of rights that are no longer used to new power stations.

Incentives for industry

The treatment of cases as "early actions" and the phasing out of nuclear power are still being hotly debated. Consequently, Vattenfall Europe has already threatened to institute legal proceedings if the CO_2 emission reduction measures it introduced as long ago as the 1990s are not adequately reflected in the allocation plans. In addition, industry is demanding emissions rights compensation for standby capacities. The Environment Minister's draft so far only envisages issuing additional certificates for over 7m tonnes of CO_2 for the second obligatory period. It is also still unclear what technical standard should apply to new plants that are being used to replace old plants.

In France too, it does not look as if the NAP will exceed the reduction obligations set down in the Kyoto Protocol in the first obligatory period. Around 1,500 plants are affected by the allocation. The allocation is based on a mix of grandfathering and projections. Presumably, this NAP will also keep something in reserve for new entrants to the market. However, how much will be kept in reserve is still unknown. It is also unclear whether the French NAP will permit "Banking".

Italy: data quality still inadequate

According to Point Carbon, the Italian government is still working on a law setting out particular technical specifications regarding the emissions data to be provided by the affected companies. The data quality is generally seen as being inadequate at present. In total, around 2,000 plants have been registered to date, and this figure is set to rise. Since there is still a demand for power stations in Italy, this sector will probably be less seriously impacted than the industrial sector.

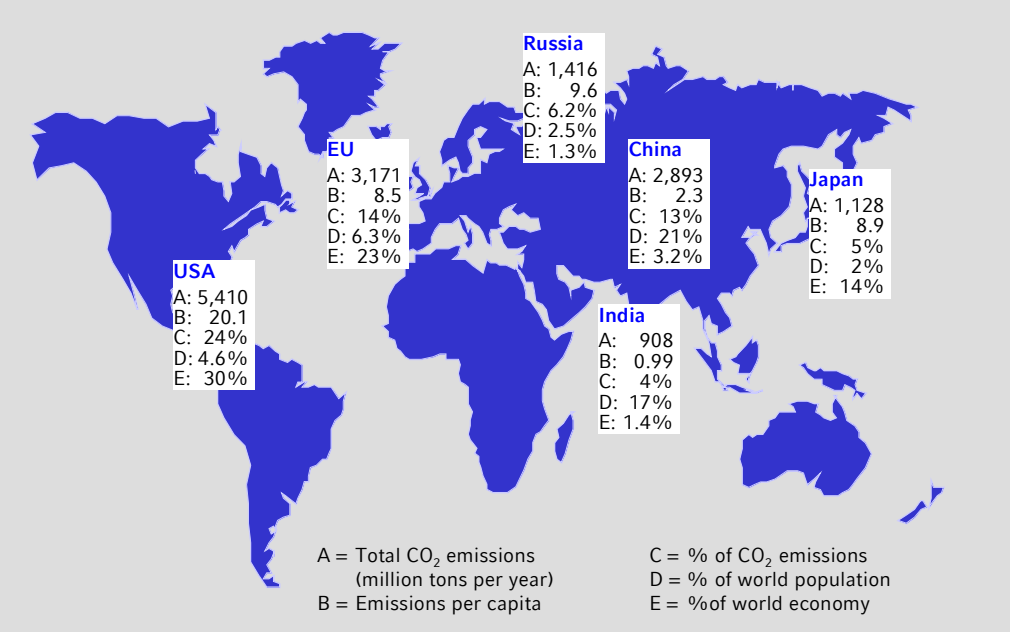
According to a study by Reuters Business Insight, the EU market for emission allowances could grow to €1.8bn in annual sales by 2012, assuming that the price for one tonne of CO_2 starts at about €5 when emissions trading begins in 2005 and rises to approximately €20 by 2012. Trading volume is projected at around 90m tonnes of CO_2.

Agreements are not enough by far

According to the latest information, the savings agreed in the Kyoto Protocol will probably barely be sufficient to sustainably stabilise the global climate. Various models comparing 'business-as-usual' with 'Kyoto Protocol' scenarios put the temperature difference at about 0.15°C by 2100 (see, e.g. Lomborg, 2002).

According to the IPCC, emissions would have to be reduced 70-80% worldwide just to stabilise CO_2 concentrations at their present level. And current knowledge suggests that even that would scarcely halt rising temperatures – at least not for the next 100 years. However, considerable improvements can be expected further out.

CO_2 emissions of the world's biggest polluter countries



Source UNFCCC

USA's rejection reduces the impact of the Protocol considerably

The USA's rejection of the Kyoto Protocol also reduces its effectiveness considerably. It is questionable whether the USA will fulfil the Kyoto Protocol reduction targets with voluntary commitments or national regulations. CO_2 emissions in the US are currently at 5,410m tonnes per year, or 20.1 tonnes per capita per year. The US accounts for 4.6% of the world's population and 30% of global GDP; its share of global CO_2 emissions is 24%.

Climate change as an economic issue

Are 'climate investments' worth it?

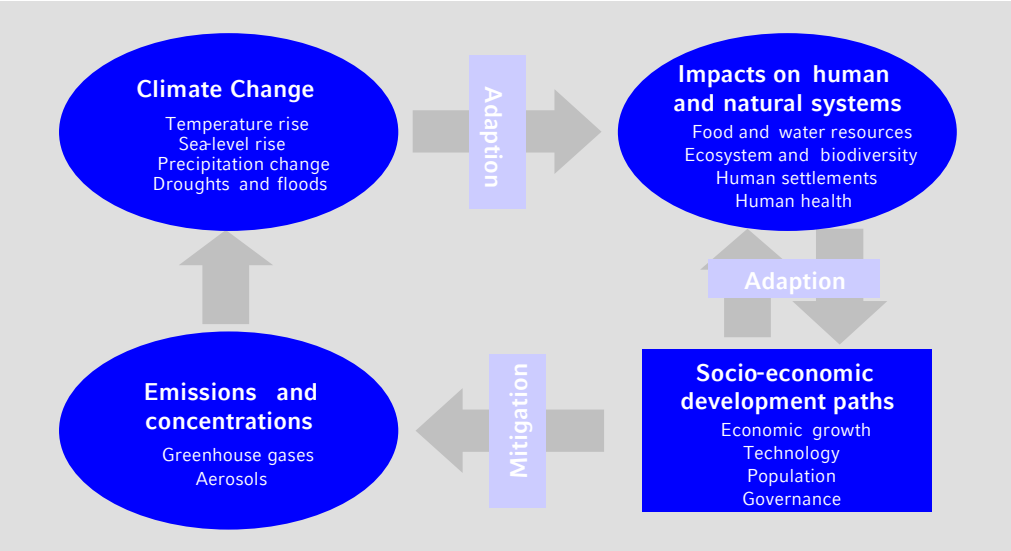
If scientific predictions are accurate, global climate change will profoundly affect our lives, our prosperity and the distribution of wealth. From a strictly economic standpoint, policy makers are faced with a choice: to use scarce resources today to limit the effects of climate change in the future or to hope that our socio-economic system's 'natural' adaptation mechanisms (including our trust in the power of technological innovations) are sufficient to deal with the problem.

'Willingness to pay' approach

Cost/benefit analyses can provide some guidance here, but have to face the problem that there is no market price representing society's willingness to pay (WTP) to avoid the risks of climate change.

The willingness to pay can only be estimated based on surveys or relative prices for real estate in areas with differing environmental exposure. But this is just one of many problems that make climate change such a complex economic issue.

The 'climate change system'



Source IPCC

How should the costs be distributed?

International benefits

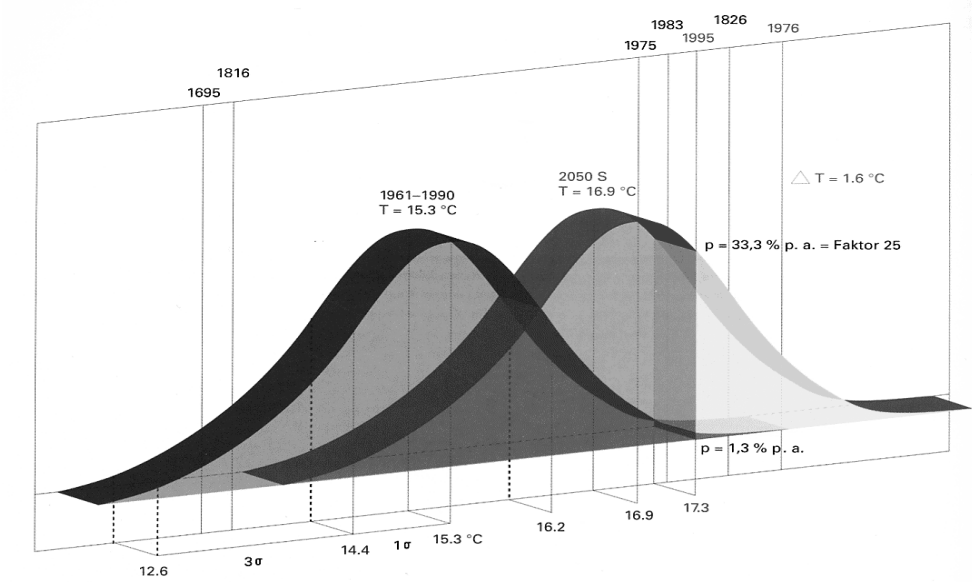
In a world linked by international trade, capital flow and technology transfer, one country's climate policies automatically have welfare effects on other countries. A pertinent question is how to distribute the costs of climate change and the benefits of any abatement measures taken (such as the Kyoto Protocol) among industrialised nations, emerging market countries (such as India and China) and developing countries. Thus, climate change can well be seen as a test case for our ability to achieve one major objective of sustainable development and that is to distribute wealth more equally around the globe. Examining the issue of equitable distribution among regions in detail extends beyond the scope of this study. However, we should point out that this aspect is particularly crucial in assessing the chances of specific regulatory measures to be ratified and implemented (such as mandatory emissions trading or a CO_2 tax).

Extreme events and catastrophic damage

Consequences reaching well beyond the insurance industry

Climate models show that the likelihood of extreme weather events rises with the degree of our atmosphere's greenhouse gas concentration. Thus, we must expect events like Germany's flood in 2002 and the disastrous economic effects that resulted from this to occur much more frequently. The consequences are felt well beyond the insurance industry.

Weather extremes on the rise



Source Munich Re

Potential climate disasters are generally projected using the WTP method; necessitating assumptions about risk aversion and the shape of the probability distribution. The Nordhaus/Boyer model arrived at costs of 0.4% to 2.3% given an average increase in temperature of 2.5°C, and of 3%-15.4% given an average increase in temperature of 6°C.

Evaluation of 'disastrous' climate damage
(WTP method, in % of GDP in 2100)

	2.5°C warming	6.0°C warming
USA	0.44%	2.97%
China	0.52%	3.51%
Japan	0.45%	3.04%
OECD Europe	1.91%	13.00%
Russia	0.99%	6.74%
India	2.27%	15.41%
Other high income (e.g. Canada)	0.94%	6.39%
middle income	0.47%	3.21%
lower-middle income	1.01%	6.86%
Africa	0.39%	2.68%
low income	1.09%	7.44%
Global		
output-weighted	1.02%	6.94%
population-weighted	1.05%	7.12%

Source Nordhaus/Boyer

Irreversibility

Slow response time of ecosystems

One main characteristic of ecological systems is their inertia. Levels of CO_2-concentration, temperatures and sea levels will continue to rise long after greenhouse gases have been reduced. Thus, damages are not immediately visible or noticeable. They tend to accumulate unnoticed and then to occur abruptly and massively. For example some ecosystems, like plants, have a certain level of tolerance and can survive climate change over a period of time (often for decades). Once the limit has been overshot, however, they cannot recover and they become extinct. The resulting damage is irreversible. Examples of events that can have a severe economic impact include melting polar ice caps or a change in global ocean currents.

Economic models used to evaluate the effects of climate change cannot sufficiently reflect irreversibilities, as they tend to assume smooth transitions between one state of equilibrium and the next. 'Jumps' in damage functions have not been modelled so far.

'The costs of inaction now outweigh the cost of action'
(CERES, 2002)

What is true for climate change and the resulting damage itself is also true for the evaluation of alternative climate change policies (i.e. choosing a particular technology), albeit with converse signs. While the irreversibility of climate-change damages pressures us to make decisions as soon as possible, the irreversibility of policy-action damages urges the longest possible delay in implementing them. The latter is also supported by the argument that considerable knowledge gaps remain, as does a high degree of uncertainty.

For this reason, some economists recommend using 'no-regrets' options first and to make far-reaching decisions only in a sequential manner, and only in conjunction with a knowledge base that is expanding over time. It is of course clear that this is a strongly disputed view. Both attitudes towards the issue can also be found, incidentally, in the debate over the Kyoto Protocol.

'Cascade of uncertainty'

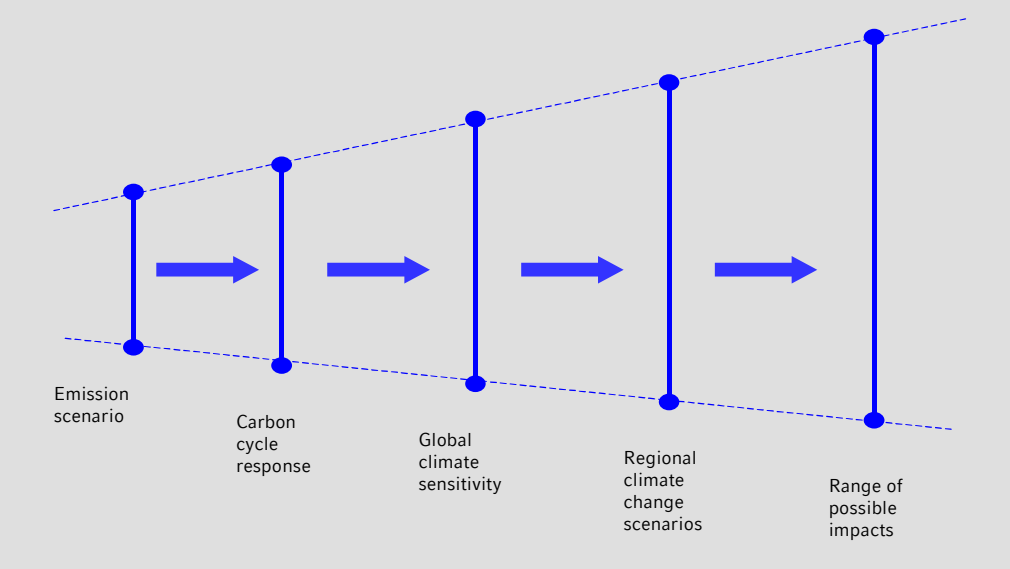
Very long time horizon poses problems

What technological innovations are to come over the next decades? Is the total replacement of fossil fuels in sight? How adaptable are the socio-economic systems without active regulation? How are consumer preferences changing in industrialised nations and developing countries? How reliable are our climate models with regard to long-term climate changes in the first place? We may be able to get a good grip on each single issue and we know that we can more or less calculate the costs of uncertainty using actuarial techniques (e.g. the WTP method).

The importance of scenarios

However, what makes evaluating climate risks and decision-making so extraordinarily difficult, even from a corporate point of view, is that the problems exist on so many levels and seem to increase exponentially when looked at in the aggregate. Schneider (1983) also refers to this as the 'cascade of uncertainty'. In economic evaluations of climate change, the special relevance of the uncertainty problem becomes apparent via the high significance of scenario techniques on the one hand, and via the existence of safety margins for discounting utility equivalents on the other hand.

Climate change and the 'cascade of uncertainty'



Source IPCC, WestLB Equity Markets

Scenarios: assumptions, conclusions and implications

Scenarios form the basis of modelling

Scenarios are a key element in evaluating climate risks. Future greenhouse gas emissions are the product of a very complex, dynamic system, driven by factors like population growth, technological breakthroughs, but also changes in economic subjects' preferences. This makes projections extremely uncertain (see 'Cascade of uncertainty') and calls for alternative views of future developments. These scenarios help us examine the form in which the driving forces of climate change will affect emission levels and the implied economic damages and how great the attached uncertainty is. Scenarios are thus the foundation for modelling climate change and its economic effects and, furthermore, act as a benchmark for regulatory measures, such as the introduction of a CO_2 tax or of a package of measures implemented to fulfil the goals of the Kyoto Protocol. The baseline scenarios are so important because they often depict a much wider spectrum of results than the various policy scenarios for which they serve as a benchmark.

From optimistic to pessimistic

The future scenarios currently under review describe a broad array of possible worlds. For those that assume rising greenhouse gas emissions, this array ranges from optimistic to pessimistic. Scenarios depicting decreasing emissions, on the other hand, consistently paint optimistic pictures of the future. Notably, the scenario modellers see a close relationship between the willingness and ability to reduce greenhouse gas emissions and the achievement of other sustainable development targets (e.g. international equity, an overall improvement in environmental quality, declining bilateral conflicts and thus greater geopolitical stability). The table below summarises again the main assumptions forecasters have made about greenhouse gas emissions.

Future scenarios and their implications regarding factors related to a change in greenhouse gas emissions

Factor	Rising GHGs	Falling GHGs
Economy	Growing, post-industrial economy with globalization, (mostly) low government intervention, and generally high level of competition	Some scenarios show rising GDP, others show economic activity limited to ecologically sustainable levels; generally high level of government intervention
Population	Growing population with high level of migration	Growing population that stabilizes at relatively low level; low level of migration
Governance	No clear pattern in governance	Improvements in citizen participation in governance, community vitality, and responsiveness of institutions
Equity	Generally declining income equality within nations and no clear pattern in social equity or international income equality	Increasing social equity and income equality within and among nations
Conflict/Security	High level of conflict and security activity (mostly), deteriorating conflict resolution capability	Low level of conflict and security activity, improved conflict resolution capability
Technology	High level of technology, innovation, and technological diffusion	High level of technology, innovation, and technological diffusion
Resource Availability	Declining renewable resource and water availability; no clear pattern for non-renewable resource and food availability	Increasing availability of renewable resources, food and water; no clear pattern for non-renewable resources
Environment	Declining environmental quality	Improving environmental quality

Source IPCC, WestLB Equity Markets

Broad range of implied world GDPs

The scenarios imply an extraordinarily wide spectrum of economic effects. Depending on the scenario used, global GDP (output-weighted) for the year 2100 ranges between $197trn and $550trn (in prices of 1990). Global temperature increases range from 1.4°C to 5.8°C. Sea level would rise between 9cm and 88cm and the world population would lie between 7bn and 15.1bn.

The level at which the CO_2 concentration is to be stabilised (measured in particles per million, ppm) has a significant effect on the necessary emission reductions and, of course, on the expected economic costs too. On average, the costs of stabilisation at 450 ppm are about three times higher than at 550 ppm across all scenarios and six to eight times higher than for 650 ppm.

Alternative stabilisation targets also imply completely different timeframes for introducing emission reduction measures. The 450-ppm level calls for much earlier, much more radical action than the 650 ppm level. It also requires a sharp increase in reduction efforts over the next 20 to 30 years. With regard to the Kyoto Protocol, the 450-ppm case implies that the Annex I countries would need to step up their efforts beyond those listed for 2008 to 2012. For the higher stabilisation levels, however, the Kyoto provisions would suffice.

How can stabilisation targets be reached?

Contributions of specific stabilisation measures

Stabilisation scenarios are naturally based on specific assumptions as to how CO_2 reduction levels can actually be achieved. This includes improved energy efficiency, a reduction in energy demand, the substitution of fossil fuels by other fossil fuels containing less carbon, a switch to non-fossil methods of energy production (nuclear power, biomass, renewable energy sources), a removal of already emitted greenhouse gases and reforestation.

Achieving stabilisation targets requires a whole portfolio of abatement measures

All in all, the findings show that no single measure will be sufficient to achieve the discussed stabilisation targets. Rather than that, a whole portfolio of abatement provisions will be necessary. Companies must keep this in mind when trying to assess which regulatory measures will be implemented in future and how to position themselves in light of these.

Climate change and shareholder value

"Of all the environmental challenges facing us today, however, climate change has the greatest potential to influence corporate competitiveness and profitability, the market's valuation of the company's stock and, by extension, the creation and erosion of shareholder value."
(Ceres, 2003)

In determining what impact, if any, climate change has on shareholder value, we need to distinguish between the macro and the micro perspective. From a macro point of view, the decisive elements are the economic damage induced by climate change and the effects that regulatory actions, such as the Kyoto Protocol, have on economic growth and thus on (monetary) prosperity. If one concludes that climate change threatens our prosperity, making the economic pie smaller, so to speak, then it is clear that overall companies' potential to generate shareholder value will also become smaller.

From the micro standpoint the relative perspective is more important, i.e., how the shrinking aggregate profit potential, all else being equal, will be allocated among the individual sectors, industry groups and companies.

Even assuming no net loss on balance, or a scenario in which the looming climate change produces a boost in innovation that actually enhances our economic well-being, climate change will lead to significant shifts within our socio-economic systems. Expected changes in consumer preferences and corresponding modifications in purchasing behaviour require companies to have strategic responses. Merely reacting to immediately pending changes in the regulatory environment (emissions trading, CO_2 tax, etc.) does not suffice. Companies that today still believe it does, are in danger of being counted among the big losers of the 'climate change' megatrend.

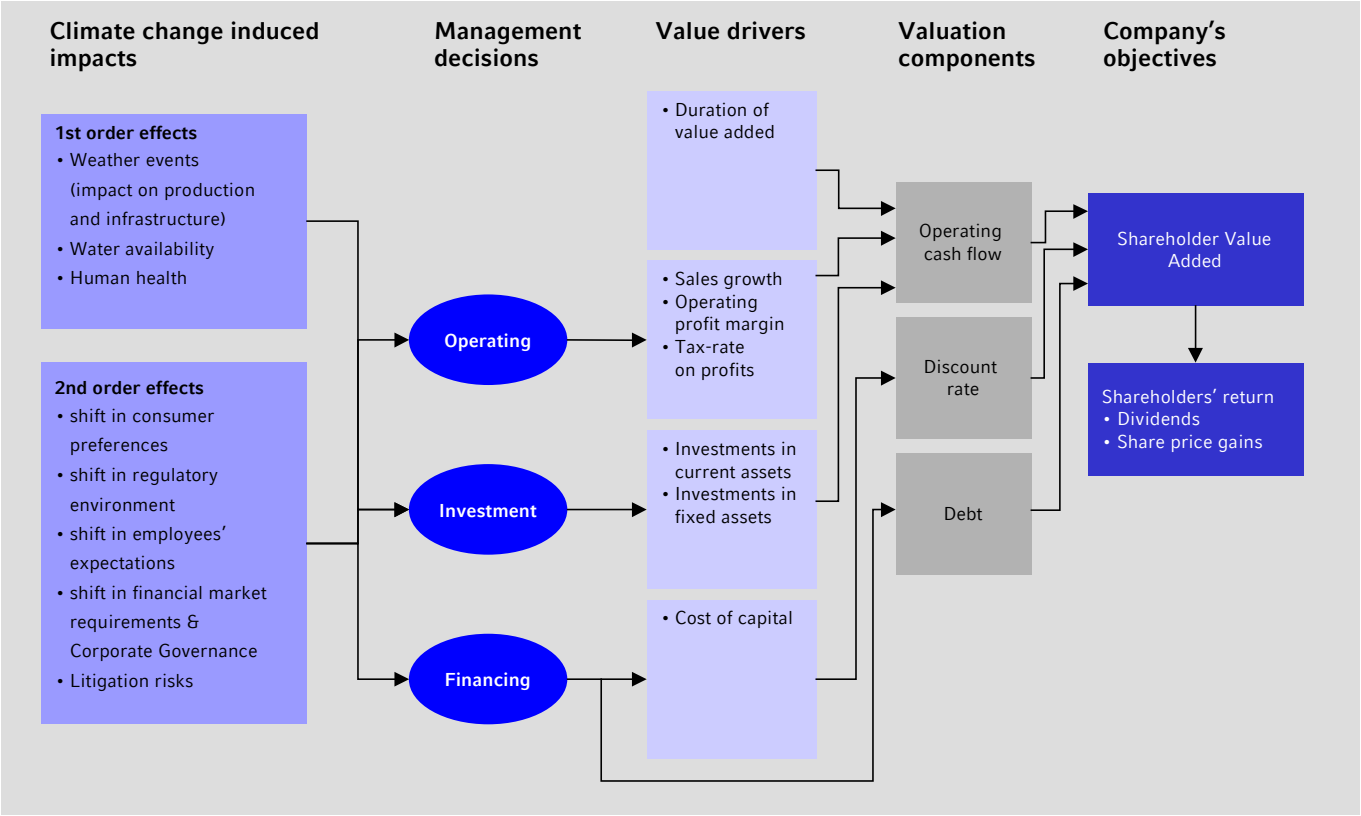
Climate change exposure and companies' value drivers

It should be clear, a priori, that companies can have very different climate change exposures. The risk profile is primarily determined by:

- the company's asset mix;
- the company's product mix;
- the company's position in the value chain; and
- the location of its operational activities and sales.

The task of a bottom-up analysis is to establish a link between the impacts of climate change and a company's key value drivers. We distinguish between two essential transmission mechanisms, the direct effects of climate change (first-order effects) and the indirect effects of climate change (second-order effects).

Climate change & shareholder value



Source WestLB Equity Markets, Rappaport

The first order effects and their specific repercussions on particular sectors have already been illustrated. In addition to agriculture and forestry – and thus the food industry and agrochemicals – the most susceptible sectors are energy (primarily hydropower), transport, utilities and tourism.

Construction industry among the winners

The manufacturing industry is particularly affected by the regionally specific consequences of climate change. Sectors with high water usage (e.g. semiconductor manufacturing) are especially vulnerable, as are sectors whose raw materials are climate-sensitive. A clear beneficiary of first-order climate effects would probably be the construction industry since infrastructures and buildings will increasingly require protective devices and reconstruction.

Sectors that are susceptible to regulation

Changes to the regulatory environment are certainly among the most important second order effects (and above all the internalisation of CO_2 emissions costs). Particularly sensitive are sectors with a high degree of energy intensity, either in terms of the production process or in terms of the products being manufactured. Besides the oil and gas industry, utilities, basic resources (paper, cement, ceramics, steel), chemicals and parts of the manufacturing and the automobile industry, the list also includes the transport sector (despite the fact that airlines up to date have been frequently exempted from policy measures like climate change levies).

Risks to reputation

We regard risks to reputation as second-order effects, too. Companies in industries which are seen to be emissions-intensive and which have, additionally, strong brands are

particularly affected and make easy targets for NGO campaigns. In addition, they face a higher risk of being sued for damages. Public opinion, in general, and consumer opinion, in particular, play key roles in risks to reputation.

Our most important empirical findings

MVaR: serious implications for companies' market value

As part of our study "Carbonomics – Value at Risk Through Climate Change' (July 2003), we estimated a Market Value at Risk (MVaR) for the world's equity markets of between $192bn and $915bn based on the macroeconomic scenarios. The scenario with the mildest outcome assumes comparatively weak growth, a regionally-oriented economic development, and little momentum of innovation, whereas the worst scenario (highest costs, in the form of a reduced market value of listed companies) would stem from a globalised world with strong growth and a high rate of innovation – even if the focus of technological development were on non-fossil fuels. Our MVaR analysis also shows that the results are heavily influenced by the choice of discount rate and that different target stabilisation levels can have very different policy implications.

Regression analyses show that climate change cannot be considered as a systematic risk factor, but ...

Besides the scenario calculations, we also conducted a series of regression analyses at the market level based on different sets of hypotheses. Our study is based on 49 industry and sub-industry groups as defined by DJ STOXX (pan-European universe). First, we were interested in whether climate change can be interpreted as a systematic risk factor, i.e., a risk factor that is priced by the market.

Using an augmented CAPM, we conclude that neither climate change exposure nor the quality of climate change management are much help in explaining the differences in average post-Rio returns of the 49 industry groups (that is, average returns since the Earth Summit, which was held in Rio de Janeiro in 1992). The result is also hardly affected by growth and value factors. After taking into account the corresponding variables, the coefficients for the climate change variables changed very little.

... also show that climate change exposure has a significant impact on relative valuation

In order to offset the drawbacks of using returns over a specific time period (here: post-Rio), we also carried out regressions in which relative valuation was defined as a dependent variable. The result was that companies in industries with a high level of climate change exposure would have to expect to be traded at a discount. In other words the market has already accounted for climate change in the form of price differences between highly exposed and less exposed industries. But the results also reveal that the market is apparently not yet able (or willing) to systematically differentiate between well-managed and poorly managed companies. This could mean that either the companies are not capable of communicating the quality of their climate change management or that there is too little transparency for the market to make a distinction between honest efforts and pure marketing. In any case, companies should take this as an indication that their activities with respect to climate change are not yet being communicated to the capital markets effectively enough. It seems there is still much work to be done in this area.

Climate change activities are not being communicated effectively enough

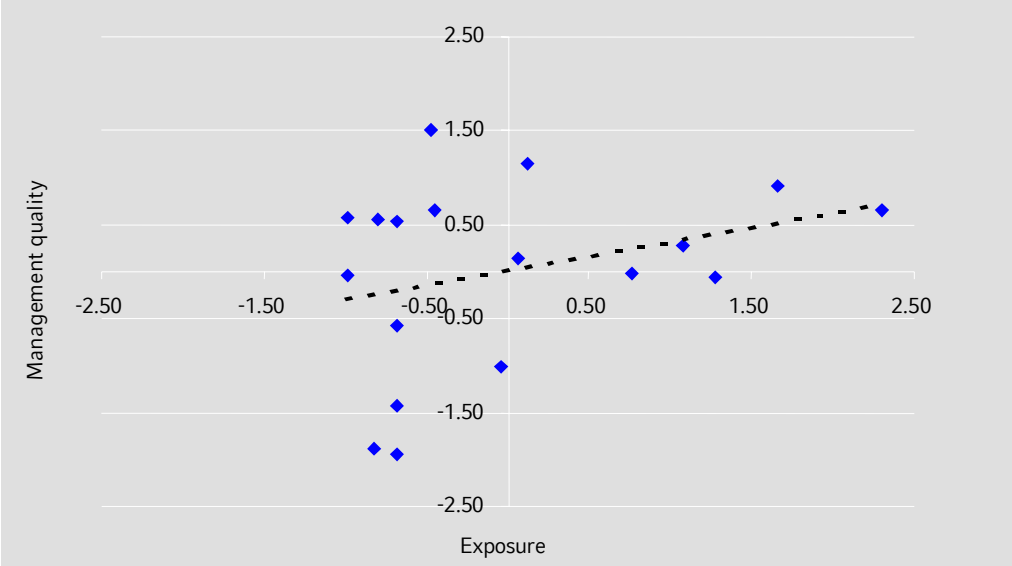
Correlation with beta and growth are economically plausible, but statistically not significant

Our regressions also showed that the climate change variables we used can neither explain the differences in the growth profiles of the 49 industry groups we studied nor the differences in beta. At least, one can say that climate change coefficients variables carry the 'right', i.e., economically plausible, sign. A high degree of climate change exposure increases beta and lowers growth prospects while a high quality of climate change management improves growth prospects and reduces beta.

European sectors: positive correlation between exposure and management quality

At the sector level (Benchmark: DJ STOXX600), we see that there is a positive link between the general climate exposure of an industry and the quality of climate change management. Thus, companies in high-exposure industries tend to do a better job than companies that are less affected by climate change.

Climate change Z-scores at the sector level – positive correlation between exposure and management quality



Source WestLB Equity Markets, SAM

Nevertheless, the relatively low level of correlation indicates that there are still many companies that are highly exposed but have not yet taken action to adequately deal with the risks and opportunities that go along with climate change.

Management quality: "outperformers" vs. "underperformers"

Using so-called z-scores to compare the average management quality of the 18 sectors very quickly separates the "outperformers" from the "underperformers". We demand a z-score of greater than one as a minimum requirement. In addition, outperformers and underperformers should also differ from the average for all sectors by more than one standard deviation. Based on this we arrive at the following findings:

- the "underperformers" include Financial Services, Media, Retail, Cyclical Goods & Services
- the "outperformers" include Telecoms, Insurance

There are even large differences in management quality within the sustainability universe

The results also show that there is evidence of clear weaknesses in the management of climate changes even within the DJSI universe (DJSI: Dow Jones Stoxx Sustainability Index). For instance, the best figure for a DJSI member in the Financial Services sector is still below the average for the entire European equities universe, and the worst result is even zero. This is certainly a completely unsatisfactory result, but it does show that the sector leaders from the financial services sector do not appear to have understood the subject of climate change and its relevance for the sector. This confirms the findings of the Carbon Disclosure Project.

MVaR at the European sector level

As at the global market level, we have investigated the effects of climate change and possible climate change policies on the market value of companies and on the European sector level. The differences between the various future scenarios are very significant in some areas. The maximum implied market value differences are especially large for Auto, Energy, Healthcare and Utilities. In most cases, the climate policy interventions implied by the stabilisation level cause considerable incremental costs in some areas, in the form of reduced market valuations. This often again involves the scenario of a "globalised world with strong growth and high levels of innovative momentum" for which very large sums have to be applied. Consequently, for example, in the case of the automotive sector, which compared to a base scenario would have to reckon with a market capitalisation that is another $35.4bn lower. Conversely, the telecoms sector comes out very differently. Regardless of the specific reference scenario it would even profit from a stabilisation of the CO_2 concentration at 450 ppm. This can possibly be explained by the shift in relative prices in favour of telecoms products and services.

Climate change & insurers

Twofold risk

Interdependence between claims and investments requires holistic risk management approach

The detailed description of climate change elsewhere in this document clearly indicates that the insurance sector is sensitive to this issue in many areas. It affects each of the three strategic pillars with which we are attempting to systematically register the risks and opportunities resulting from sustainability themes for the insurance sector. Once more as a reminder, the pillars are: (1) claims, (2) investments and (3) new business areas/products (see detailed description in introduction). One special feature of the insurance sector is the strong interdependence between claims and investments. It is therefore clear that the key to success is to manage climate change risks holistically (in the sense of asset/liability management). However, this generally also applies to the other sustainability topics (in particular risks of terrorist action for example) that we consider within this study.

Specific management tasks

However, what does the demand for a holistic management approach specifically mean? More concrete information can be found in the latest study from CERES/Innovest, which deals with climate change as a matter of corporate governance. It specifies a combination of four management duties in total:

- the reduction of greenhouse gas emissions;
- the researching of opportunities and risks arising from changes in weather conditions and bio-physical conditions;

- observing how changing markets and regulatory conditions could positively or negatively effect the products and services the company offers;
- evaluating how corporate strategy will be influenced by the implications of climate change for all of the company's business activities, or the other way round, how corporate strategies will affect the impacts of climate change.

Greenhouse gas emissions certainly affect the insurers less, ...

In contrast to, for instance, companies in the manufacturing sector, the greenhouse gas emissions themselves are certainly not of predominant importance to the insurers. As compared to other industries, the insurers' contribution to the greenhouse effect is not very significant. Insurance, so to speak, can thus be considered as one of "clean industries". However, how these companies handle their own emissions (buildings, fleets of vehicles, etc.) is nevertheless of great importance. It gives useful information about a company's risk awareness and the credibility of its publicised strategies.

...but how they handle their own emissions gives information about risk awareness and credibility

That the insurers themselves are aware of their own greenhouse gas emissions and accordingly assume responsibility for their reduction is demonstrated by some prominent examples. Munich Re, for example, has introduced an internal energy management programme that is intended to systematically cover and analyse all of the emissions reduction options. Equally, Swiss Re has made significant efforts to reduce its employees' business travel activities to the essential minimum, to increase its energy efficiency and to modernise its office buildings, in order to ultimately achieve a more favourable emissions profile. The company has begun to record the emissions generated in the entire value added chain.

Specific examples as "anecdotal evidence"

Another example is Allianz. The company has reduced its emissions by ensuring that 5% of its total energy requirement is provided by renewable sources of energy. In addition, according to company sources it has managed to increase considerably the efficiency of its employee mobility. On average, Allianz employees travel around 4,000 km on business trips which are mainly undertaken using flights and cars. In 2002, train travel accounted for 16% (significantly up on 1999). The group's internationalisation is primarily responsible for the increase in air travel because the distances travelled are longer. At the same time, the merger of widely scattered office locations in Munich and Berlin has permitted a considerable reduction in company internal travel. Given the enormous traffic volumes that occur in urban conurbations this represents a welcome contribution to relieving the roads and to CO_2 reduction. Furthermore, tickets for the public transportation system have been given to the Allianz's Munich-based employees for their business trips.

Systematic analysis based on climate change exposure and management quality...

The cases cited are admittedly only "anecdotal evidence" and far short of what would be required for a systematic analysis. As part of our "Carbonomics" study we have developed an approach which permits evaluation of a company's general exposure and management quality with regard to climate change matters. The scores are based on bottom-up assessments of SAM (Sustainable Asset Management), which also form the basis for membership of the sustainability indices of Dow Jones and DJ STOXX (for further information on DJSI method, please refer to www.sustainability-indexes.com).

... with the help of z-scores

Using our climate change exposure variable (*Exp*), we model the relative significance of the issue of climate change to the company and the sector, regardless of the way in which the company deals with this issue, i.e., the way it manages the opportunities and risks associated with climate change. To do this, we use the maximum climate score SAM assigns an industrial group and which is expressed as a share of the maximum sustainability score of 100 points. The purpose of the second variable (*Qual*) is to get a reading of the company's quality in terms of its opportunity/risk management, regardless of its exposure. To this end, the total number of points given by SAM is normalised with the help of the maximum number of points that can be achieved. Finally, the results thus compiled are then transformed into so-called z-scores.

$$z_{Exp,i} = \frac{x_{Exp,i} - \overline{x_{Exp}}}{\sigma_{Exp}} \qquad z_{Qual,i} = \frac{x_{Qual,i} - \overline{x_{Qual}}}{\sigma_{Qual}}.$$

Advantages of the z-score method

The advantage of using this method is that it will result in values centring around the average value of zero, and thus make it easy to read off which sectors (e.g. in terms of management quality) are among the 'outperformers' or the 'underperformers'. We have aggregated the company-specific scores at the level of the 18 DJ STOXX market sectors. The following table contains our findings.

Climate change z-scores at sector level (based on SAM bottom-up assessments)*

	Z-Scores		*Qual* (unadjusted scores)		
	Exp	*Qual*	ø total	Max DJSI	Min DJSI
Auto	2.30	0.65	0.46	0.87	0.19
Basic Resources	-0.45	0.66	0.46	0.79	0.38
Banks	-0.68	-0.58	0.30	1.00	0.00
Cyclical Goods & Services	-0.04	-1.01	0.25	0.46	0.12
Chemicals	1.28	-0.05	0.37	0.74	0.26
Construction	0.76	-0.02	0.38	0.68	0.24
Energy	1.66	0.91	0.50	0.93	0.50
Food & Beverages	-0.68	0.54	0.45	0.95	0.63
Financial Services	-0.68	-1.95	0.13	0.12	0.00
Healthcare	0.07	0.15	0.40	0.81	0.19
Industrial Goods & Services	-0.99	-0.04	0.37	0.72	0.19
Insurance	**0.13**	**1.14**	**0.53**	**0.91**	**0.41**
Media	-0.82	-1.88	0.14	0.42	0.03
Non-cyclical Goods & Services	-0.98	0.58	0.45	0.92	0.32
Retail	-0.68	-1.43	0.20	0.67	0.00
Technology	-0.80	0.55	0.45	0.75	0.05
Telecom	-0.47	1.51	0.57	0.94	0.29
Utilities	1.08	0.27	0.41	0.81	0.24
Average	0.00	0.00	0.38	0.75	0.23

* Weight of the climate change related issues in SAM's total sustainability score;
Qual reflects the performance of companies regardless of their climate change exposure (*Exp*)

Source WestLB Equity Markets, SAM

Insurance sector: slightly disproportionate exposure, management quality significantly above average, ...

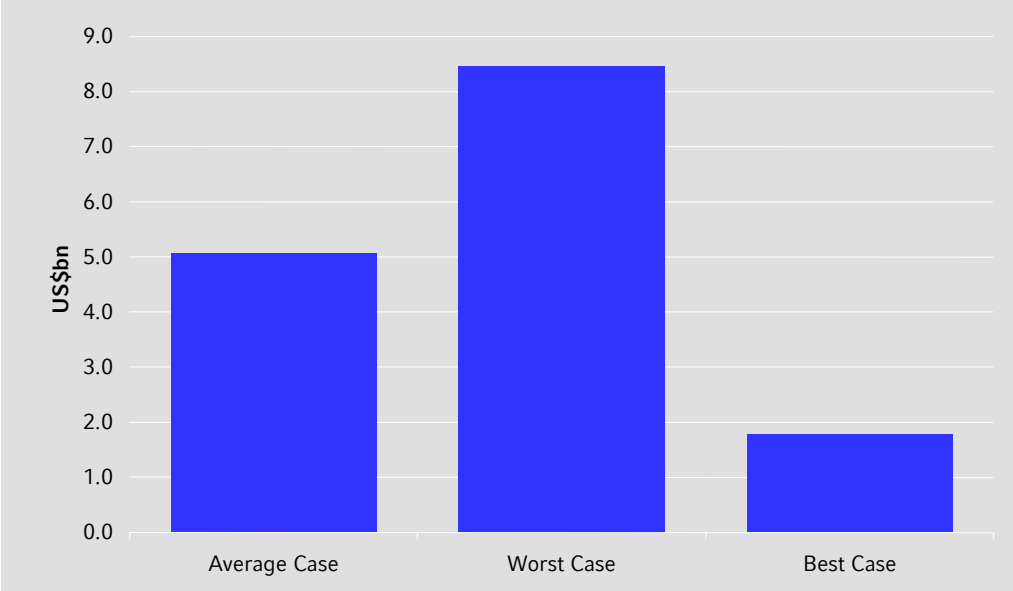
Based on this analysis, the insurance sector's (risk) exposure in terms of climate change is positive, a sign that this sector tends to be disproportionately negatively affected by climate change. However, at +0.13, this value was not significantly above the market average. Considerably more affected are, for example, sectors like Automotive at +2.3 or Energy at +1.66. To us, threshold values are differences from the market average of one standard deviation either up or down. It is only when this is exceeded that we view the

sector's risk as significantly above or below average. The same, of course, also applies to management quality, which is our second climate change variable. The insurance sector is clearly unusual here. Insurance and Telecoms are the only sectors that are considered "outperformers" according to our definition. This result is well in keeping with the impression given by anecdotal evidence.

... MVaR comparatively low

However, in our "Carbonomics" study we go considerably further than this. Based on the above findings, in a second step we have attempted to quantify the impact of the differences in exposure and management quality on the market value equivalent costs of climate change at the sector level. The starting point here was the global costs resulting from climate change, as indicated by the scenarios of the IPCC. Details of the methods we used can be found in the earlier study. The insurers come away relatively unscathed, which is hardly surprising given the low exposure and the high level of management quality. Depending on the scenario, the "market value at risk" is between US$1.8bn and US$8.5bn, which is the equivalent of a potential loss in market capitalisation of "only" 0.7 to 3.5%. This is significantly less than, for example, the automotive sector, where exposure is primarily determined by the product. According to the same method of calculation, the potential loss in market value here can be up to 43.5% (worst case scenario).

Market value at risk for European insurers*



* assumption: level of stabilisation at 450 ppm; transformation to sector level is based on mcap- and z-scores weights; the global market value equivalent climate costs were allocated to Europe with the help of mcap weights

Source WestLB, SAM

Meaningfulness is limited, however

The assessments made by SAM, and those of other rating agencies, are primarily based on the efforts of companies to reduce their own greenhouse gas emissions and on the companies' general awareness of risk. It is not very surprising that the insurers come off pretty well here. The meaningfulness of these ratings is, however, limited with regard to the economic opportunities and risks generally associated with climate change. We would therefore like to take this a step further and, with the help of a tailor-made survey, explore this issue further. In particular we are aiming at taking the special relationship

between the risks involved in the insurance business and those inherent in the insurers' investment business into account.

Exposure is determined by the underwriting and the investment business

Generally, it may be said that the greater the equity risk exposure on the investment side, the greater is also chance that major climate change related damages are able to undermine a company's financial strength (see the introductory chapter of this study). Of course, bond positions can also carry climate change risks. This applies to corporate bonds (close correlation to share prices) and, of course, also to CAT bonds, in which some insurers have invested.

Investment portfolio weights among European insurers (in %)*

In %	Equities		Bonds	
Company	**2001**	**2002**	**2001**	**2002**
Aegon	6.5	4.7	na	58.6
Allianz	22.9	16.2	67.7	73.4
AXA	26.9	21.7	58.7	61.5
CNP	19.2	12.9	83.3	85.1
Generali	7.3	5.1	45.0	48.4
ZFS	13.3	9.7	54.4	59.6
Converium	13.1	8.2	73.6	78.6
Hannover Re	8.4	5.6	69.5	71.9
Münchener Rück	19.8	11.1	47.4	54.8
Scor	7.2	6.4	61.9	67.8
Swiss Re	18.7	13.2	59.7	66.3
Average	**14.8**	**10.4**	**62.1**	**66.0**

* based on market values

Source Company, WestLB Equity Markets

Equity exposure and financial strength

The amount of equity exposure is the one general metric by which the insurers' exposure to climate change can be measured. The second metric is their financial strength, which, for example, is expressed in the size of their loss reserves or in the general quality of their balance sheets. Highly solvent insurers are basically better equipped to cope with climate change risks. One possible proxy indicator for the solvency of an insurer is its current credit rating.

Credit rating as a measure of financial strength

The credit rating is based firstly on the underwriting risks on the liabilities side and secondly on the investment risks on the assets side. The rating reveals a lot about a company's risk capital adequacy due to the medium-term horizon (as a rule, two years for the rating and six months for the outlook). However, it is not possible, of course, to draw conclusions about exposure to climate change based on the rating alone.

An insurer operating in the retail business at the national level may well have a 'stronger' rating than an international insurer who underwrites any type of risk (including major claims risks). But due to the regional bias in underwriting exposure, it is not unlikely that the smaller company's existence may be at risk due to a major loss event that is regionally limited and climate related (despite good credit ratings).

European insurers: S&P credit rating and outlook

Aegon	A+	stable
AGF	A	negative
AMB Generali	AA	negative
Allianz	AA-	negative
AXA	A	stable
Converium	A	stable
Generali	AA	negative
Hannover Re	AA-	negative
Munich Re	A+	stable
Nürnberger Bet.	A	negative
RAS	AA-	negative
SCOR	BBB+	stable
Swiss Re	AA	stable
ZFS	A+	stable

Source Bloomberg

So far we have given our more general thoughts about climate change and its impacts on the insurance industry. In the following we will more specifically look at the implications of climate change on each of our three theme pillars: claims, investments and new products. We will begin with the claims side, the insurers' original operating business, so to speak.

The claims side

Trend

The damage caused by natural disasters has increased by a factor of more than ten over the past fifty years

The US Department of Energy (2001) estimates that natural disasters have caused more than $1trn of damage worldwide over the past 15 years. Around three quarters of this is directly linked to climate and weather events. Compared to the fifties, the damage caused by natural disasters has increased by a factor of more than ten, and it more than doubled in the nineties alone. 2002 was also a year of catastrophes. The economic damage caused by the 'Oder flood' in Germany alone is estimated at €9.2bn. However, only 20% of this was insured. Flood claims occupy second place in the overall statistics. At $6.7bn wind and storm damage was again responsible for the lion's share of insured claims.

Insured losses in 2002 (non-life, in $ millions)

Floods	4113
Wind and storm	6654
Drought, forest fires	120
Other natural disasters	537
(Direct) caused by human beings (for example, terrorism)	2130

Source Swiss Re, sigma 2/2003

Reason: more frequent weather anomalies, increasing affluence and population growth

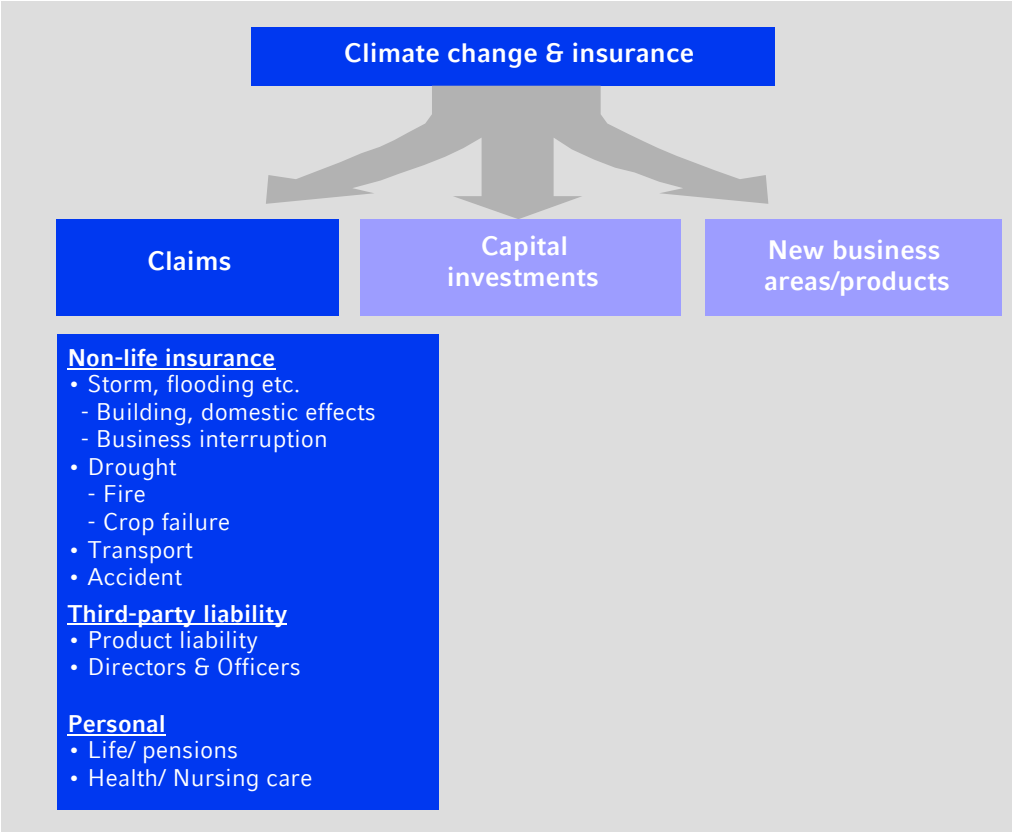
There are several reasons for the rising trend charted by the volume of insured losses. Climate change has repercussions on the frequency and level of claims. Weather anomalies occur more often and are more extreme, causing correspondingly greater damage. However, it is clear that climatic change is not responsible for all of the increase in economic damage. Other factors include increasing per capita affluence and population growth. Both tend to augment the value of the insured assets (e.g. infrastructure). As a result, the claims caused by weather anomalies would continue to

increase even in the absence of climate change. In addition, price inflation must be taken into account when looking at calculations that are based on nominal figures, as it can play a significant role in comparisons and projections over long time periods.

This is not intended to play down the influence of climate change on the claims process. Indeed, the analysis in the preceding chapters has demonstrated impressively just how significant climate change induced economic losses can be, all other things being equal. We believe it is also important to consider the interactions of climate change with other global trends (such as the population growth mentioned above).

Below, we look briefly at the various insurance types and segments where the claims experience is affected by climate change.

Climate change and repercussions on the claims process of insurance companies



Source WestLB Equity Markets

The most heavily affected segments: non-life insurance ...

Looking at major damage events, such as the 'Oder flood' in 2002 or Hurricane Andrew in 1992, it is clear that non-life insurance is the most heavily affected segment. Claims have to be met here not only as a result of the direct damage to buildings and infrastructure caused by extreme weather, but also as a result of the loss caused by business interruption.

... including business interruption, ...

The significance of business interruptions as potential claims should not be underestimated. For example, if storm damage cuts offices off from power supplies over a period of several days, then the overall insured loss may often be higher than the

damage to the building. Many insurers of wind turbines, for example, are currently going through a very bad patch: storms crack the masts too easily and/or lead to generator overloads. The claims caused by turbine operating interruption, combined with the insured property claims, lead to combined ratios (claims ratio plus cost ratio) of well over 100%.

... but also personal insurance ...

Crop failure is very much to the fore in agriculture. The repercussions on transport and motor vehicle insurance are not quite as apparent, but nevertheless they undoubtedly exist. Extreme weather increases the risks for transport by road, air and sea. The accident risk is increasing. The implications for personal insurance (accident and health) are self explanatory here. Personal insurance is also affected by the repercussions of global warming on mortality and the spread of diseases (e.g. heat stress, malaria, Dengue fever, cholera).

... and third party liability insurance

The situation in the third-party liability segment is less clear. Here, it is not even primarily a matter of liability within the context of construction work, for example a dam that bursts because of construction faults, or a high-rise building that fails to withstand a storm despite the fact that the wind-force limits have not been exceeded. In our view, polluter liability has far broader implications. This is already well-anchored in the US legal system and is now also taking shape in Europe with regard to environmental damage. At the end of last year the insurance industry was just able to ward off a compulsory insurance scheme being considered by the EU Commission, but this is far from being struck off the agenda.

Polluter liability is also becoming increasingly relevant in Europe

Within the climate-change context, polluter liability may possibly be attributed to the large CO_2 emitters, for example, to the power utilities, as well as to the manufacturers of CO_2-emitting products (particularly automobiles). Class actions against the automobile industry along the lines of previous nicotine and asbestos cases are already being prepared in the USA. Their prospects of success are highly uncertain. What is certain, however, is that an adverse court decision could entail costs that would endanger the very existence of the companies concerned. The fact that the danger facing the companies from the legal side should not be underestimated is underlined by the establishment of the so-called Climate Justice Programme. An international grouping of lawyers, scientists and public interest groups is behind this initiative. Its intention is to look into how far existing statutory requirements can be used to act against climate change. In the future we expect that companies will also come under increasing pressure from this side to take concrete measures regarding climate change.

Potential 'climate change third-party liability' insurance involves not only the companies as legal entities, but also the managers acting on their behalf. Just how explosive this topic can be is shown by an example from the insurance sector itself. Swiss Re has announced it would not protect its senior executives if they were to be sued by shareholders on the grounds that their climate policy is inadequate (Environmental Finance, November 2002).

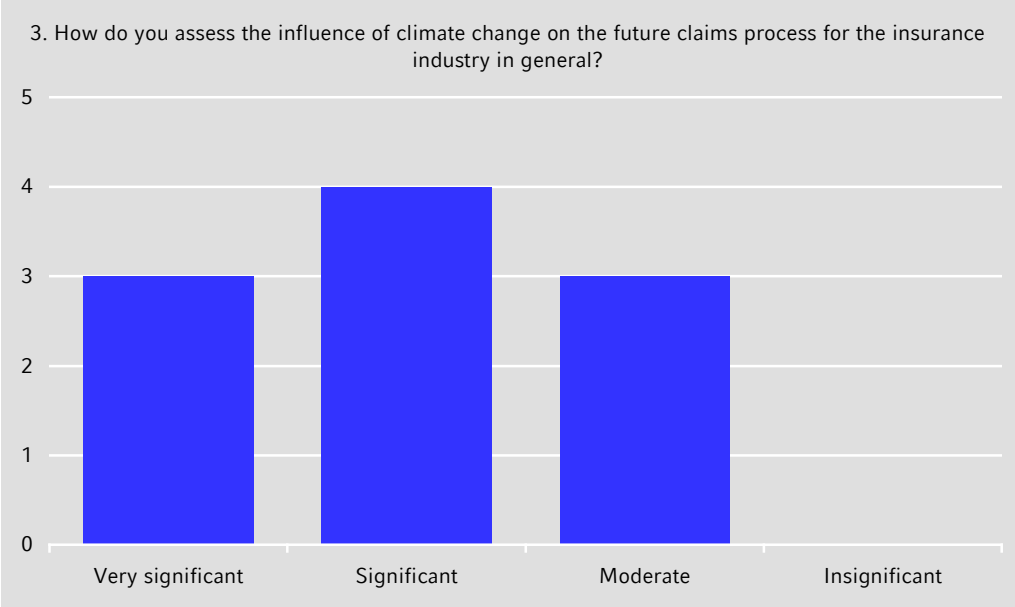
Process of reorientation in the US prompted by astronomically high compensation claims

Lawyers in the USA usually work on a contingent fee basis. Since between 30% and 40% of the claims won from legal proceedings are received by the lawyers, they have a vital interest in astronomically high compensation payments. Even if it is helpful to increase the pressure on companies in many areas, in our view the American system does not necessarily lead to economically meaningful results (also not to results that are compatible with sustainability thinking). Following the bankruptcy of several industrial companies as a result of compensation payments to former employees (e.g. on the grounds of asbestos exposure), a process of reorientation is now apparently underway in the USA. In the area of medical third party liability some US states are calling for a ceiling of, for example, $250,000 per claim event. In some cases insurance has become unaffordable for companies because of excessively high claims and rising premiums, with the result that some clinics have already had to close as they no longer had any insurance cover. A similar trend among motor vehicle manufacturers on account of climate-induced claims would be fatal in economic terms.

Survey findings: climate change and the claims process

We asked the companies participating in our survey how they themselves assess the significance of climate change related underwriting risks.

Survey – climate change and the claims process



Source WestLB Equity Markets

Influence of climate change on the claims process: industry-wide and ...

The responses to Question 3 show that a clear majority of the companies believes climate change exerts a significant influence on the insurance industry as a whole. None of the companies is of the opinion that the topic will be insignificant for the claims process. No systematic differences were found between primary and re-insurers.

...for their own company...

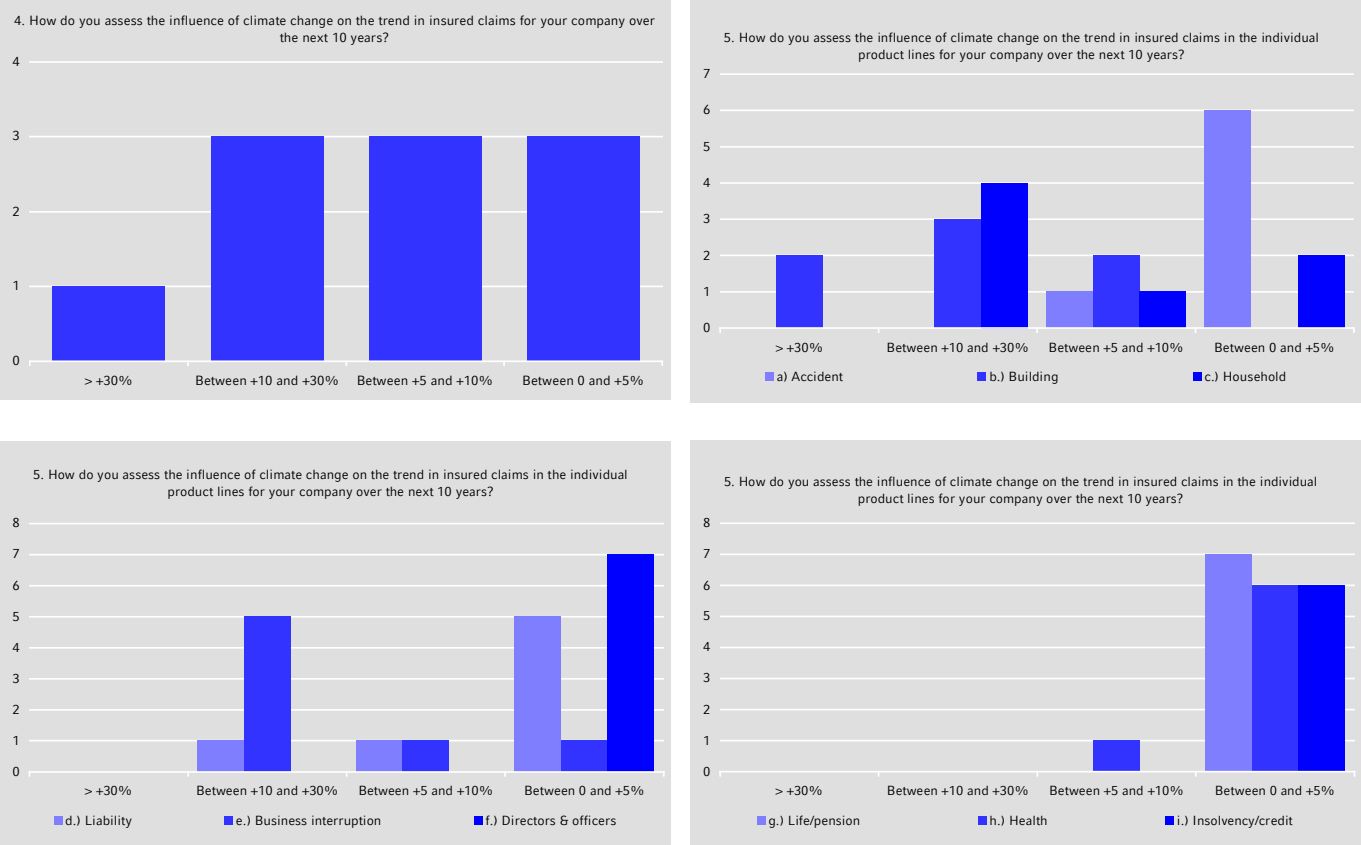
Worthy of note in the responses to Question 4 (see the following chart) is that one company, which wishes to remain anonymous, sees climate change exerting an influence on the claims volume of more than 30% over the next 10 years. The other answers show an equal distribution over the other categories. It is conspicuous that the re-insurers tend

to assume only a minor influence on the claims process for their own company. This could be interpreted as indicating that the re-insurers feel well prepared and credit themselves with considerable expertise in the area of risk management. This is backed up objectively by the reinsurers' particularly high level of research effort.

... and in the individual product segments

The responses to Question 5 imply that buildings, business interruption and household effects are the claims types that are most affected by climate change. This is a finding that we should also have expected a priori. Over half the companies participating in our survey believe the losses caused by climate change in these areas will increase by more than 10%. By contrast, they believe climate change will have little influence in the areas of accident, third-party liability, D&O, life/pension, health/nursing care and insolvency/credit insurance. Beyond these specified categories, one company, which wishes to remain anonymous, explicitly cited motor vehicle insurance as an area that is affected. The influence of climate change on the claims process is estimated to be as high as between 10% and 30%.

Survey – climate change and the claims process



Source WestLB Equity Markets

Risk management: how are insurers dealing with risk?

Several options on hand for dealing with climate change risks

The increased frequency of substantial claims caused by natural disasters has led insurers and the insured to look at the situation in a fresh light: while the insurers are looking for ways to deal with climate-change risks, the insured have identified the need for more insurance cover. The coincidence of major claims (besides natural disasters the terrorist attack on the WTC may be cited here) and the continuing weakness of the

capital market have shaken the financial foundations of many insurers. In this environment, pressure has built up significantly on management to find solutions. They have several options to choose from:

- risk exclusion
- Reinsurance
- Risk sharing
- Risk selection/pricing
- Research
- Asset and liability management.

Risk exclusion

Simple, but not a genuine solution

Barring certain risks is undoubtedly the simplest and most obvious response for the insurers. There are already several companies that do not offer, for example, insurance against claims resulting from natural hazards (flooding, for instance).

However, excepted risk clauses only make economic sense to a limited extent. First, for cross-selling reasons the insurers themselves are chary of giving up entire product lines. Offering a broad range of products 'from a single source' enhances cost-efficiency and allows access to the customer via different product lines. Second, offering insurance cover is after all the prime economic task of insurers. The (understandable) wish only to insure against events that will never occur anyway cannot ultimately be the guiding principle for the insurance industry of the future. It would also be naive to believe that the insured would play along with this. Nor would governments be able to stand by impassively. Compulsory insurance is a real option, as the present debate in the EU over polluter liability in environmental damage shows.

Reinsurance

Shifting the risk within the sector

Reinsurance is another option to provide protection against climate change risks. Although the risks are merely shifted around within the insurance sector here, the large re-insurers can diversify the risks better than can small primary insurers, with the result that the reinsurance model makes it possible to ease the overall pressure on existing risk capital. However, the heavy financial pressure created in the last few years by catastrophic investment results has meant that the retention rate of primary insurers has even increased (e.g. in Germany from 72% to 79%). Saving on reinsurance costs could turn into a dangerous boomerang. Major damage events such as Storm Lothar or Hurricane Andrew could end up threatening the existence of some companies.

Risk selection/pricing

Long-term option, flexibility is decisive

Major loss events such as the 'Oder flood' do not only bring the insurers disadvantages. Naturally, first of all they need to settle the claims for the insured damage, which may occasionally lead to substantial pressures on their operating cash flow. However, in the medium to long term, major damage events such as these may be of great economic

advantage as the insurers take them as an opportunity to raise their premiums and to filter undesired risks out of their portfolios.

Adapting their policy terms rapidly and flexibly to a dynamically changing claims management process is of decisive importance for the insurers. The fact that the overwhelming majority of non-life insurance policies in the primary and reinsurance business are renewed each year is undoubtedly of great help here. In addition, risks need to be assessed with foresight and with as much precision as possible. Research is, therefore, becoming an essential success factor.

Research/assessment of risks

Research is an important prerequisite for designing risk-adequate policy conditions ...

The large re-insurers such as Munich Re and Swiss Re have teams of specialists who deal exclusively with climate risks. In addition, in past decades they have also stepped up their co-operation with scientific institutes.

Estimating risks with foresight and precision is the most important prerequisite for designing risk-adequate policy conditions and minimising claims ratios. This is anything but simple. Moreover, the special nature of climate-change risks should not be lost sight of here (see page 59 and following). Climate-change risks are exceptionally difficult to predict as they are based on very complex, non-linear dynamic systems (with a large number of feedback mechanisms).

The claims process depends on the so-called claims amount process and on the so-called claims-counting process. While the claims-counting process is relatively easy to describe and whereas it is comparatively easy to count the number of claims, quantifying the amount for a series of claims in an insurance portfolio is relatively difficult.

Part of the problem is that the parameters of the claims process are not static. In other words, climate change is itself susceptible to change: the insurance density increases; the insurance portfolio changes (in the non-life sector) almost continuously; weather anomalies are increasing. Consequently, even an optimal estimate can be obsolete after just a few months, with the corresponding repercussions on the ability to calculate fair premiums.

...and for comprehensive precautionary measures

However, good research not only provides the basis for designing risk-adequate policy conditions, it is also a prerequisite for taking precautionary measures in good time. Comprehensive precautionary measures combined with the identification of imminent perils at an early stage may do most to mitigate damage in the majority of cases, or may even often prevent it entirely. The experience of many thousands of households after the end of the Oder floods provides an example of this: when it became clear that it was impossible to divert the flood waters, precautionary measures were taken in northern Germany early enough. As a result, the large insurers reported only negligible claims. In such cases, therefore, it is in the interests of the insurers to play an active role in supporting precautionary measures.

Risk sharing/insurance consortia

A common tool especially for primary insurers

Consortia are another common tool allowing the primary insurers to share greater-than-average underwriting risks. One prominent example of this in Germany is the 'Versorgungswerk Metall-Rente'. The consortium is led by Allianz. Other members are Victoria (Ergo, Munich Re), BHW and WestLB. The consortium spreads the load of company pension provision for more than 3 million metal workers over several 'strong shoulders.'

The insurance of large industrial risks is structured in a similar manner. After winning the insurance contract, the primary insurer signs an insurance policy for a large project and then brings in other primary insurance companies. The margins are usually the same for all the insurers, but only the consortium leader books a large part of the premiums.

Risk sharing between the private and public sector

State assistance is invoked loudly each year as soon as the forests surrounding Sydney catch fire or floods inundate vast stretches of land in the USA. As a rule, a state of emergency leads not only to the deployment of the army or the National Guard, but also to massive financial aid from the state.

Should the state intervene?

It is clear that private households alone cannot bear the burden of the major damage caused, for example, by the 'Oder flood' or Hurricane Andrew. Nevertheless, the help proffered in Germany to flood victims who were not insured appears in a way grotesque: those living in flood areas and who did not have insurance coverage received substantial government aid. In this case, why should anyone living in such an area see a need to take out insurance at all in the future (free rider problem)? Moreover, for historical reasons, the flood risk was covered by household effects insurance in the five 'Neue Länder', which is different from West Germany, where supplementary insurance is needed. The policies of Allianz customers in Eastern Germany that were continued after re-unification still covered the flood risk.

Oder floods: state aid exceeds economic damage

The economic damage caused by the 'Oder flood' in Germany is estimated at €9.2bn. Only around 20% of this was insured. In the end, government aid added up to €9.8bn. The difference here obviously includes a general 'pretium doloris', not least because of political reasons.

Oder flood in August 2002 – state aid in Germany

(in €m)	
Federal government	5,007
EU Structural Fund	1.2
Federal states and local authorities	3,593
Total	**9.8**
State aid as % of damage	107
State aid as % of uninsured damage (%)	132

Source Monthly Report 09/2002 Federal Ministry of Finance

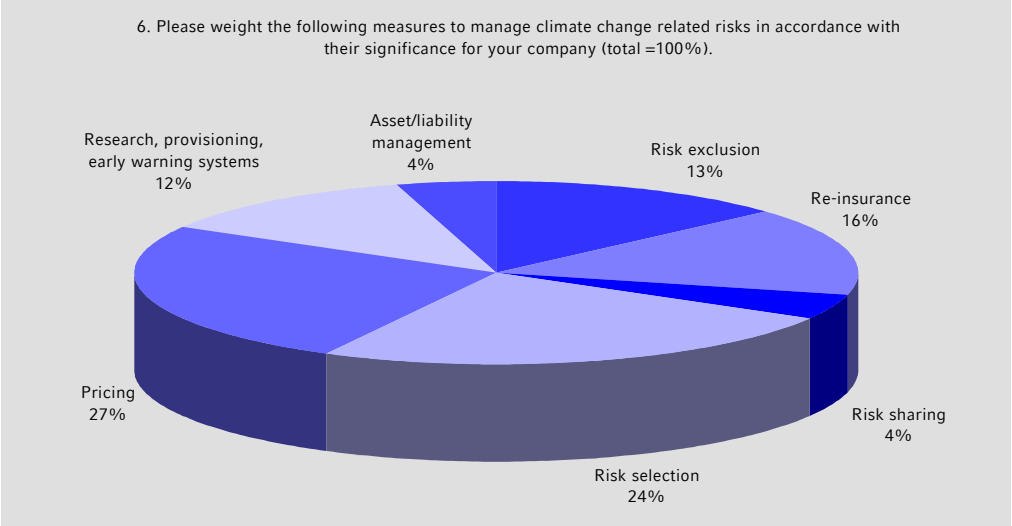
Adequate protection can only be provided by private-public partnerships

It is clear that the public sector cannot be let entirely off the hook. After all, the state also exerts a major influence on the potential amount of the claims to the extent that it is responsible for precautionary measures, such as the construction of dykes. It also enacts building regulations and decides on the climatic tolerance levels for CO_2 emissions. Today, private-public partnerships appear to be the only way of ensuring adequate insurance cover and of keeping the economic damage to a minimum. However, it is not the task of the state to completely undermine all incentives to take out insurance against storm and tempest damage and to allow those without insurance to recoup their claims at the state's expense. In the future, the way the political sphere handles major claims events may well change in the light of the public sector's empty coffers and the large public sector deficits. In our view, therefore, there is little reason for the insurers to lean back and rely on the state.

Survey findings

Our 'Carbonomics' study revealed that – compared to other sectors – the insurers enjoy a high level of management quality in matters related to climate change. The telecoms and insurance sectors are the only ones in the DJ STOXX600-universe whose score is more than one standard deviation above the market average (see table on page 70).

Survey – climate change and the claims process*



* the % weighting of the individual measures was polled (total = 100%); the chart reflects the average weights; N = 9

Source WestLB Equity Markets

Pricing and selection are the most important tools

As expected, the insurers deem pricing and selection to be the most important tools for the management of the operational risks arising from climate change. The top weighting attributed to pricing was as high as 70%. At another three companies the weighting for this factor was between 25% and 30%.

Surprisingly great importance is attached to research/provisioning measures

The comparatively high weighting for 'research, provisioning measures, early warning systems' is rather surprising. Almost as much importance is attached to these measures as to 'classic' measures such as risk exclusion and reinsurance. The fact that research is deemed important fits very well together with the high weighting given to pricing and risk selection. Indeed, without good research both these would be impossible. Swiss Re is undoubtedly one of the leading companies in the area of climate-change research. This

is also reflected in its responses, which attribute a weighting of 30% of the overall package of measures to 'research, provisioning measures, early warning systems'. This tends to confirm the results of the Carbon Disclosure Project 2003, which credits Swiss Re with a 'superior awareness' and a 'sophisticated risk analysis' approach.

Carbon Disclosure Project

The so-called Carbon Disclosure Project (CDP) brings together 35 well-known institutional investors with assets totalling more than $4.5tr. A survey carried out by the CDP among the world's 500 largest companies by market capitalisation (FT500 Global Index) shows that as many as 80% of the companies polled (221 filled in the questionnaire, of which 13 were insurers) concede that climate change represents a substantial business risk for them – among the insurers this was only 30%. Between 35% and 40% of the companies polled reported that they have already introduced concrete measures to manage this risk. A survey-update is being carried out at present. The new results are likely to be available in May this year.

Capital investment side

In their role as trustees insurers are also increasingly obliged to react to climate change risks

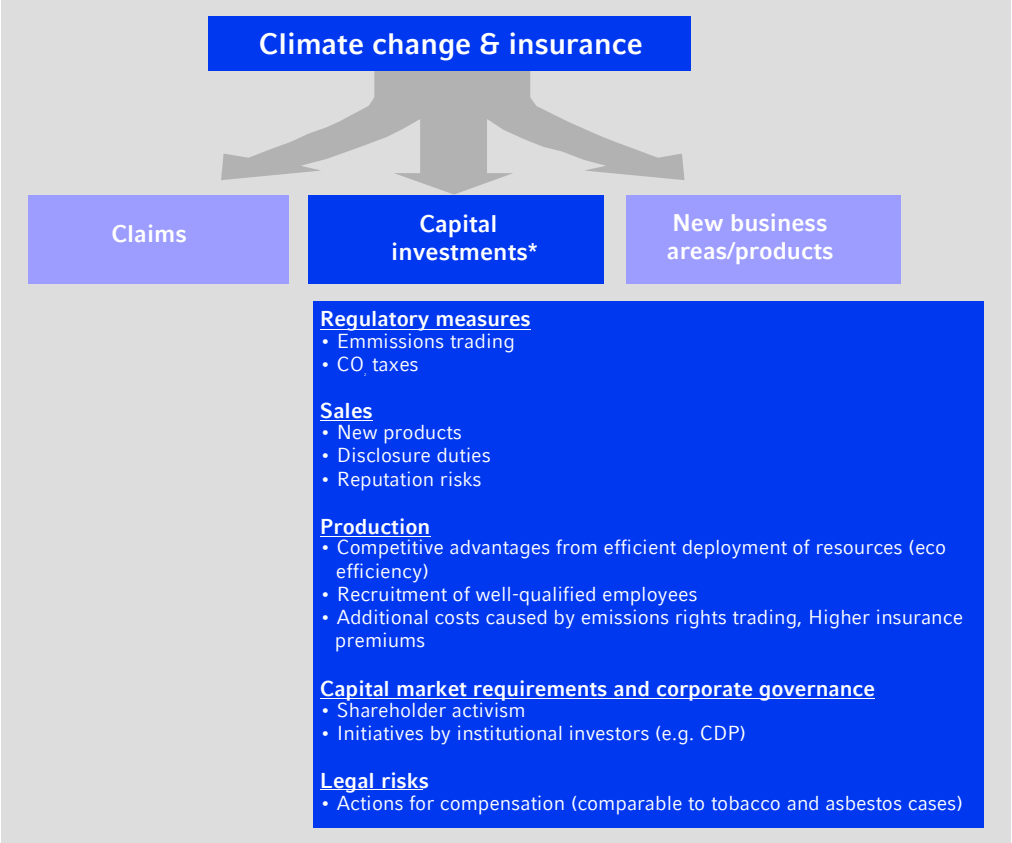
The requirements imposed on companies by the capital market have changed fundamentally in the wake of the accounting scandals in the USA and Europe. More transparency and better checks on managers are called for. In addition, fiduciary duties are being interpreted increasingly broadly, and this includes the need to consider climate change risks. This is particularly true in the USA, but also increasingly so in Europe. As large financial intermediaries the insurers are affected directly by this. The duty of care incumbent on them as trustees requires them to react 'prudently' and 'reasonably' to climate change risks and in a manner that is in the long-term interest of beneficiaries. However, even disregarding for a moment the special duty of care resulting from their trustee status, it is also in the insurers' own interests to deliver a good capital investment performance.

Shareholder value is potentially jeopardised by...

The potential repercussions of climate change on shareholder value are of themselves reason enough to take a systematic look at the climate-change risks relating to investment portfolios. On the basis of economic models we estimated a 'Market Value at Risk' (MVaR) of between $210bn and $915bn for the global equity markets (see our 'Carbonomics' study).

The following chart summarises the risks and opportunities arising from climate change with regard to the value of the insurers' equities and corporate bond portfolios.

Climate change and its repercussions on the insurers' capital investments*



* the factors listed are those which may influence the market value and/or performance of insurers' capital investments

Source WestLB Equity Markets

... regulatory measures ...

Climate change risks may influence the value of the insurers' investment portfolios via various mechanisms. These include legislative measures, such as the emissions-rights trading scheme being debated in the EU and its economic repercussions on companies, as well as the competitive advantages that can be achieved from eco-efficiency in production, or the enhancement of a company's reputation vis-à-vis its competitors.

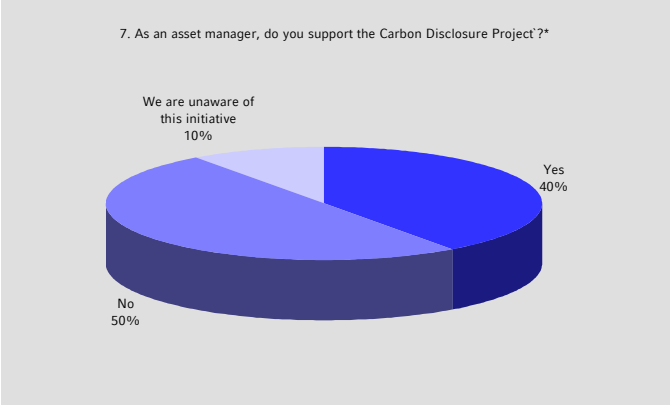
... or claims for compensation

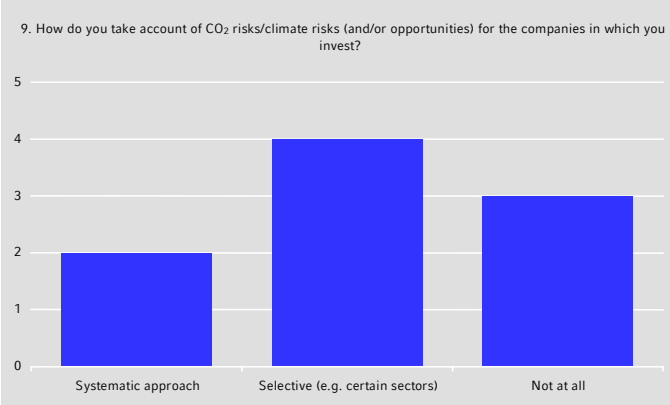
Another major risk factor for shareholder value lies in the legal risks referred to at the beginning of this study. Various NGOs are examining whether actions can be filed for compensation against companies or countries that deny the necessity for climate protection and that oppose the Kyoto Protocol. This is a source of substantial financial risk, particularly in the USA. According to estimates by Claros Consulting, compensation claims totalling between $0.2bn and $1bn a year are conceivable, for example, for ExxonMobil. Class actions against the automobile industry are also being prepared.

Survey findings

One of the aims of our survey was to find out from the companies how they tackle climate change risks on the investment side. The following charts summarise our findings:

Survey – climate change and capital investments





* N = 10; ** N = 9

Source WestLB Equity Markets

Although insurers do take account of climate change risks in principle when taking investment decisions...

... there is little evidence of 'genuine' risk-management

The responses to Questions 7 to 9 paint a somewhat contradictory picture. While just under two thirds of the companies are either unaware of the CDP or do not support it, more than half have a systematic or selective approach to climate change risk management on the investment side. None of the companies supported the Institutional Investors Group on Climate Change (Question 8). Nine companies said they were not a member, and one company was unaware of the organisation. Overall, we are unable to avoid the impression that the response that climate change risks are handled selectively is a mere palliative, in some cases at least. The fact that the 'genuine' management of these risks still tends to be the exception rather than the rule can also be inferred from the fact that insurance companies still offer only a very small number of SRI funds.

New business segments/products

Market opportunities for early birds

Climate change is discussed primarily from the point of view of the (downside) risks, and understandably so one might think as, after all, climate change entails a net macroeconomic cost, and not a net gain. However, looked at relatively there will undoubtedly also be winners, namely those companies that are early to recognise the need for new products and services and that lay claim to market leadership. These may be products that derive from new regulatory conditions, e.g. everything associated with the implementation of the Kyoto Protocol. The introduction of emission-rights trading in the EU is an example. Its launch is planned for January 2005. (However, it remains to be seen whether it will be possible to adhere to this timetable in the light of the arguments over the national allocation plans that have to be submitted by the end of March.)

... in the CO_2 markets ...

Insurers may benefit in many ways from the markets that are being created by the implementation of the Kyoto mechanisms. As specialists in research and risk-assessment in the area of climate change they could become important intermediaries in CO_2 markets, in which they could conceivably play a role as brokers and/or market makers. As market makers they would fulfil the very important function of ensuring the market's liquidity. In the absence of adequate liquidity there is a danger that the market might fail, a consideration which we believe has been given too little thought so far. Thanks to their superior information and knowledge, insurance companies could also be exceptionally successful in emissions trading for their own account. Other possible activities include the insurance of price risks and/or derivative instruments. Moreover, companies might express the wish to insure themselves against new CO_2 liabilities. From what has been

said above, one might also infer that insurers could also generate new earnings potential by offering consulting services for matters related to the CO_2 markets. At all events, we believe that demand for risk-transfer solutions will inevitably increase in the most heavily affected sectors.

Estimated size of the CO_2 markets

World Bank	$10 billion by 2005
U.S. Council on Foreign Relations	$2.3 trillion of trades completed by 2012
Energy Policy Journal	$24–37 billion of trades completed annually during the period 2008–2012
Resource and Energy Economics	$46.6 billion of trades annually (unspecified time frame)
The Economist	$60 billion – $1 trillion of trades annually (unspecified time frame)

Source CERES/Innovest

Admittedly, it remains to be seen just how great the potential will ultimately be. However, what one can say is that Swiss Re seems to have been able to establish itself as the market leader in this area. This is also reflected in the establishment of the 'Greenhouse Gas Risk Solutions' group, which is to look systematically into the development of new financial products designed to provide help in meeting CO_2 emissions reduction targets. This has made Swiss Re an important partner for companies responsible for large CO_2 emissions (for example, the utilities). Other insurance companies are also actively observing developments related to the CO_2 markets in the UK and in Europe as a whole. According to the CDP survey, this group includes Legal & General, Aviva and Munich Re.

... or in the area of weather risks

However, emissions-rights trading is not the only lever for creating new business. Ever greater weather risks themselves will also create new growth potential for existing products, such as weather derivatives or so-called catastrophe bonds. This sector could also see the emergence of liquid trading markets in which insurers aim to play the role of brokers and/or market makers.

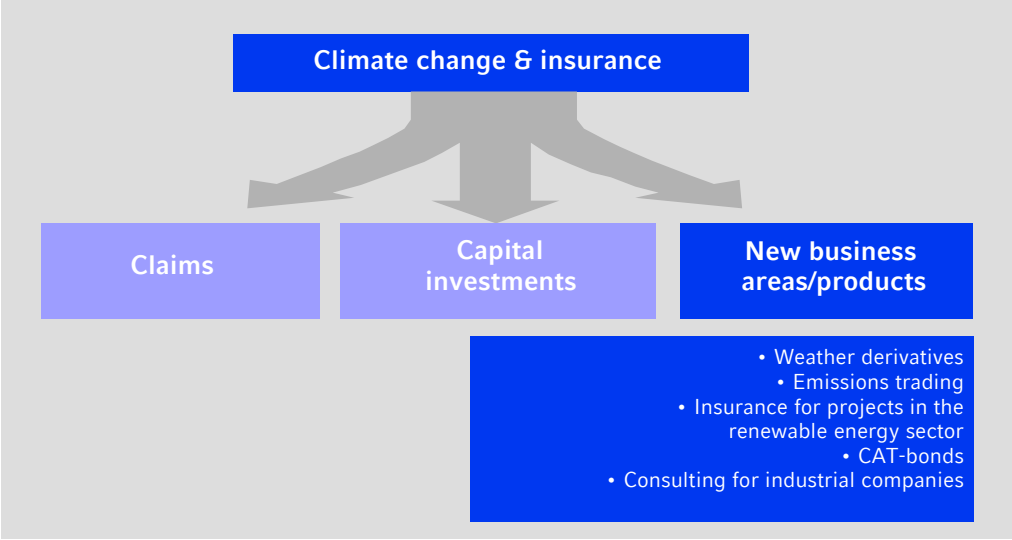
The consumer market also harbours considerable potential ...

New products for the consumer market should also be cited here. Fear of the repercussions of climate change could, for example, stoke demand for conventional insurance products (e.g. for home owners) that link the insurance premium directly to energy consumption efficiency. Similar products are also being developed in the motor vehicle insurance segment. According to the CDP report, Aviva is already offering 'pay-as-you-drive' insurance on a test basis. This links the premium to the frequency and length of trips made by car. However, the ecological aspect is merely a positive side-effect here. Many insurers offer attractive premiums in the motor vehicle business if the mileage travelled is limited. This is simply because the actuarial risk falls linearly the less a car is used. Legal & General, by contrast, draws express attention to the possibility of price reductions for vehicles with low CO_2 emissions.

... as does the investment side

Finally, the investment side naturally also offers possibilities for new products. According to the CDP report, for example, Swiss Re manages an 'eco fund' that offers venture capital funding to start-up companies from the renewable energy sources sector.

Climate change and its repercussions on insurers' product side

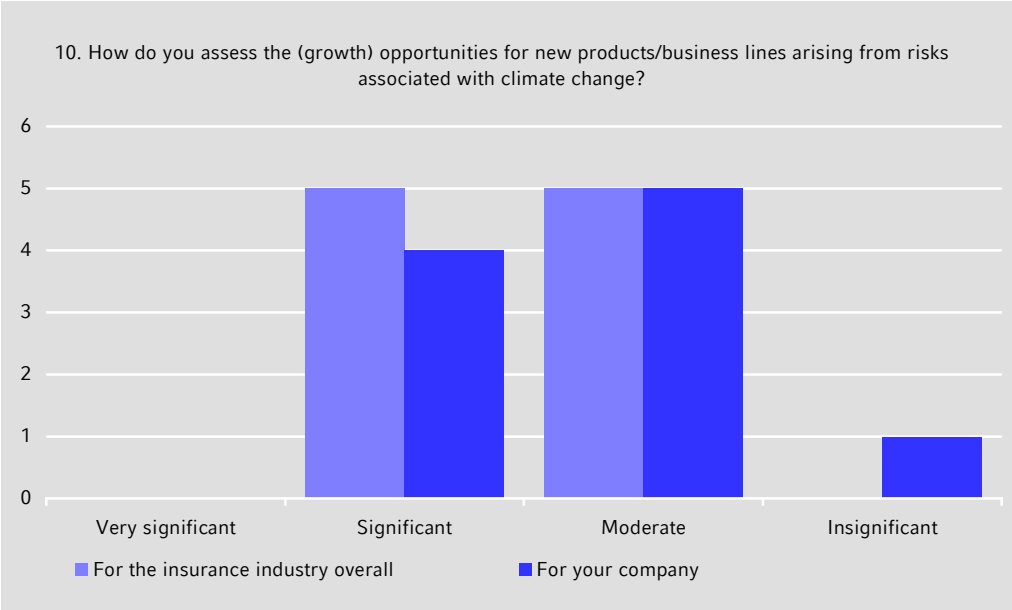


Source WestLB Equity Markets

Survey findings

We asked the companies how they deal with the topic of climate change on the product side. The following chart summarises our findings:

Survey – climate change and the product side



Source WestLB Equity Markets

Growth opportunities have been identified and ...

It is clear that the insurance companies agree that there exist notable growth opportunities for new products/business segments for the insurance industry as a whole. Four insurers even see significant possibilities for their own company. These include Nürnberger Beteiligungs-AG, RAS and Swiss Re. None of the companies polled opted for the two extremes 'very significant' and 'insignificant', at least not for the question about the opportunities open to the sector as a whole. However, one respondent did select the

"insignificant for your own company" option. That the responses differentiate clearly between the sector and the company viewpoints is also shown clearly elsewhere.

We naturally wished to take a closer look at the product side and therefore asked the companies the following question:

- Question 11: In which areas (e.g. CAT bonds, weather derivatives, emissions rights trading, insurance of renewable energy projects, consulting for industrial companies) do you particularly see potential for your company?

... some insurers are already active

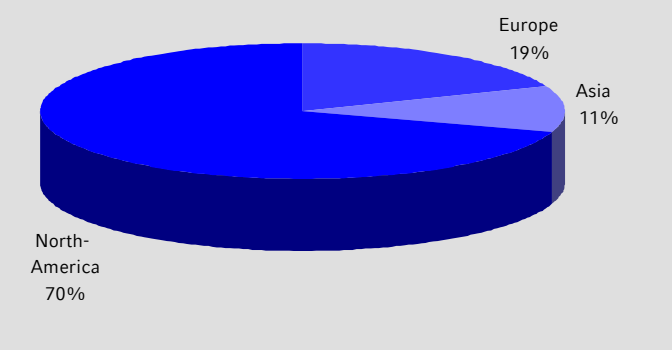
The responses paint a very mixed picture. All the product segments cited in the question show up in the responses. The insurance of solar power plants was also mentioned explicitly. The market leader, Swiss Re, responded particularly exhaustively. The company sees great potential in all the cited product areas and draws attention to the fact that it is already active in some of these areas. These include weather derivatives as well as products and services related to emissions trading. This also tends to confirm the findings of the Carbon Disclosure Project 2003. The CDP credited Swiss Re (along with Allianz, Aviva and Axa) as being one of the first to evolve an awareness and knowledge of profit opportunities and also to have taken appropriate measures to exploit these opportunities.

Are banks competitors that need to be taken seriously?

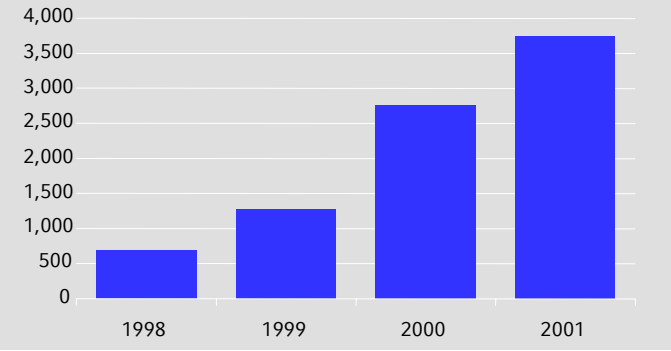
Although the banks are also competing, ...

Virtually every big bank would offer a ski-lift operator cover against the risk of snow failure. Financial derivatives and exotic options linked to climate-induced events are part of the banks' everyday business. Moreover their level of specialisation is very high.

Weather derivatives 2001 – regional breakdown



Weather derivatives world-wide – No. of contracts



Source PWC/WRMA

... we believe they are generally inferior to the insurers in this field

Nevertheless, we doubt whether the banks will be able to significantly endanger the leading position of insurance companies on a grand scale in this segment (and particularly not with regard to the insurance of potentially large damages): while the banks deploy small specialised task forces with limited resources to price large risks, an insurer has at its disposal the resources of its entire group to analyse risk, customer relations and the level of premiums that customers can afford to pay. The design of risk-adequate policy conditions and the development of comprehensive information systems thus indeed appears to remain the special domain of the insurers.

Conclusion – insurers and climate change

Our findings show that the insurers as a whole are aware that climate change has substantial economic implications for their sector. This applies at least to the claims and (insurance) product sides. We also found that the insurers see climate change as having the greatest impact on insured losses in the same areas that we had assumed a priori (building, business interruption, household effects). The insurers' risk management measures are based less on risk exclusion, and more on pricing and risk selection. The considerable importance attached to research, which might appear surprising at first sight, also marries well with this finding. After all, good research is a necessary condition for risk-adequate policy pricing.

Insurers still lack a holistic risk-management approach

It is conspicuous that little importance is attached to asset/liability management. This tallies with our general impression that the underwriting and investment sides are largely run in parallel, but not jointly, despite the fact that there is undoubtedly a high correlation between climate change risks on both sides. What the insurers are obviously still lacking is, therefore, a holistic risk-management approach that integrates both the asset and the liability sides. We believe it is here that the greatest opportunities for improvement lie.

Gene technology

Gene technology – brave new world

Advances in gene technology harbour a broad spectrum of risks and opportunities for the insurance sector. One of the new business opportunities, for example, is liability insurance against the unintentional spread of genetically modified seeds.

Gene tech-related underwriting risks are still relatively new and difficult to assess. Extensive research is clearly indispensable for adequate pricing. As it is becoming increasingly feasible for insurers to diagnose genetically conspicuous dispositions, they are able to exclude specific risks from personal policies. As a result, the insurability of risks is likely to increase, although insurers will be facing new challenges as gene technology may lead to sudden increases in life expectancy (longevity risk). On the investment side, stakes in companies that depend on society's acceptance of gene technology also harbour new risks and opportunities.

Survey: re-insurers leading the way, insurability of risks increasing

The main results of our survey are:

(1) Insurers are less able to estimate and grasp the economic implications of gene technology for their individual companies and for the insurance industry as a whole than they are in the field of climate change.

(2) Re-insurers are leading the way to a certain extent; they pay more attention to research and are more confident than primary insurers in selecting risks.

(3) Companies do not only see the downside risks of gene technology; e.g. assessments in life/pension insurance are predominantly positive, perhaps as a result of the improved risk selection offered by genetic testing. The growth potential of new products is recognised, which may also be due to the expanded insurability of risks offered by genetic testing.

Opportunities and risks for insurers

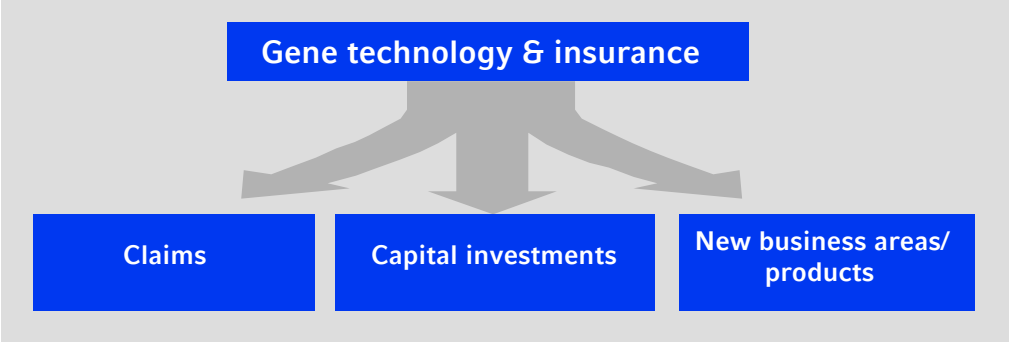
Although there are many risks, gene technology offers unmistakable opportunities. It is difficult to weigh up the pros and cons

Gene technology will provide many opportunities and risks for the insurance industry in the 21st century. Benefits will include improved insurability for high-risk patients and lower healthcare costs. However, the risks for agriculture and the pharmaceutical industry are harder to insure against than more traditional liability risks. There is little data available for estimating the claims process – the main reason, we believe, behind primary insurers excluding risks related to genetically modified products. High deductibles (the portion of an insured loss borne by the policyholder) and a high proportion of reinsurance are also essential in our view for primary insurers to survive. The bundling of information at the reinsurers (in particular Munich Re, Swiss Re) has made good progress. The spread of this knowledge among primary insurers, however, is not sufficient yet.

Ongoing training for underwriters and maximum transparency from the scientific and research community will be indispensable.

In analysing the subject, we are using the familiar three-pillar structure. Before looking in detail at the implications of gene technology for the insurance industry, we will give a quick overview of the possible general socio-economic consequences.

Sustainability and insurance: three-pillar structure



Source WestLB Equity Markets

Gene technology: the challenge of the 21st century

There is no doubt that the responsible application of gene technology constitutes one of the great challenges of the 21st century. Scientific and technological progress in the field moves extremely quickly. There are knock-on effects for many areas of life, spanning agriculture, medicine and healthcare, and food. We are also likely to see genetically modified products being used in industry. New opportunities, include using gene technology in environmental technologies, and the need for new techniques for genetic engineering and for processing genetically modified products will increase.

A question of social acceptance

Gene technology does seem to offer a huge range of opportunities, but the use of genetically modified products also throws up a number of risks which are currently difficult to evaluate and which also affect the insurance industry as the risk bearer. These 'objective risks' which arise from gene technology use are just one part of the story though, with the other part shaped by public perceptions of gene technology. Obviously, the media plays a key role here. For those companies which could potentially be affected, there is a latent danger of losing reputation capital (e.g. through a shift in public opinion).

The risk profile of the pharmaceutical, agricultural and food industries in particular has changed significantly

Gene technology has had a particular impact on the risk profile of the pharmaceutical, agricultural and food industries. This has in turn affected the insurance industry, since it is responsible for covering the risks in these sectors. The long-term nature of gene technology risks and the fact that very little is known about the type and scale of the potential risks makes it immensely difficult to assess them. Gene technology has a complex risk profile, reflecting the vast range of potential applications, and it is hard to predict the consequences of using this technology.

Furthermore, until now, it has not been clear what basis should be used for calculating civil liability claims. The socio-political debate about gene technology (in Europe, at

least) is still largely shaped by the conflict between dogmatic principles. However, there are still few practical answers to questions such as how to deal with the risks. The general public also have mixed feelings about gene technology. Although particularly in Europe the use of gene technology and GM products in agriculture is strongly opposed, healthcare applications are generally accepted, despite the fact that both opportunities and risks are much greater for the individuals concerned.

However, the assessment of the danger, and of society's response to gene technology, provide the basis for the risk that companies and insurers have to deal with, determining both the scale of liability claims and the likelihood of claims being made.

The trend away from liability based on fault to liability based on causation increases the risks

The risk of socio-political change, or, in other words, the risk that the rules may be changed 'during the game', is especially high in the case of gene technology. At the moment, for example, social values are shifting, with the 'subjects of protection' environment and health becoming more important. Combined with this shift in values is a change in attitudes towards genetically modified products. At the same time, Europe is moving away from liability based on fault and towards liability based on causation, one example being the new EU directive on environmental liability. This makes the problem of civil liability for serial and long-term claims much more serious now. The likelihood both of claims being made and of succeeding will tend to increase if claimants no longer need to prove criminal negligence or omission.

A relatively small number of victims and alleged victims can be sufficient to put companies in the sector under a lot of pressure. Class actions, which are becoming increasingly popular in the US and UK, are particularly well suited to this. Since gene technology claims are included in many existing civil liability insurance policies held by large industrial companies, there is a very high risk for insurers.

Gene technology is revolutionising agriculture

Genetic engineering could help feed the world's expanding population

Genetically modified plants with inbuilt resistance to disease can significantly improve agricultural yields (at the moment, around 40% of crops worldwide are lost to pests and disease). Nutritional value can also be increased, particularly for staple foodstuffs like rice and potatoes. The world's population is growing – we will probably hit the 8bn mark in about 25 years' time – whilst the land available for agricultural use is shrinking as a result of erosion, drought and soil depletion, making it very difficult to guarantee food supplies. There are also strict limits on clearing (by fire), draining and other methods of establishing new areas suitable for agricultural use, last but not least for ecological reasons.

According to the FAO (the UN Food and Agriculture Organisation), 826m people suffered from malnutrition in 1998. Although global cereal production grew 120% between 1961 and 1990 and the average crop yield per hectare increased by 90% in industrialised countries and by 120% in developing countries, these trends seem to have stagnated since 1995. Traditional methods of increasing efficiency – manure, irrigation, mechanisation, selective breeding and pesticides – may have reached their limits. This means more people are putting their hope in genetically modified plants (and animals). Genetically modified micro-organisms can also be used to restore soil quality with

significantly less effort and fewer (partly toxic) by-products than traditional methods (which currently involve the use of so-called hard chemicals).

Global acreage of GM crops (in m hectares)

	2000	2001	2002
Rape	2.8	2.7	3.0
Cotton	5.3	6.8	6.8
Maize	10.3	9.8	12.6
Soya	25.8	33.3	36.7
Total	**2,044.2**	**2,053.6**	**2,061.1**

Source www.transgen.de

Can gene technology help increase life expectancy?

In future, advances in genetic engineering could allow us to combat the root of diseases

Medical use of gene technology has generated a lot of optimism. For example, there is now the prospect of treating previously incurable illnesses: where traditional medicine has previously been limited to alleviating symptoms, these diseases could in future be combated at source. The number of organ transplants could increase massively if transplants with genetically engineered organs become part of popular medicine.

That is not all, though: gene technology could also revolutionise the whole healthcare system. Genetic tests could be used to identify and treat high-risk groups. Preventative medicine would become more of a priority. Patients' own contributions are likely to become increasingly significant as health costs spiral, and this could be further intensified by genetic testing. These are the more positive benefits of gene technology for the insurance industry.

Increased life expectancy represents a new risk for pension providers

One major plus of gene technology is that it further increases life expectancy, but this does raise new problems for insurers. In the past 50 years, global life expectancy has increased from an average of 47 years in 1950 to approximately 66 years in 2000. It is virtually impossible to predict what effect gene technology will have. Here is an example of just how sensitive life expectancy figures are: according to a study by Munich Re, a 50% fall in the number of deaths caused by heart attacks alone would increase women's life expectancy by 0.8 years. As yet, we cannot say whether the medium-term objective of reducing this figure by 50% is reasonable. No reliable test results are available at the moment, and a project being carried out by the German pharma group Schering was recently halted.

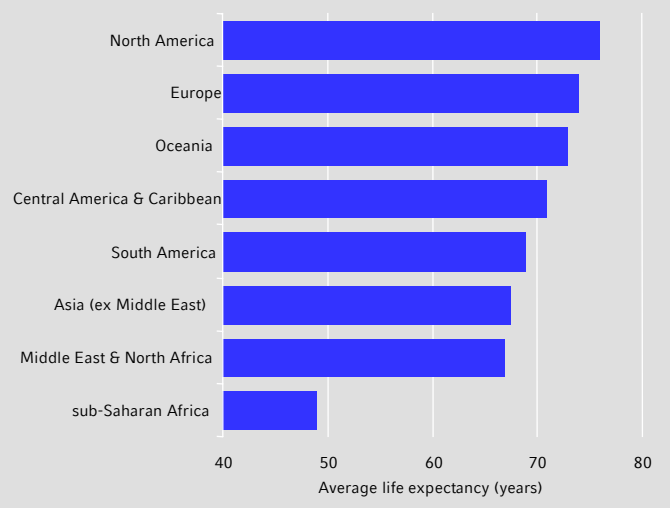
The risks of longevity have to be factored into insurance

Longevity risks are increasingly becoming a concern in insurance industry discussions. A few years ago, people believed they could guarantee a lifetime pension simply by adjusting the calculation basis (known as the mortality table) for new business, but now pension providers in many countries are desperately looking for new products. At a recent official function, a senior actuary from a major European insurance company said the idea of a guaranteed lifetime pension is "nonsense". We do feel that the massive increase in life expectancy could mean the mathematical reserves are no longer adequate.

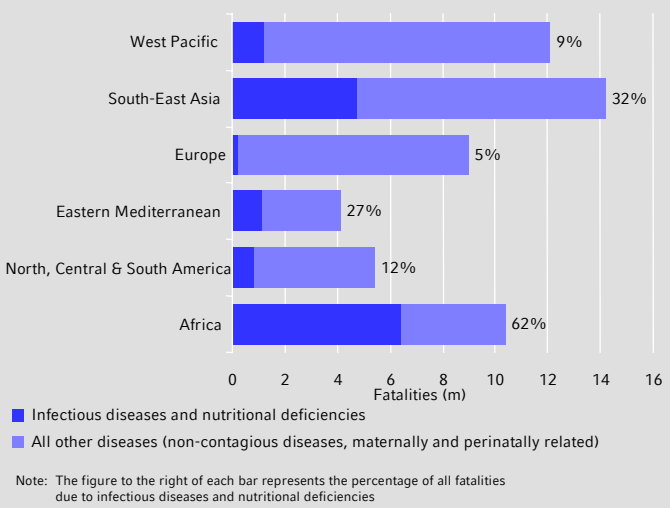
One notable victim was the UK company Britannic in 2003. It had not adjusted its mortality table to allow for current life expectancy for too long, and required a

substantial injection of funds into the actuarial reserves. In future, insurance companies will either have to price longevity risks correctly or transfer part of the risk to the policyholder. Increased life expectancy is only one half of the story, however. The other is that gene technology could ensure that medical and care costs in old age fall with more preventative care and more effective measures against the causes of illness. The watchword is "ageing healthily". In the longer term, drug prices are also likely to come down as ingredients become cheaper and production costs fall.

Life expectancy by region



Cause of death in selected regions



Source UN Population Division, 1999

Improved food supply would also provide an opportunity to increase economic growth

For developing countries and emerging markets, improved food supply and healthcare as a result of biotech advances would also provide an opportunity to increase economic growth and productivity, and thereby national income. Diseases like AIDS, tuberculosis and cholera are currently taking a large portion of the active population between 15 and 45 in these countries out of action, thus causing lasting economic damage. On balance, this can only bring good news for insurers. As prosperity grows, so does demand for insurance services, while pricing flexibility also increases. All in all, the insurability of risk (for example in life insurance) would increase and the loss ratio would tend to fall.

Concerns about gene technology still persist

The general public is on the whole very sceptical about gene technology. This attitude was definitely shaped by symbolic one-off events such as the cloned sheep, Dolly. Ethical concerns about the manipulation of human and animal stem cells are the main source of concern, but experts and consumers also have reservations on ecological grounds, particularly in Europe. It is still not clear to what extent genetically modified plants can pose a threat to ecosystems, reduce biodiversity or harm consumers.

New regulations are the EU's response to scepticism about gene technology

In order to counteract public fears about genetically modified organisms (GMOs) in food, the European Union adopted two regulations in July 2003 which (1) establish an EU-wide system for traceability and labelling of GMOs and (2) regulate the sale and labelling of foodstuffs which contain GMOs. These new laws were intended to mark the end of the moratorium on approving new GMO products, which has been in place since 1998. The EU moratorium led to a bitter trade dispute with the US within the WTO.

The long-term effects of genetically engineered drugs or genetically modified organs are not known, nor is it clear what damage might emerge as a consequence. Companies in the sector are therefore subject to risk in terms of the acceptance of products and technologies and reputation risks, which should not be underestimated and which are particularly relevant in the case of brand name manufacturers, as in the case of Monsanto (see below). Unexpected consequential damage could also significantly increase litigation risks.

New challenges for product liability underwriters

Use of GM products in agriculture varies greatly

A wide range of GM products already exists in the agricultural sector, although the level of dissemination varies greatly, according to the national legal and socio-cultural constraints. For example, GM soya is in widespread use in the US, but European consumers appear to have rejected the products in general. The greater wariness in Europe is also in evidence at an administrative level. As a rule, new products are approved several years earlier in the US than in the EU.

GM crops

	Modified characteristic:	Company	Year first approved	Country	EU
Cotton	Herbicide-tolerant	Monsanto	1995	USA	Proceedings not yet completed
	Insect-resistant	Monsanto	1995	USA	Proceedings not yet completed
Maize	Herbicide-tolerant	AgrEvo (Bayer)	1995	USA	1998
	Insect-resistant	Monsanto	1995	USA	1998
	Herbicide and insect-resistant	Ciba Geigy (Novartis)	1995	USA	1997
	Herbicide and insect-resistant	Pioneer Hi-Bred	1996	CAN	Proceedings not yet completed
	Herbicide-tolerant	Monsanto	1996	USA	Proceedings not yet completed
	Herbicide and insect-resistant	Northrup King (Novartis)	1996	USA	1997
Rape	Male sterility and herbicide-tolerant	Plant Genetic Systems (Bayer)			1996; not for food or animal feed
	Herbicide-tolerant	AgrEvo (Bayer)	1995	CAN	Proceedings not yet completed
		AgrEvo (Bayer)	1997	USA	1998; import, storage and sale approved, no cultivation
Soya	Herbicide-tolerant	Monsanto	1994	USA	1998; import, storage and sale approved, no cultivation
		AgrEvo (Bayer)	1996	USA	
Tobacco	Herbicide-tolerant	Seita	1994	F	1994
Tomatoes	Delayed ripening	Zeneca	1995	USA	Proceedings not yet completed
		Calgene	1992	USA	1996; UK only

Source Munich Re, www.rki.de, vm.cfsan.fda.gov, www.olis.oecd.org

Higher civil liability risks in agriculture

The civil liability risks associated with GM product cultivation can be significantly higher than for traditional products. Take crop failure: the theory that genetic engineering makes agricultural crops more robust and therefore decreases the probability of crop losses is only partly true. It is true, if you only look at those factors which have been improved. However, when assessing the overall vulnerability of GM plants, i.e. to all influencing factors, it is actually higher than that of the equivalent conventional crop standards. This means the probability of crop failure is actually higher overall for GM plants. There are also higher costs for GM seed, which makes the actual loss more expensive for the insurer.

It will probably be difficult to distinguish between GM and non-GM products in practice

For insurers, it would be best to maintain a strict division between GM and conventional agricultural products. The number of claims and level of damages in the two categories vary dramatically, and have a corresponding effect on pricing. In practice, it will probably be difficult to distinguish between the two, as demonstrated by recent cases of unintentional seed propagation.

Genetically modified and engineered products are used for medical purposes in many countries and are widely accepted. They are mainly used in drugs for common diseases like diabetes and arthritis. In insurance terms, this poses a big problem because there is virtually no experience of GM claims. This makes the underwriting of risks much more difficult. Pharmaceutical risks are the sole source of major civil liability claims, other than nuclear risks. Drug approval requirements were tightened up considerably after the Contergan/Thalidomide scandal (1957-1961).

Drugs which are genetically modified and engineered

Product	Indication	Company name	2001 sales in $	Year of approval	Countries
Procrit	Anaemia	Amgen/Ortho biotech (sold via Johnson & Johnson in USA)	3.4	1989	USA
Epogen	Anaemia	Amgen/Ortho biotech (sold via Johnson & Johnson in USA)	2.2	1989	USA
Intron A	Anti-tumour activity, hepatitis B/C	ICS, Schering-Plough	1.5	1997	USA
Neupogen	Neutropenia	Amgen/Ortho biotech (sold via Johnson & Johnson in USA)	1.3	1991	USA
Humulin	Diabetes	Genentech/Eli Lilly	1.1	1982	USA
				1987	EU
Avonex	MS	Biogen	1	1996	USA
				1997	EU
Enbrel	Arthritis	Immunex (Amgen)/Whyeth-Ayerst	0.8	1998	USA
				2000	EU
Rituxan (Mabthera)	Lymphoma	Idec/Genentech	0.8	1997	USA
Recombinate	Haemophilia A	Genetics Institute/Baxter	0.7	1992	USA
Betaseron	MS	Chiron/Schering	0.6	1993	USA

Source Munich Re

Genetically transparent world is still a long way off

Recognition of genetic risk factors could lead to greater insurability provided specific risks are excluded

In future, personal insurance policies (life, pension, medical and healthcare insurance) will be influenced by gene technology. Sooner or later genetic testing will become part of underwriting personal insurance policies. For cost reasons, however, a genetically transparent world is still a pipe dream. At the moment, a genetic test to assess the risk of breast cancer costs around $2,500. The test would probably only cost $50 if there were no patent. Even without patents on each test, a full analysis of an individual's genetic make-up (over 100,000 genes) would cost at least $5m. We suspect only the key, relevant tests will be performed. The reason for testing will determine the nature of the tests: for recruitment purposes, for life insurance, medical insurance and so on. It is important to create a legal framework for the basic care of high-risk patients. Risks relating to the use of genetically modified agricultural and medical products need to be legally limited.

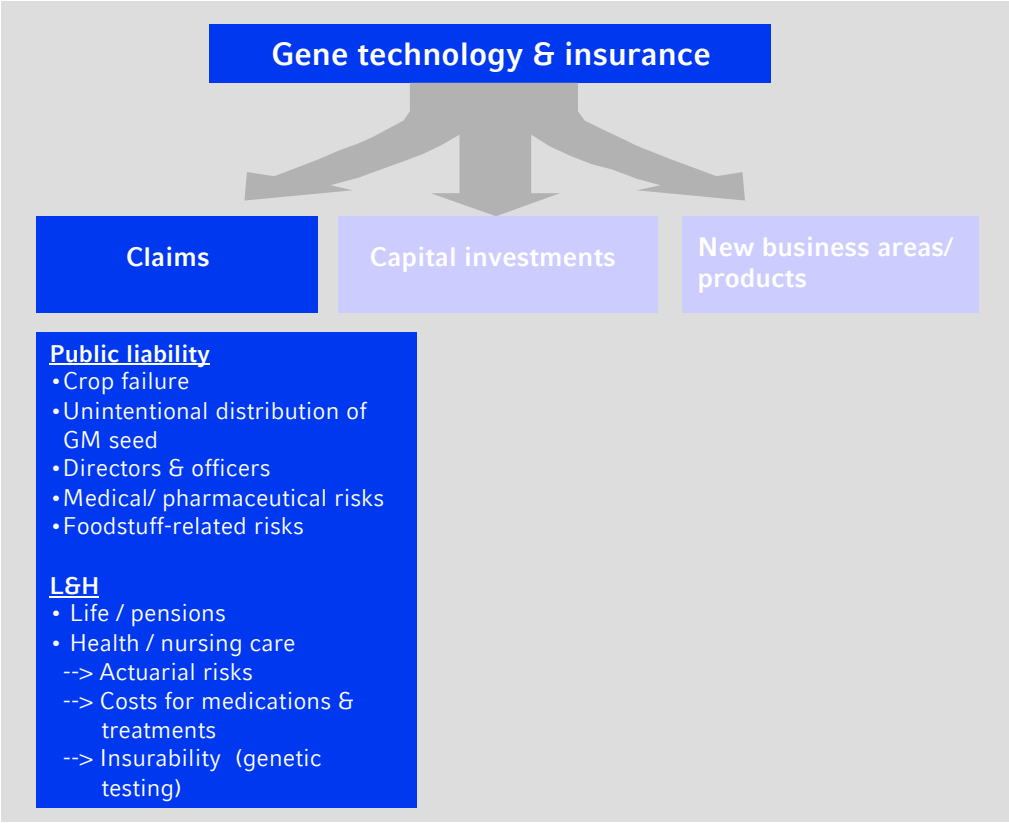
For the insurance industry, genetic testing effectively means greater insurability and increased business volumes. The acceptance rate for applications for private insurance has risen dramatically over the last 100 years. Genetic testing will probably allow insurers to raise this still further in the long term.

Different countries have different conditions for the use of genetic testing for these purposes. These fall into three distinct groups (source: Munich Re):

- States with no legal regulation and no voluntary code of conduct: Japan, the US, Italy, Canada, Spain, Ireland, Portugal, Greece, Hungary and the Czech Republic.
- States with a voluntary code of conduct for the insurance industry: the United Kingdom, Germany, Switzerland, the Netherlands, Australia, South Africa, Finland, Sweden and Turkey.
- States with legal regulation: France, Belgium, Denmark, Austria and Norway.

The diagram below again shows our three-pillar structure and also lists which branches of insurance are usually affected by gene technology. We then go on to present the results of our survey on this subject.

Gene technology and its repercussions on the claims process

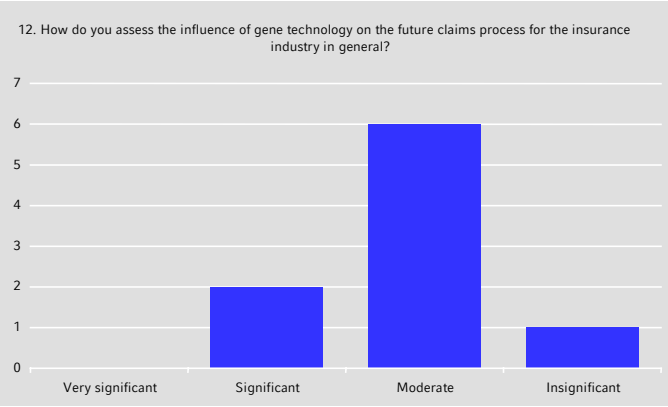


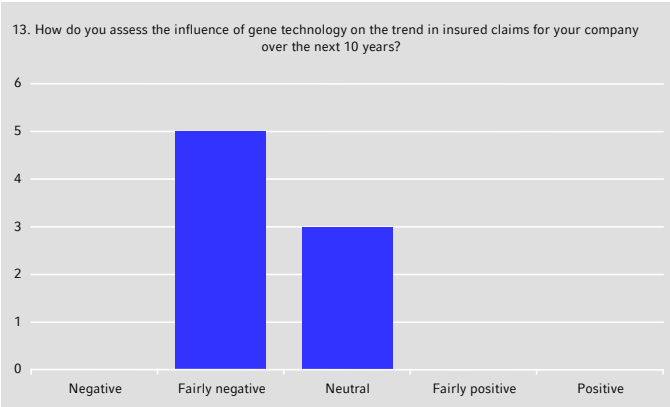
Source WestLB Equity Markets

Survey results

We wanted to know how the companies themselves assess risks for their sector. Once again, we will start with the questions about the claims process.

Survey – gene technology and the claims process





Source WestLB Equity Markets

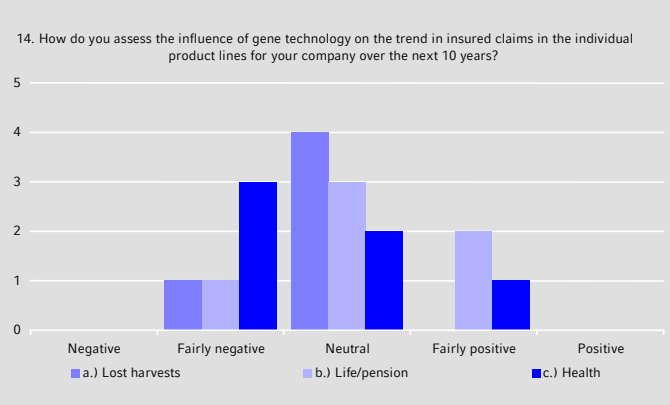
Negative effects on numbers of claims predominate

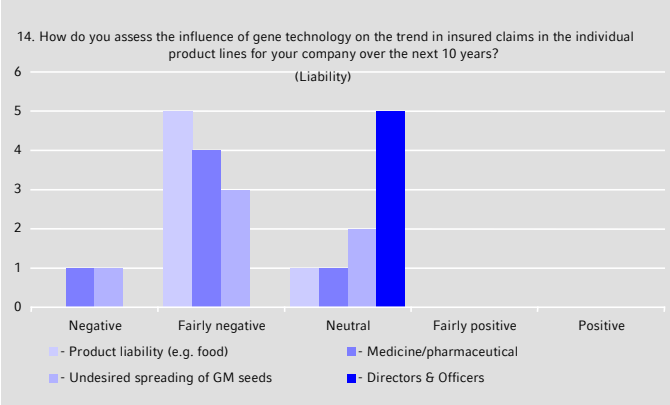
The insurers we questioned tended to see gene technology as less of an issue than climate change. Gene technology was mainly perceived as having a negative impact on the claims process. But very different pictures emerged for different product areas (see Question 14 in next diagram): in private insurance, the life/pension area tended to be seen positively, while a more negative bias was observed in the medical/pharma area. We can only speculate about the reasons for this. One possible interpretation is that risk selection is easier for life and pension insurance providers, whereas one fears that expensive new drugs and higher life expectancy will increase medication costs.

Risk of unintentional propagation of GM seed

With regard to the legal liability area it is conspicuous that insurers have fairly major concerns about the unintentional propagation of GM seeds (see Question 14), similar to those in the medical/pharma area, although – or maybe because – the subject is relatively new and there is very little experience of claims of this kind. Besides, perception has probably been influenced by the heavy media coverage over the last few months. When looking at the results, it also emerges that gene technology was considered insignificant for D&O insurance. This may be due to the fact that no claims have been made yet, and that accordingly there is a lack of expertise in the assessment of the risks. However, it does not take much imagination to see that gene technology, which is an extremely controversial and precarious issue, could produce some very large compensation claims for mismanagement in the future. Insurers may be underestimating this risk.

Survey – gene technology and the claims process



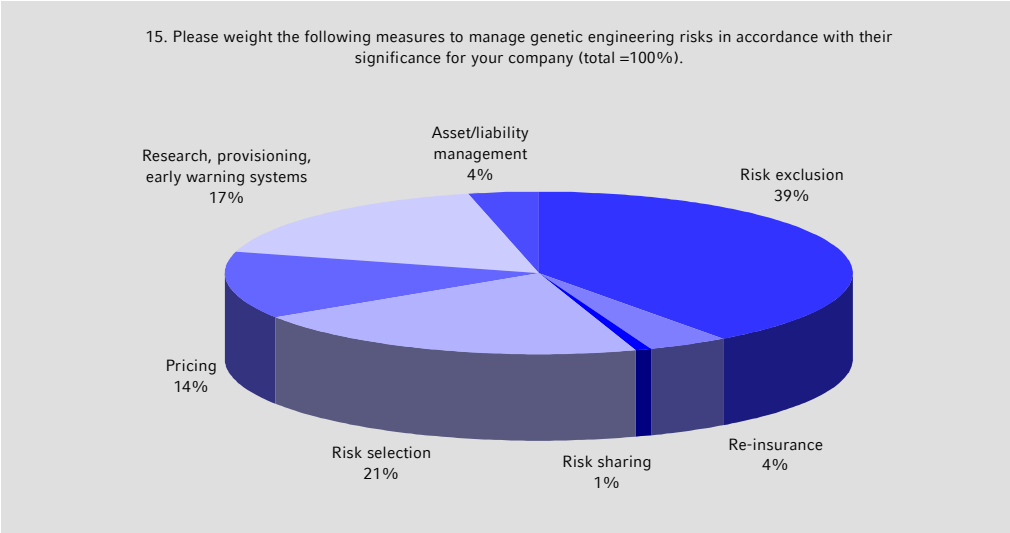


Source WestLB Equity Markets

Risk exclusion is the name of the game

Answers about risk management (Question 15, see below) show a very different situation than for climate change. The result is unambiguous: risk exclusion is very clearly the name of the game for gene technology. We take this as a sign that insurers are finding it hard to assess gene technology risks. They obviously do not feel they have the risks under control, or that research will solve the problem. However, there is a very clear divergence between primary insurers and reinsurers. For Munich Re and Swiss Re, for example, research, provisioning and early warning systems has the highest weighting and risk selection is seen of above-average importance. Reinsurers obviously have more confidence in these tools – as they do for climate change.

Survey – gene technology and the claims process*



* N = 7

Source WestLB Equity Markets

Capital investment side

Focus here, too, on equities

Gene technology also affects insurers in their role as major institutional investors. The transmission mechanisms are similar to those for climate change. It is worth mentioning the various general fiduciary obligations on the one hand and, on the other hand, the fact that insurers need to protect their portfolios against gene technology risks and to exploit the growth potential which undoubtedly exists in this sector in order to enhance portfolio

value. Of course, the focus is again mainly on equities although, as in the case of climate change, corporate bonds can also be affected.

In the case of gene technology there is a (cross-)correlation between the actuarial risk of major claims and the market value of equity portfolios. Insurers should therefore take a holistic approach to risk management.

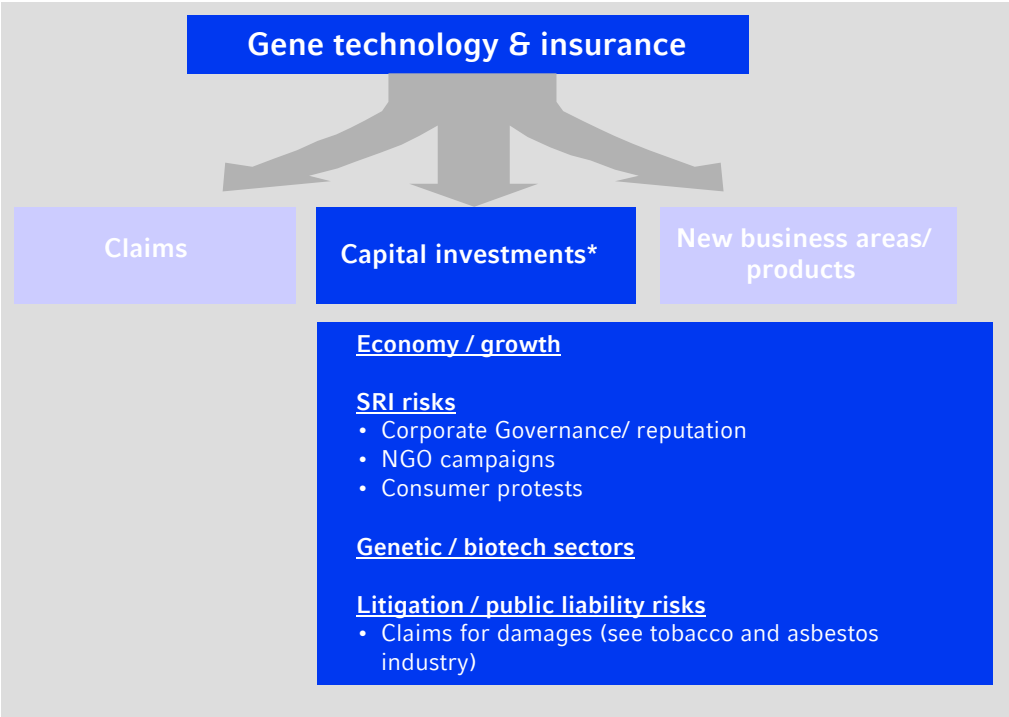
When analysing the opportunities and risks posed by gene technology in terms of shareholder value, there are two main determining factors:

- reputation risks and
- product opportunities and risks (including legal liability risks).

Reputation risks are particularly high in gene technology

In order to protect and ideally enhance shareholder value with respect to gene technology, it is essential to build up trust and transparency – far more so than for many other sustainability issues. Public pressure on manufacturers, particularly in the pharmaceutical, agrochemical and food industries, is incredibly high, and any loss of reputation can also entail considerable market share and share price losses. The diagram below shows how gene technology can affect the risks and opportunities for the value of insurers' equity and corporate bond portfolios.

Gene technology and its repercussions on the capital investments side



* List of factors which can affect the market value or performance of insurers' investments

Source WestLB Equity Markets

Monsanto and genetically modified food: a classic win-win situation?

One high-profile example is that of Monsanto. At the end of the 1990s, the company tried to market genetically modified soya seed in Europe – a venture that came to a sticky end. But Monsanto was convinced it was a classic win-win situation. The GM seed gave better yields for farmers, while Monsanto increased sales and the environment benefited from lower pesticide use. Ecological efficiency was obviously factored in, so what was the problem?

USA vs. Europe: conflicting reactions to GM food

US opposition to GM food was limited, whereas in Europe NGOs like Greenpeace made a big stand against imports of GM products. Although Monsanto tried to enter into dialogue with these groups, there was no real recognition of the risks associated with pursuing an aggressive marketing strategy in Europe. For example, no attention was given to the concerns expressed about the potential for GM and non-GM products getting mixed together. Critics claimed this prevented consumers from making an informed choice. Monsanto chose to respond to these fears with a massive PR campaign rather than joining forces with stakeholders.

Monsanto forced to abandon hopes of becoming an integrated life science group

The GM debate is still far from over. However, there can be no denying that Monsanto's strategy was extremely damaging to the company. In 1999, its share price was hit hard by the public debate about genetically modified food. Investors were particularly worried that a company like Monsanto could be hit by compensation claims similar to those in the tobacco industry. A study by Cornell University caused more confusion, reporting that 44% of butterfly larvae died after being fed GM food. In the ensuing weeks, the Monsanto share price dropped 17%. In late 1999, the two largest US health food retail chains, Whole Foods Market and Wild Oats Market, announced they would be following European retailers' example and removing all GM products from their range. Monsanto's GM food problems eventually caused Robert Shapiro, the visionary Monsanto CEO, to abandon his dream of an integrated life science group. Monsanto merged with the US pharmaceutical company Pharmacia & Upjohn in early 2000. The new company's agrochemical division was floated on the stock exchange that October. One reason given by analysts for the low issue price ($20, which was at the lower end of the book-building range) was the reputation risk associated with Monsanto's GM product division.

In our survey, we wanted to find out how the companies assess gene tech risks and opportunities on the investment side. These are our findings:

Survey – gene technology and capital investments

Source WestLB Equity Markets

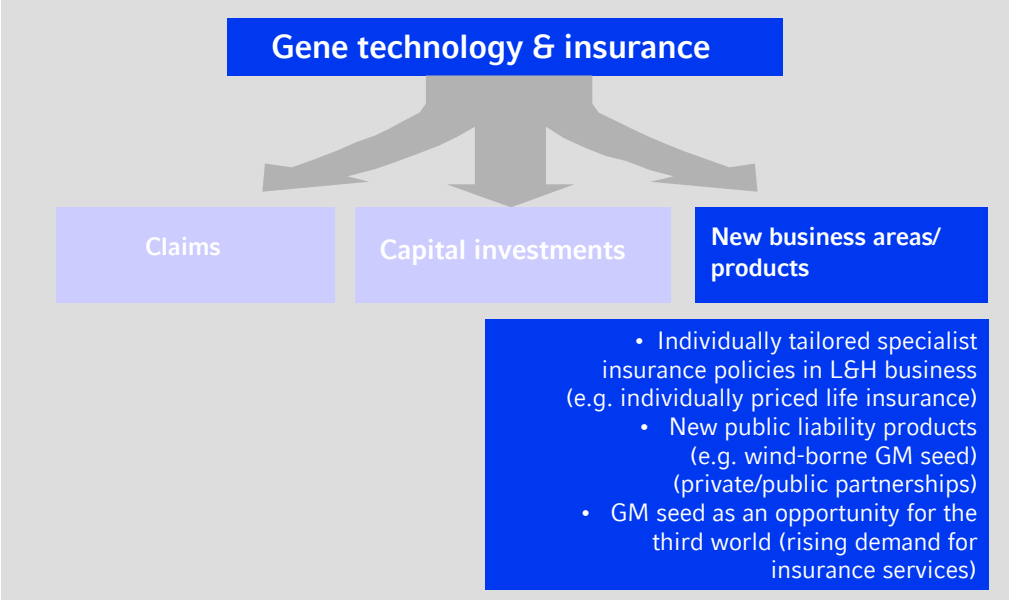
Obviously no company believes it has really understood the risks

When asked about the management of gene tech risks on the capital investments side, only one company, which did not wish to be named, said it had a systematic approach, although it did not provide further details. The vast majority of answers were either "selectively" or "not at all", which mirrors the situation on the underwriting side. Remember, risk exclusion was by far the most popular management measure there (Question 15), which we interpreted as a signal that companies do not feel they fully understand the risks relating to gene technology. This now obviously applies to the capital investment side as well. It simply seems that the prerequisites for a systematic approach are not in place yet. The predominance of risk exclusion on the underwriting side also reduces the pressure to introduce a systematic investment approach. If the actuarial risks are excluded, there is no danger of risk accumulation, even given the positive correlation. This also explains the low priority given to asset and liability management in attempting to control the risks associated with gene technology (see Question 15).

New business areas and products

How do insurers deal with the topic of gene technology when it comes to new products? Where are the perceived opportunities for growth? What risks are there? These were all things we wanted to ascertain with our survey. The diagram below once again lists the starting points discussed above.

Gene technology and its repercussions on the product side

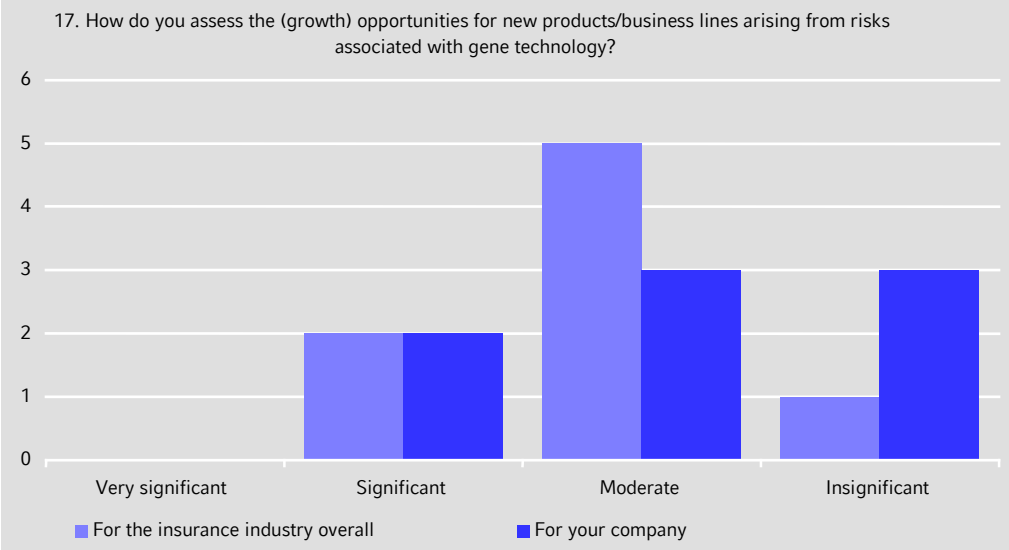


Source WestLB Equity Markets

Insurers anticipate only moderate growth potential

The basic message that emerged from the responses is that while companies do expect to see new products emerge, they only anticipate moderate overall growth potential (Question 17, see below). It is worth noting that only one company (Generali) rates the opportunities for the industry as insignificant. Companies are more inclined to take this view, however, when it comes to assessing their own potential and targets. There are three companies (including Generali and RAS) that do not consider that gene technology offers them significant potential. By contrast, Munich Re and one primary insurer that wishes to remain anonymous both consider new product potential to be significant, for the sector as a whole and also for their own company.

Survey – gene technology and the product side



Source WestLB Equity Markets

At this point we wanted to get some more details from the companies and asked:

- (Question 18): In which areas (e.g. life/health insurance priced on personalised basis, new food liability products, genetic engineering as a way for third world countries to escape the "poverty trap": rising demand for insurance services as a result of rising living standards) do you see particular potential for your company?

Only a few companies responded to this question, and their answers were very sketchy and vague. Specific reference was made to product liability for the agricultural, food and pharma industries. Several answers mentioned the expected increase in demand, supporting the answers to Question 17 which indicated a trend towards moderate market growth.

Conclusion – Insurance and gene technology

Insurers have more difficulties assessing opportunities and risks than in other areas

In general, our impression was that insurers have more difficulty in understanding the economic implications of gene technology for the sector as a whole and for their own company and find them harder to assess than for climate change.

Although gene technology was considered a relevant issue, risk exclusion is by far the most popular management tool in responding to all the uncertainty about the consequences of gene technology. It is also striking that pricing is considered much less important, which shows that insurers are not convinced they understand the risks. This is particularly true for the primary insurers. Reinsurers seem to be the trail blazers here again: they weight research considerably higher than the sector average and are more confident about risk selection than primary insurers.

Broader insurability offers growth potential

It is also worth noting that it is not just gene technology risks that are taken into consideration: positive assessments dominate with regard to the life/pension area, which may be due to the improved risk selection made possible by genetic testing. This area also offers growth potential for products (e.g. in the view of Munich Re), which is probably related to the improved insurability of risks due to genetic testing.

Geopolitical risk

- ‘SARS risks’
- Terrorism
- Emerging Markets

Geopolitical risks – uncertain times

September 11 represented a watershed. Since then geopolitical risks have been more deeply rooted in our collective conscious than perhaps ever before. The insurance industry was hit from two sides: underwriting losses depleted actuarial reserves, while investment income and undisclosed reserves melted away with share prices.

Terrorism is the most extreme of many different geopolitical risks. Globalisation has elevated epidemics like SARS and bird flu to global threats. The 'risks of infection' increased in a purely economic sense as well, as the Asian crisis of the late 1990s painfully demonstrated. The results of our survey show two things. Firstly, companies struggle to assess terror risks effectively and therefore they exclude rather than price them. Secondly, with regard to Emerging Markets, companies focus on the overall high market potential which is driven by population growth and increasing prosperity.

Age of instability

After the bipolar world order ended, a new age of uncertainty has begun

There can be no doubt about it – we are living in a new age. When the Soviet Union collapsed, the old world order collapsed with it. The old bipolar world order – which, despite the nuclear threat and proxy wars in the Third World, brought a certain stability – ceased to exist. The new world order, characterised by unipolarity and unilateralism on the part of the USA (e.g. Iraq, International Criminal Court, Kyoto Protocol, etc.), is obviously much less stable and predictable than the old. Europe is simply too weak to take on the role of stabiliser alongside the USA. It is too preoccupied with its own affairs (eastward EU enlargement), and its capacity to act is too severely weakened and thrown into doubt by the lack of legitimacy of its institutions (debate surrounding the EU constitution). There are other destabilising factors, too:

- There is considerable doubt about whether Russia is actually on the way to becoming a democracy governed by the rule of law.
- Emerging markets in East Asia are still extremely susceptible to crises. Development at an institutional level (financial institutions) has failed to keep pace with economic growth. Time and again, this has resulted in economic and financial crises, such as that at the end of the 1990s, also representing a threat to regional political stability and to the global economy.
- The increasing proliferation of nuclear weapons lends regional conflicts such as that between India and Pakistan an entirely new geopolitical dimension. Combined with the spread of religious fundamentalism, this has brought about a new and considerable potential risk.

The most extreme example of the new geopolitical instability is undoubtedly international terrorism.

11 September

Attack on the WTC caused a change of awareness

The words 'Everything has changed' were often heard in the wake of the 11 September terrorist attacks, and certainly apply equally to the insurance industry. The WTC attack alone resulted in damage covered by insurance in excess of $20bn, a dimension that has only been reached by Hurricane Andrew in 1992 and the Northridge Earthquake in 1994. The market capitalisation of seven large insurers affected by the attack fell by €60bn just in the 10 days following the attack (see table on page 8).

WTC: one or two events?

It has still not been agreed whether the attack that destroyed the twin towers of New York's World Trade Center was one loss event or two. Since a maximum insurance payment per loss event of $3.55bn had been stipulated in the insurance policy, this question is of the utmost importance for the insurers and claimants.

If the US courts were to agree with the plaintiff, the two air attacks would have to be treated as separate events and the maximum sum would therefore have to be paid out twice. We do not believe it likely that the US courts will take this view. In insurance law, the maxim 'Causa proxima non remota spectatur' ('the immediate not the remote cause is considered') applies. The idea that the destruction of the two towers within a short time period was part of a single plan would therefore determine the insurance payment. If, contrary to expectations, this is not the outcome of the legal dispute, the insurers are likely to seek recourse against airports and air traffic controllers (and therefore ultimately against the government).

Many sectors of the insurance industry affected

Highest insurance payments caused by interruptions to business

Almost every sector of the insurance industry was affected by the 11 September disaster. Despite the fact that so many died in the disaster, it is not the life sector that has faced the highest claims. Even the immediate structural damage, the payouts for which are still being contested in court by the insurers concerned, 'only' comes to a single-digit figure in the billions. By contrast, much larger insurance payments have been made under insurance policies covering business interruption. If a bank or fund company has to suspend operations, this can cost millions a day. If the business has to be rebuilt from scratch somewhere else, the claim is many times larger.

Local events with a global impact

The attack opened the world's eyes to the fact that the impact of geopolitical risks is no longer limited to the regions in which they occur. Terrorist attacks can be carried out all over the world. The cause and effect of each geopolitical risk can no longer be attributed 100% to one particular country or region.

Even small groups of perpetrators (or perpetrators working alone) are enough to cause a huge amount of damage – particularly if the attacks are aimed at exposed targets. With the events of 11 September, geopolitical risks have taken on an entirely new dimension. Opinions differ about whether the wars in Afghanistan and Iraq were a correct and legitimate response to the terrorist attacks, and we do not wish to use this as an opportunity to enter the controversial debate between the USA and 'Old Europe'.

However, we see it as an indisputable fact that the risk of terrorist attacks has in no way abated, as the terrorist attacks in Madrid painfully demonstrated.

'SARS risks'

Globalisation brings risks in faraway countries closer to home

A second reason why public interest has focused on geopolitical risks recently is the fear that epidemics such as SARS or bird flu will continue to spread. One of the downsides of globalisation is that epidemics can propagate around the globe very quickly due to international travel. There may not be time for appropriate precautions such as vaccinations. Many human lives could be lost and the economic fallout would undoubtedly be immense.

SARS

SARS was classified a global threat in March 2003 after the first cases came to light in southern China in November 2002. It is a droplet infection and therefore spreads quickly from one person to another through direct contact. According to the World Health Organisation, 8,089 cases of SARS were recorded worldwide between November 2002 and July 2003. Of those infected, 774 died. Although countries in East Asia were the worst affected, Canada also recorded a comparatively large number of cases.

Bird flu

Since the end of 2003, the outbreak of a highly contagious form of bird flu has been causing alarm among health authorities and in the media. An increasing number of Asian countries are reporting cases of this disease. What is alarming is the unprecedented speed with which the disease has spread in so many countries and the fact that the H5N1 bacteria strain is 'species-hopping' and can therefore cause serious illnesses in humans, too.

Although the risk to humans is currently believed to be very low, if the new virus contains sufficient human genes, it can spread directly from one person to another without having to go via animals, as is the case at present. This could mean the beginning of a new flu pandemic with consequences similar to those of the Spanish flu in 1918-1919, when an entirely new type of flu spread around the globe within 4-6 months killing around 40-50m people in several waves over a period of two years.

SARS claims have so far been limited. Will that change in the future?

Insurance companies are affected by health risks like SARS in a number of ways. The implications for personal insurance policies such as life, pension and health insurance are obvious. It is practically impossible to estimate the treatment costs, for example, should millions of people become infected. In this case, however, demands would also be placed on the government. Insurance companies would face larger claims as a result of interruptions to business, and not just in the countries directly affected. With a very marked international division of labour and just-in-time production, global manufacturing can very quickly be disrupted. Just a few delayed deliveries can bring the end stages of production to a standstill. Although the global economic system can be very efficient, it can also be very vulnerable. This does not only apply to the exchange of tangible goods, of course. Travel restrictions can make it impossible to provide consultancy services, for example. This could lead to liability claims under policies such as D&O (directors and officers) policies. Thus, company employees who, despite warnings from the WHO, are sent into epidemic zones and become ill could claim damages from individual members of management.

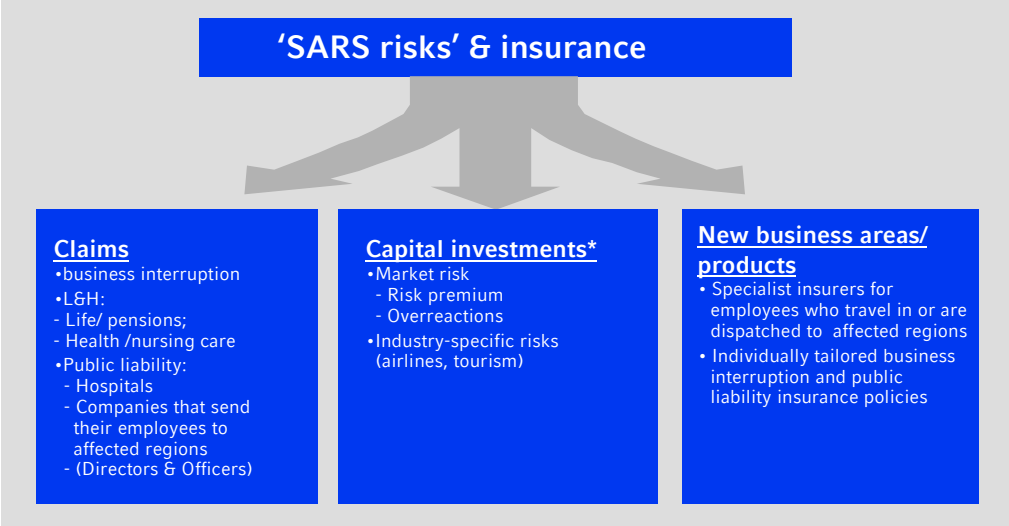
No D&O insurance without deductible

Companies usually take out D&O insurance for their managers, directors, supervisory board members, etc. When providing these policies, insurers take every care to ensure that the manager concerned bears a personal deductible, setting the right incentive to prevent claims from the outset. Unlike in the US, large claims relating to manager liability have so far been the exception in Europe. Nevertheless, insurers have repeatedly had to hike premiums over the last few years, as there has obviously been a tendency to underestimate possible claims.

SARS risks: airlines and tour operators are the most severely exposed

The following diagram outlines the risks that the rapid spread of epidemics around the globe could cause for the insurance industry. Capital investments can also be badly affected, as SARS well demonstrated. Not only did share prices in the countries directly affected come under severe pressure, but there was also a rise in the market risk premium worldwide. At sector level, airlines and tour operators have particularly high exposure. This is not only true with regard to the spread of epidemics such as SARS or bird flu, however, but also with geopolitical risks in general. On the new products side the opportunities appear rather limited. Special insurance policies for employees sent to affected regions or bespoke policies providing occupational disability cover are a possibility.

'SARS risks' and their impact on the insurance industry



* the factors listed are those which may influence the market value and/or performance of insurers' investments

Source WestLB Equity Markets

SARS risks not very high on the agenda of the European insurers surveyed

We asked the companies about this issue too. Please see the appendix for detailed results. In summary, the insurance risks resulting from epidemics such as SARS are largely considered to be low. The issue seems to be deemed much less important than all the other issues discussed in this study. The companies obviously take a much more relaxed view of the global spread of epidemics than the public did to SARS and bird flu. It is beyond the scope of this study to say whether this indicates a response based less on emotions and more on business rationale or a lack of concern on the part of insurers who have so far experienced low claims. If we consider that the Spanish flu killed many millions of people, it becomes clear that the insurers could be underestimating the scale of the problem.

Focus is on terrorism risks and emerging markets

In the sections below, we intend to cover in more detail two subjects of relevance in the context of geopolitical risks: terrorism, which we touched on at the beginning of this chapter, and emerging markets (EM). What makes the latter so interesting is the traditional definition of geopolitical risks as risks to the stability of individual regions. However, more recent EM crises such as the Asian crisis at the end of the 1990s have shown that the risk of their spreading to industrialised countries is considerable. They are transmitted mainly via globally networked, highly integrated financial markets. But before moving on to these two major issues, we will take a glance at geopolitical risks in general.

Instability, escalation and risk of infection

Underlying cause is the instability of political and socio-economic systems

Geopolitical risks are caused initially by the instability of political and socio-economic systems. The instability of a country or region may be fairly obvious (see Israel/Palestine) or it may bubble quietly below the surface, remaining hidden for a long time, in which case seemingly insignificant events can often set off a powder keg. The situation can then escalate very quickly, making risk management extremely difficult.

Regions of high geopolitical risk

Risk analysis using accurate information delivered in real time is an absolute necessity

According to Control Risks Group, regions of particularly high geopolitical risk currently include Burundi, Somalia and Liberia. However, very few international companies are represented in these countries due to their 'traditionally' extreme political instability. A much greater problem occurs when a stable situation becomes an unstable situation (often within a short period) and the international companies and investors operating in the country concerned are unable to adapt to the changing conditions quickly enough. The crisis in Argentina is one example. Given the potentially devastating economic impact of crises like this one, risk analysis using accurate information delivered in real time is clearly an absolute necessity.

Risk map 2004

Risk assessment	Country
Extreme – political	Somalia
Extreme – Security	Burundi, Somalia, Liberia
High – Political	Burundi, Chad, Cote d'Ivoire, Guinea (Conakry), Guinea-Bissau, Liberia, Nigeria, Zimbabwe, Haiti, Venezuela, Afghanistan, North Korea, Philippines, Belarus, Bosnia-Herzegovina, Georgia, Macedonia, Serbia & Montenegro, Tajikistan, Turkmenistan, Iraq
High – Security	Congo (DRC), Guinea (Conakry), Guinea-Bissau, Zimbabwe, Colombia, Haiti, Afghanistan, Pakistan, Georgia, Tajikistan, Algeria, Iraq, Yemen
Medium – Political	Albania, Algeria, Angola (H), Argentina, Armenia, Azerbaijan (H), Bangladesh, Benin, Bolivia, Burkina, Faso (L), Burma, Cambodia, Cameroon, Central African Republic (H), China, Colombia, Comoros, Congo, Congo (DRC) (H), Cuba, Cyprus (L), Djibouti, Dominican Republic (L), Ecuador, Egypt (L), El Salvador (L), Equatorial Guinea, Eritrea, Ethiopia Fiji, Gabon (L), Gambia, Ghana, Guatemala, Guyana, Hong Kong (L), Indonesia, Iran, Jamaica (L), Kazakhstan, Kenya, Kyrgyzstan, Laos, Lebanon, Lesotho, Libya, Madagascar, Malawi, Mauritania, Mexico, Moldova, Mongolia (L), Mozambique, Nepal, Nicaragua, Nigeria, Pakistan, Papua New Guinea, Paraguay, Peru, Romania, Russia, Rwanda, (L), Sao Tome e Principe (L), Saudi Arabia, Sierra Leone (H), Slovakia, Solomon Islands (H), Sri Lanka, Sudan, Swaziland, Syria (L), Thailand, Togo, Turkey, Uganda (L), Ukraine, Uzbekistan, Vanuatu, Yemen, Zambia
Medium – Security	Albania, Angola, Armenia, Azerbaijan, Bahrain (L), Bangladesh, Belarus (L), Bolivia (L), Bosnia-Herzegovina, Bulgaria, Burkina Faso (L), Cambodia, Cameroon, Central African Republic, Chad, Comoros, Congo, Cote d'Ivoire, Dominican Republic, El Salvador, Ethiopia, Fiji, Gabon (L), Guatemala, Honduras, Indonesia, Israel & Gaza/West Bank, Jamaica, Kenya, Korea (North) (Insignificant), Korea (South) (L), Kuwait (L), Kyrgyzstan, Laos, Lesotho, Macedonia, Madagascar, Malawi, Mauritania, Mexico, Moldova, Mongolia (L), Morocco (L), Mozambique, Nepal, Niger, Nigeria, Oman (L), Panama, Papua New Guinea, Peru, Philippines, Qatar (L), Russia, Rwanda, Sao Tome e Principe (L), Saudi Arabia, Serbia & Montenegro, Sierra Leone (H), Solomon Islands (H), South Africa, Suriname, Swaziland, Thailand (L), Trinidad & Tobago, Turkmenistan, Ukraine, UAE (L), Uzbekistan, Vanuatu, Venezuela

Source Control Risks Group

23% rise in countries rated as medium-risk

The number of countries rated by Control Risks Group as medium-risk has risen by 23% over the last year to 96. Control Risks Group cites the following potential regional developments for 2004:

Europe

The main risk factors are the European Union's enlargement to 25 countries and the deadlock over the European constitution. The threat posed by Islamic terrorism will persist, with major European cities (such as London) particularly affected. The risk of sleeper cells becoming active is considered to be particularly high in the UK.

Middle East

The threat posed by Islamic terrorists and their sympathisers makes this region a 'powder keg'. The risk is considered to be particularly high in Morocco, Tunisia, Egypt, Jordan and the smaller Gulf States. Due to the many rebel groups sympathetic to the Taliban, Afghanistan remains a trouble spot. Iraq will remain unstable for some time, even after Saddam Hussein's arrest. There is a risk of anti-western attacks in Yemen and Saudi Arabia in particular. Iran's support for regional terrorist groups and the national nuclear programme pose further security risks. Nevertheless, it is considered unlikely that American troops will invade Iran (or Syria).

America

In Latin America, political and economic instabilities again represent the main risks for globally active companies and investors in 2004.

Asia

South and Southeast Asia remains a critical region in the war against terror. Afghanistan, Pakistan and countries in Southeast Asia are especially high-risk. The risk of political instability is particularly high in Indonesia and India given the upcoming elections. Pakistan and India continue to be seen as high-risk conflict zones. The situation is similar in Nepal, where civil war could break out again.

Africa

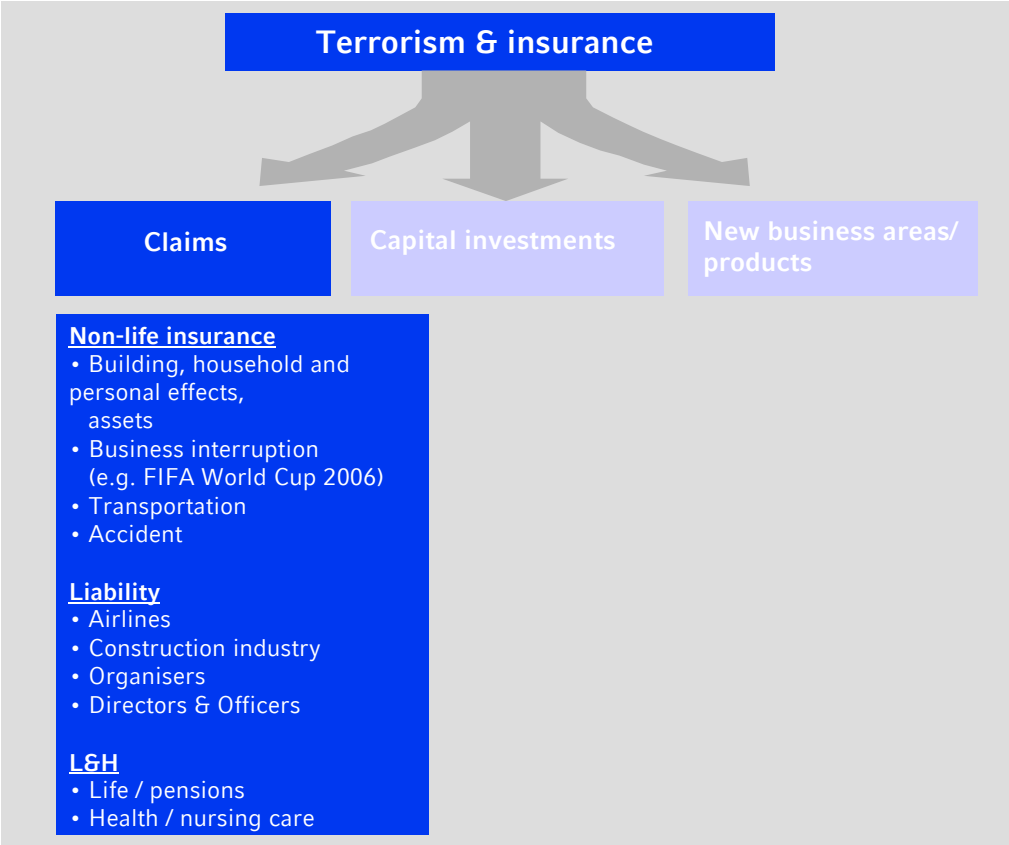
Although it is likely that an increasing number of governments in this region will try to create a more attractive economic environment for foreign investors, there are still major trouble spots. The ongoing spread of Aids, a threat to entire economic areas, poses another enormous business risk.

Terrorism risks

Risk technically comparable to that of natural disasters

Due to the enormous damage that can potentially be caused by single events, terrorist attacks represent a special type of risk. In certain respects, they can be compared to natural disasters: terrorist attacks occur suddenly and unexpectedly, affecting many different areas of economic and social life. Risk diversification becomes difficult as the potential damage is concentrated, and single events can affect entire economies and many different claims areas.

Terrorism risks and their repercussions on the claims process



Source WestLB Equity Markets

Special nature: planned for maximum effect

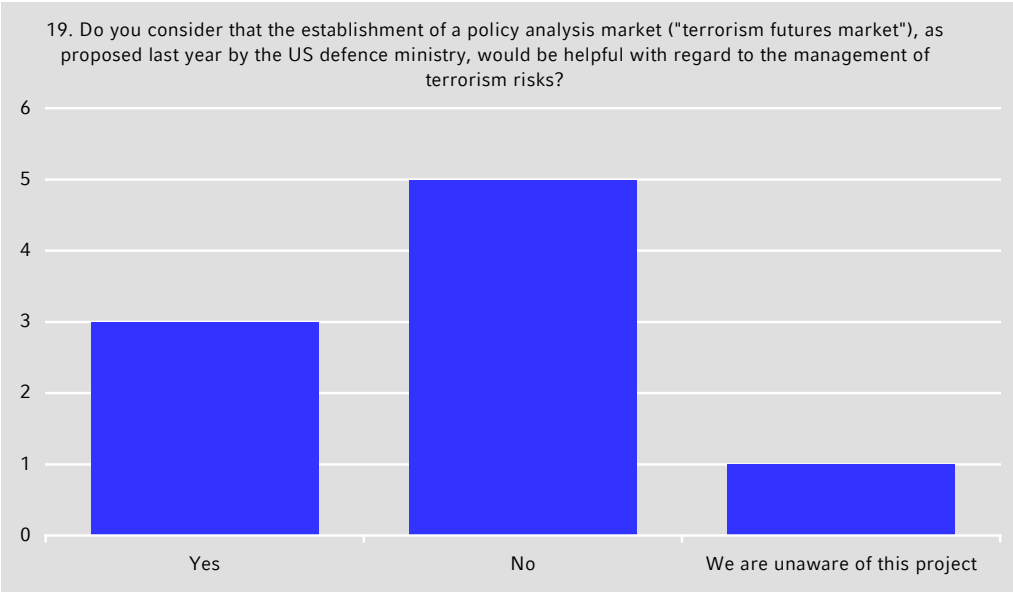
However, there are also significant differences between the damage caused by natural disasters and that caused by terrorist attacks. The former occurs purely by chance while the latter is caused deliberately. Terrorist attacks like those of 11 September are planned so that they cause the maximum amount of political, psychological and economic damage. Modern weapons technology, ever more concentrated tangible assets and increasing global networking mean relatively simple, concentrated attacks can have devastating effects.

It is precisely the special nature of terrorism risks that makes them almost impossible to model and estimate. Whether a Policy Analysis Market (PAM), a market on which futures on geopolitical events such as terrorist attacks can be traded, offers a solution to the problem is much disputed. A project of this kind was proposed last year by the US Pentagon. The appropriate financing had barely been requested in the US Congress when outrage spread, prompting the Pentagon to very quickly withdraw from the project.

Could a market offering futures as a hedge against terrorism risks be a solution?

Critics raise doubts about the PAM on ethical, moral and economic grounds. The idea of traders placing 'bets' on events such as the attack on the World Trade Center and profiting financially when these events occur is difficult to accept. From a purely economic viewpoint, it is argued that the PAM is superfluous, as traders already have the opportunity to hedge against geopolitical risks on other futures markets (currencies, commodities, interest rates, etc.). Whether this is true or not is much debated among experts. Our feeling is that we haven't heard the last word on 'terrorism futures'. We asked the insurance companies for their opinion on this issue.

Survey – insurers and terrorism risks



Source WestLB Equity Markets

'Terrorism futures market' finds little favour among insurers surveyed

The result of our survey reflects the current negative sentiment in the US about this issue. The majority of the companies polled does not believe that setting up a futures market for geopolitical risks would help them to manage terrorism risks. Their responses may also have been influenced by the concern that approval of such a market would have a negative impact on the company's reputation. As mentioned above, the American

public were outraged when the project was announced. The response in Europe is likely to be very much the same.

But now back to the unique aspects of insuring terrorism risks, one of which is undoubtedly the difficult task of estimating possible claims.

Dearth of data makes underwriting difficult

Estimating possible claims is a difficult task

Insuring events which seldom occur is extremely difficult due to the dearth of data with which to estimate possible future damages. The insurance for the 2002 World Cup in Japan and South Korea is a prime example. The terrorism risk, which could have stopped the entire event, included insurance for damage as a direct result of terrorism and insurance for billions in lost revenue. AXA had originally assumed the risk as lead underwriter but later withdrew from the contract. National Indemnity, a subsidiary of Warren Buffet's Berkshire Hathaway, then jumped in and underwrote the risk.

For the 2006 World Cup in Germany, FIFA has adopted a different approach. A €230m bond has been issued to international investors, and the Organising Committee has arranged €150m of liability insurance with Hamburg-Mannheimer. FIFA had requested at least €140m coverage from the organiser.

Excluding and limiting liability seem to be the only appropriate methods for primary insurers

Terrorism risks are excluded by most insurers

Many non-life insurance policies renewed since 11 September explicitly exclude terrorism risks. Although long-running life insurance policies usually cover the risk of death through terrorism, most do not cover death through acts of war or declaration of war. Just recently, a special product had to be created in Germany for German military personnel deployed abroad, as it was almost impossible for them to obtain additional, private insurance covering the risk of death.

Exclusion of liability is the last resort for primary insurers. In our view, they cannot be called upon to provide adequate insurance cover alone. This requires the involvement of other primary insurers (through the setting-up of consortia), reinsurers and the government.

Private-public partnerships are a solution

The government is forced to act if an individual sector's bounds of 'load-bearing capacity' are exceeded and the threat to the entire economy is considerable. For example, governments assumed risks and handed out sometimes massive subsidies for the airline industry in the wake of the 11 September attacks. In cases like this, private-public partnerships are probably the only way to prevent the collapse of entire sectors and avert damage to the economy.

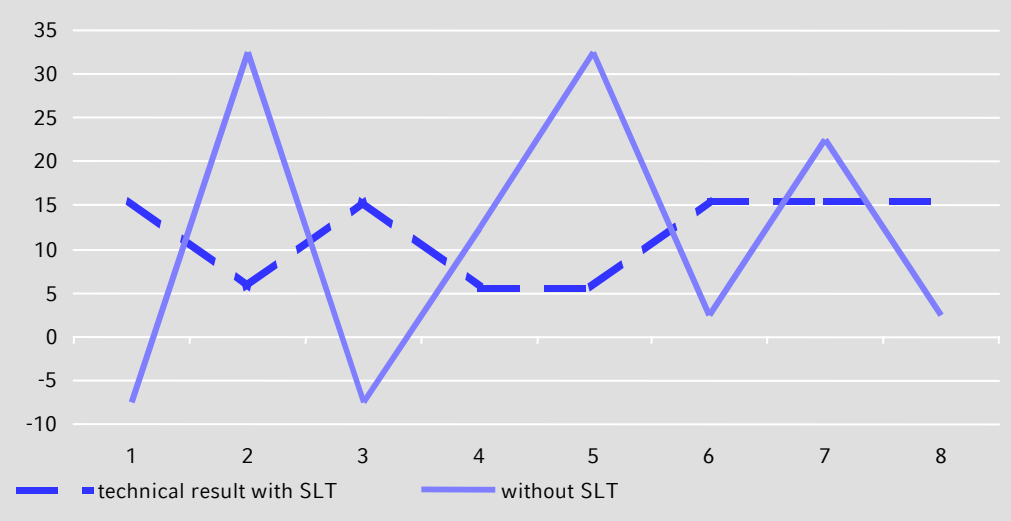
Reinsurance cover is vital

Various reinsurance solutions

Due to the special nature of the claims process (involving events which seldom occur), we consider what is termed a spread loss treaty (SLT) to be a preferable form of reinsurance cover to a finite quota share (FQS). An SLT enables the primary insurer to transfer the underwriting risk to the reinsurer when claims peak. Underwriting profits and losses are thus normalised or smoothed out over time (see diagram below).

However, we consider an FQS to be more suitable for events which occur more frequently (for details see our study 'Financial Reinsurance – (Un)canny success', 17 January 2003).

Technical result of a primary insurer with and without SLT (€ m) – example

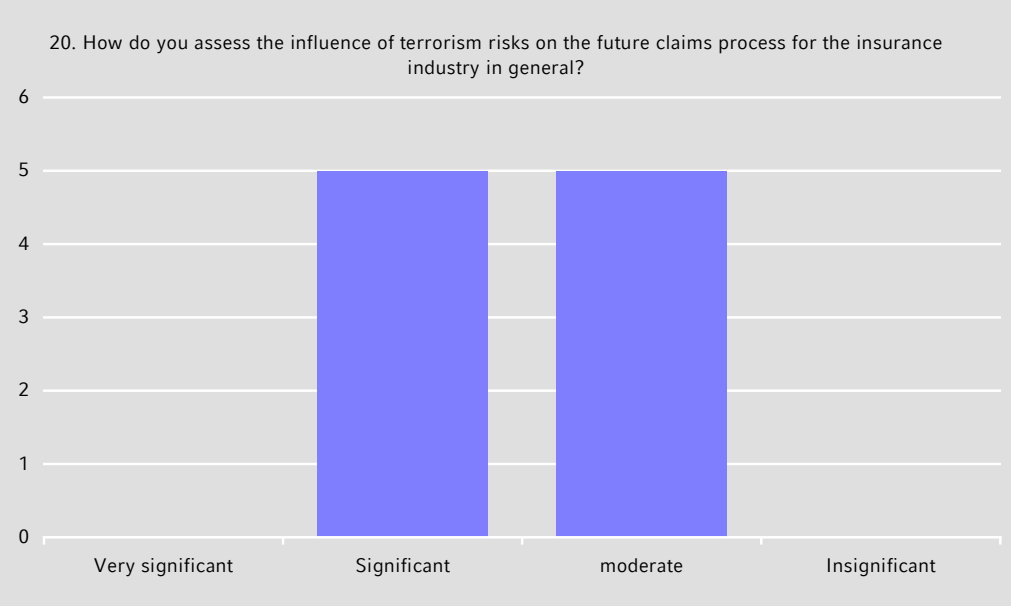


Source WestLB Equity Markets

Survey results

We wanted to find out from companies how they assess the significance of the 'new' terrorism risks on the underwriting and the capital investments sides of their business, and where they might see market potential for new products. First, let's take a look at the repercussions on the claims process.

Survey – terrorism risks and the claims process



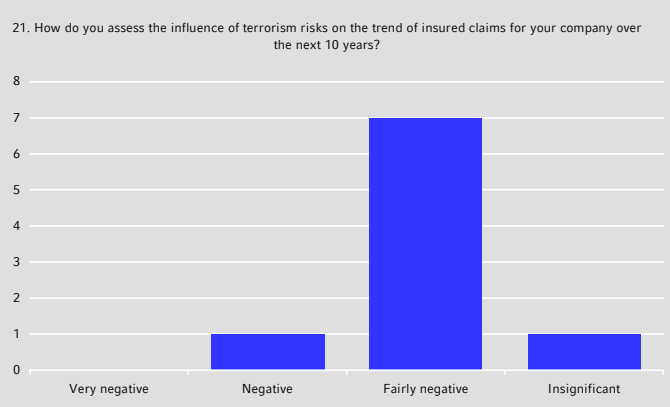
Source WestLB Equity Markets

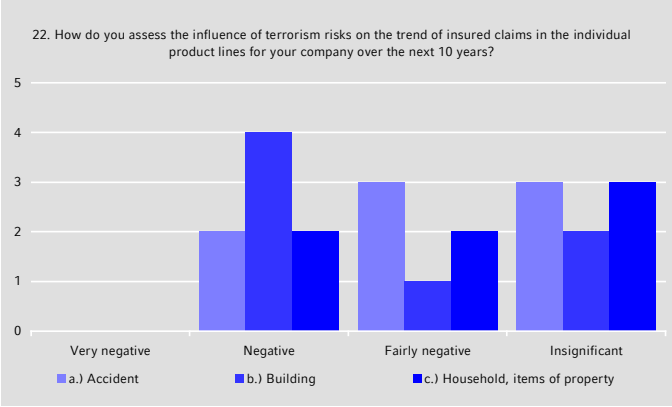
Terrorism risks and the claims side

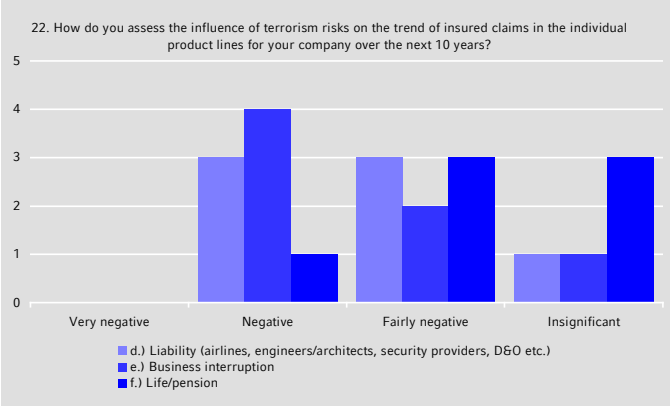
No company could bring itself to opt for 'very significant'

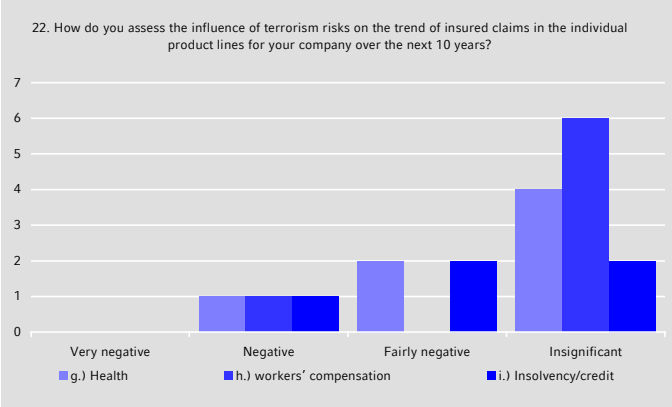
The answers clustered in the centre. None of the companies ventured an answer from either of the extreme ends of the scale. That no company opted for the 'insignificant' category may have something to do with political correctness. Certainly no insurer would want the public to say it was playing down the problem. Facing the losses caused by the attacks on the World Trade Center it is plain to see, in any case, that events like this do have a major impact on the industry as a whole. Ultimately, even a single loss can threaten the very existence of a company. It is therefore also not really surprising that no company surveyed could bring itself to answer 'very significant', despite all the complaining noise after 11 September. This may have something to do with the role of the state, which usually gets drawn in in such cases (and maybe is even happy to get involved, e.g. as demonstrated by the 'Oder flood' event in Germany). There has always been political mileage in providing state support to victims. What politician does not wish to be seen helping citizens in their hour of need?

Survey – terrorism risks and the claims process









* Airlines, engineers/architects, security providers, D&O etc.

Source WestLB Equity Markets

Reinsurers tend to respond to the issue in a more relaxed manner

An analysis of the responses given by individual companies reveals that it is the reinsurers who tend to be slightly more relaxed about the issue. We attribute this to the confidence their recognisably high-quality research and risk control gives them that they have a firm grip on the financial risks to their companies from terrorist attacks.

The views expressed are quite moderate overall. This is also true of the responses given to the question about the impact on their own companies. Seven of the nine companies that answered Question 21 see only a slightly negative impact on the claims process, while only one insurer, the Italian company Generali, was prepared to go as far as an unequivocal 'negative'. All in all, the findings suggest that insurers are convinced, at least as far as their own companies are concerned, that the economic risks arising from terrorist attacks are limited.

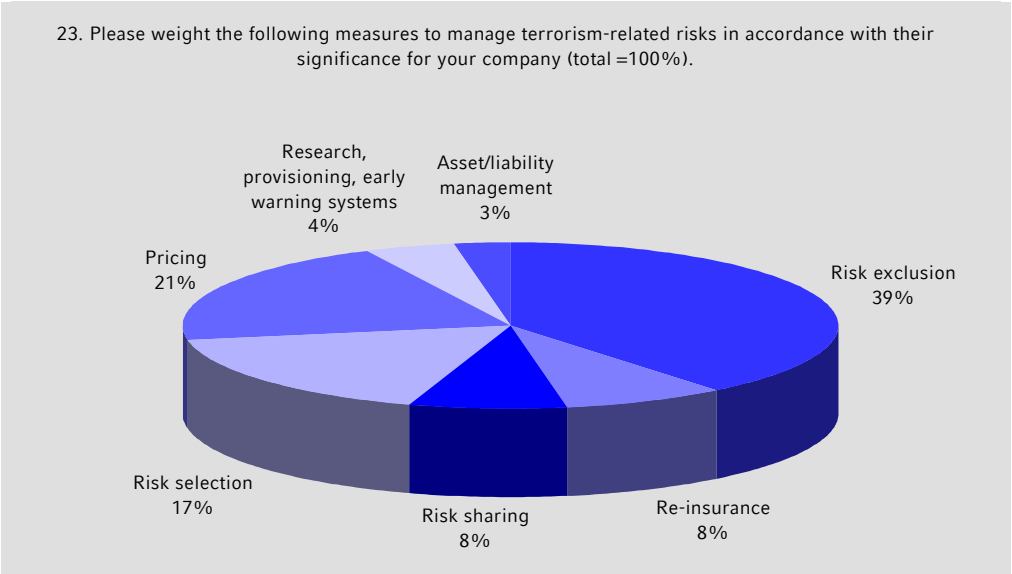
'Business interruption' and 'buildings' are most affected once again

When asked which specific types of insurance were affected (Question 22), it was the buildings and business interruption segments that stood out again. There are clear parallels here with the insured losses occurring through climate change. The difference is that with terrorism the loss is caused by deliberate action but with climate change it is not. The economic losses arise primarily from the destruction of infrastructure. This is also reflected in the lack of importance attributed by insurers to the effects of terrorism risks on personal insurance in the life, pensions and health insurance segments. Even the high death toll caused by the attacks on the WTC has evidently made no difference to this assessment. Terrorist attacks, even of such an extreme nature, remain a local problem in terms of their impact on personal insurance.

Exclusion of risks predominates

The point that immediately stands out regarding the measures taken against terrorism risks (Question 23) is that, as with genetic engineering, by far the greatest importance is attached to risk exclusion. This ties in with our view that companies feel extremely uncertain about the issue of terrorism and do not believe they can get the risks properly under control.

Survey – terrorism risks and the claims process



* N = 7

Source WestLB Equity Markets

Terrorism risks: doubts as to the benefits of research

This also fits in with the low weighting apportioned to research. The failure of the secret services on the Iraq front has shown just how difficult it is to assess geopolitical risks in general. The classification of risks associated with buildings and other types of infrastructure is hampered by the large number of objects potentially affected and the fact that terrorist attacks are characterised by their unstructured nature. We therefore do

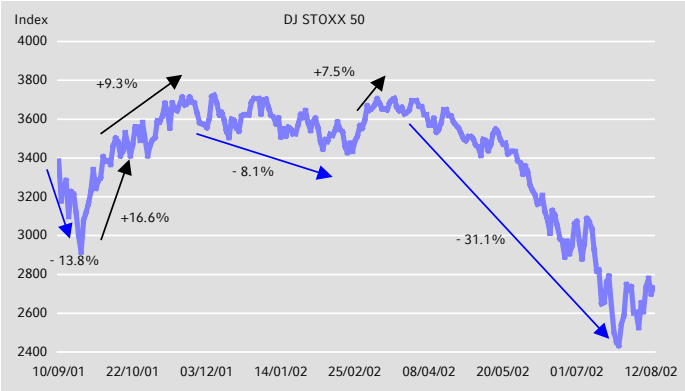
not believe that the high weighting given to pricing can be attributed to an ability to differentiate terrorism risks, but think it is more likely to be because the severe losses sustained on 11 September were used to implement undifferentiated price rises across the board. Risk selection occupies third place in the ranking of individual measures. This is likely to be driven by the exclusion of specific, particularly exposed and symbolic infrastructure objects (such as the WTC).

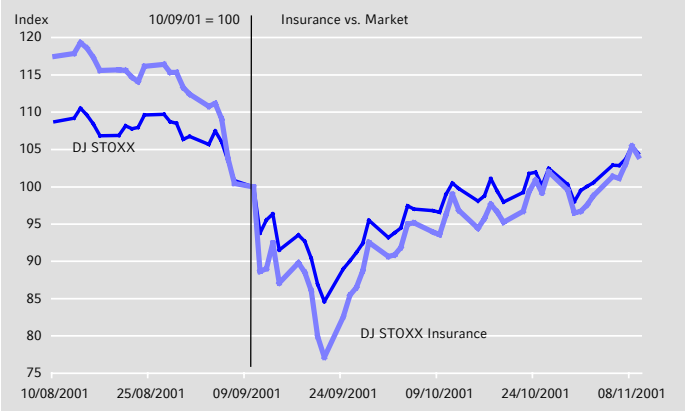
Terrorism risks and the capital investments side

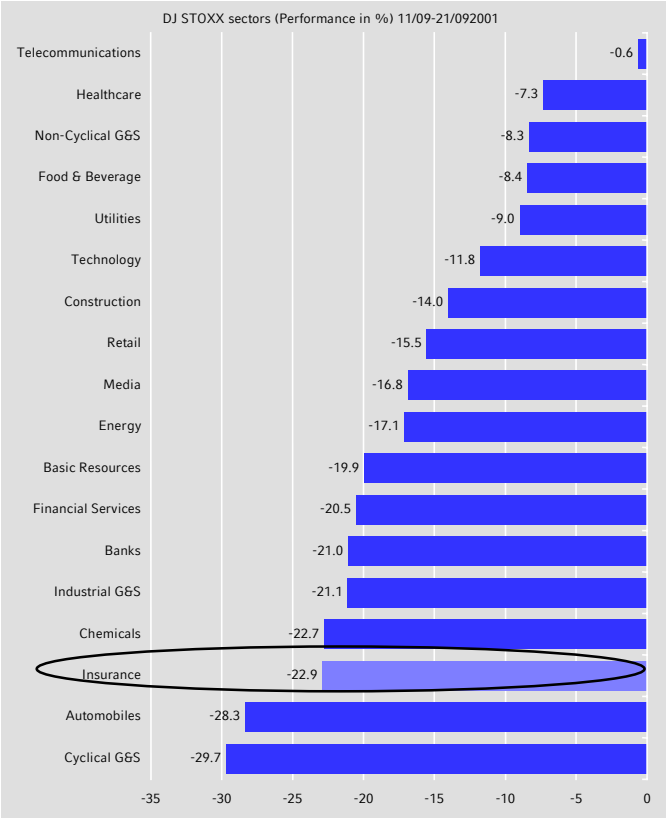
Terrorist attacks: herd instinct and market over-reaction come into play

Insurers are also affected by the risks associated with terrorism in their capacity as major institutional investors. The reaction to 11 September has revealed just how severe the potential impact on companies' market values can be. Such situations are often typified by herding and overreaction on the part of investors.

Performance after 11 September







Source Datastream, WestLB Equity Markets

Of course, the focus here is again on equities, although naturally corporate bonds may be affected too, as with climate change. As far as equities go, there are various factors at work: firstly, the pattern of overreaction indicates that performance can be greatly influenced by market timing.

Emotionally driven sector rotation also opens up opportunities

Secondly, with regard to sector allocation, it is worth noting that the same candidates bear the brunt of disasters such as 11 September time and again. These include airlines, tourism and, of course, insurers. As with the broad market, overreaction is a commonly observed pattern on the sectoral level too, with the respective implications for return opportunities.

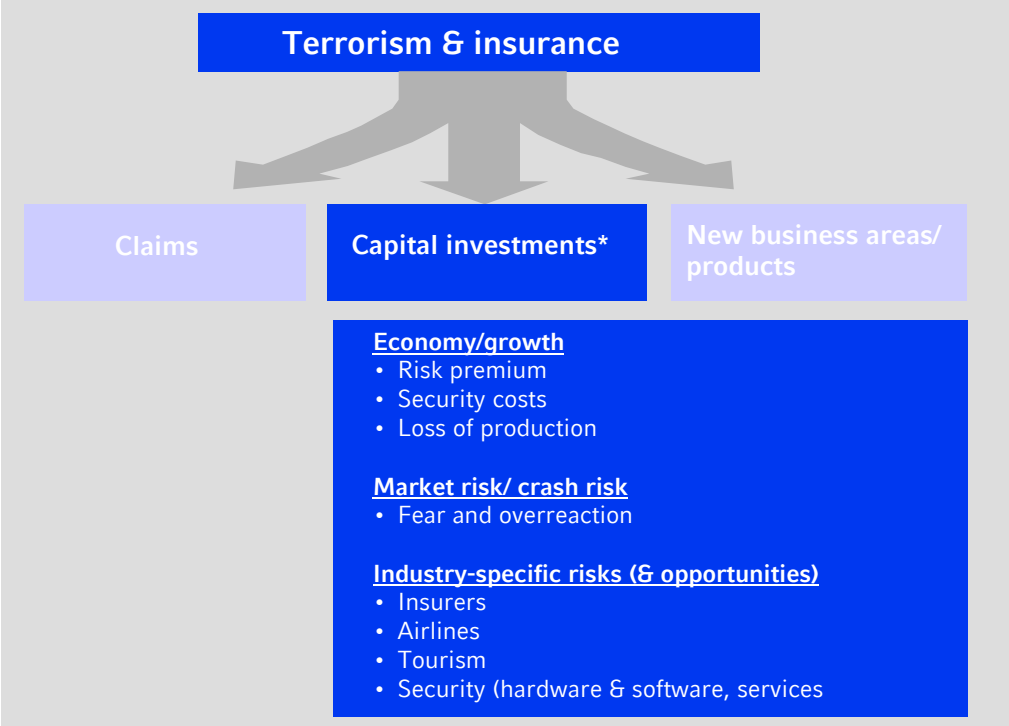
'Betting' on terrorist attacks ethically questionable

However, it is clearly not sufficient to look at these issues in purely economic terms only. No doubt, placing stock market bets based on events such as 9/11 is an ethically questionable behaviour. Similar reservations apply here as towards the 'terrorism futures market' described earlier. On the other hand, it is also indisputable that prices must also be given the chance to adjust to the altered external conditions to minimise disruptions to the overall economic situation. This is why we think it is right to halt trading straightaway, so as to end speculation and undue volatility. Equally though, exchanges should reopen just as soon as calm has been restored and investors are able to make financially sound decisions again.

Holistic management approach called for

Another important aspect for insurers to consider is the correlation between severe actuarial losses due to terrorism and the plummeting value of their equity portfolios. When it comes to terrorism risks, as with climate-related risks, insurers are well advised to take a holistic management approach. The diagram below provides an overview of the potential impact areas of terrorism risks on the value of insurers' equity and corporate bond portfolios.

Terrorism risks and their repercussions on the capital investments side

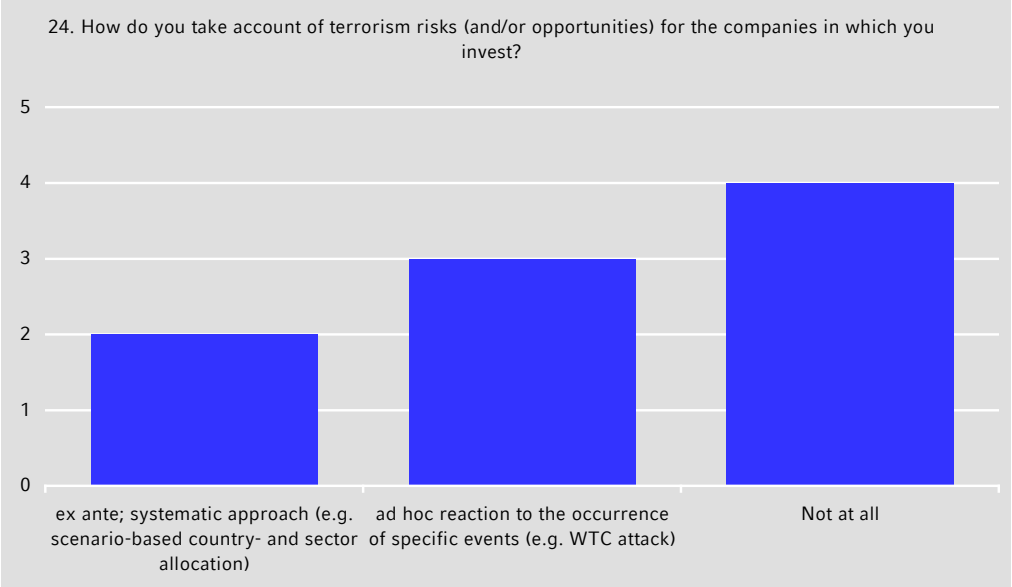


* the factors listed are those which may influence the market value and/or performance of insurers' investments

Source WestLB Equity Markets

One immediately striking finding of our poll (Question 24) was that the relative majority of companies evidently do not have a particular approach to managing terrorism risks on the investment side or do not see any point in responding proactively to their occurrence.

Survey – terrorism risks and capital investments



Source WestLB Equity Markets

Should companies take a systematic approach or maintain a 'calm hand'?

There are two conceivable reasons for this. One is that, for the ethical reasons outlined above, companies are declining to avail themselves of terror event-driven stock market bets. However, it may also be because they do not believe there would be any systematic benefits for them. At the end of the day, prices adapt extraordinarily quickly to changes in external parameters, so that a hasty reaction may have an adverse effect on performance (due to the pattern of overreaction mentioned above). So despite the undoubtedly huge pressure on institutional asset management to take a proactive stance, maintaining a 'calm hand' is possibly the better option. The three companies (including Swiss Re and Generali) that said they react in an ad-hoc manner to events such as 11 September evidently view the matter differently. The fact that two insurers (including RAS) claim to have a systematic approach in managing terrorism risks admittedly surprised us a little bit. It is not explained what this actually looks like. But one possibility would certainly be strategically underweighting sectors such as airlines and tourism.

New business areas and products

Fairly low impact on product side

The impact on the product side is on balance fairly low. What active role insurers could play, e.g. on the 'terrorism futures market' suggested by the US Department of Defense, is anybody's guess. As with emission rights trading, the basic idea is that insurers could be considered as market makers, arbitrageurs, and so on, by virtue of their superior expertise at dealing with risk. But the project has been put on ice after attracting massive criticism.

Increased efforts in consulting imaginable

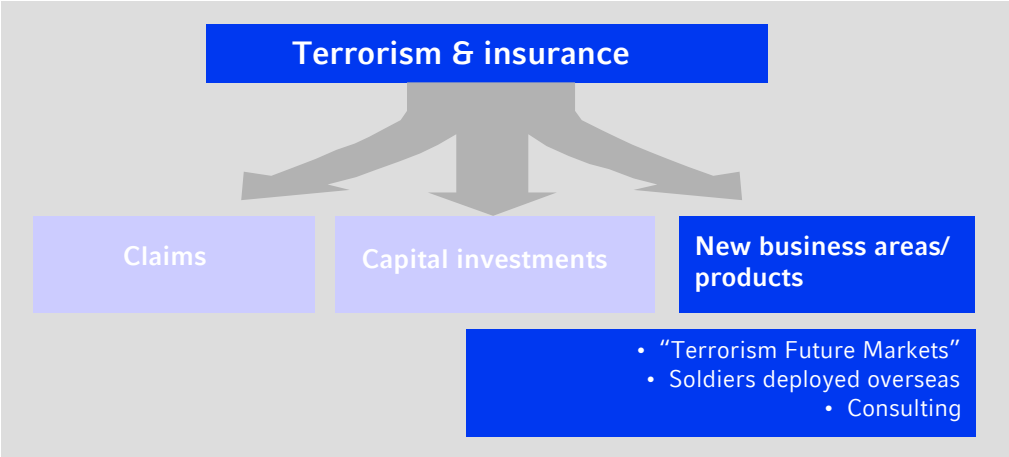
Increased efforts towards advising companies how to prevent or minimise risks of property damage through terrorist attacks are, however, perfectly conceivable. In Germany, for example, the newly created specialist insurance fund Extremus advises on protection against property damage and business interruption caused by terrorist attacks. But with gross written premiums of only just below €20m, Extremus AG is more of a small niche provider. We find it striking how far the risks of terrorism are still

considered manageable in Germany. If Extremus AG's gross written premiums remain so low, we would question the wisdom of the company's existence medium-term. Extremus was set up by Allianz, AIG Europe, AMB Generali, Swiss Re, Munich Re, HDI, Gerling, ZFS and others.

Need for special protection for military personnel

The terrorist attacks of 11 September have also led to military involvement in Afghanistan and Iraq. The USA's new doctrine is preventative military intervention – if necessary even without the support of the UN Security Council. Ultimately this policy means a higher number of military conflicts abroad. The current situation in Iraq also shows that military presence will by no means necessarily be brief and that there can be considerable loss of life and equipment even after the end of the actual engagement. This has undoubtedly given rise to an enormous need for special insurance protection for military personnel serving abroad.

Terrorism risks and the product side

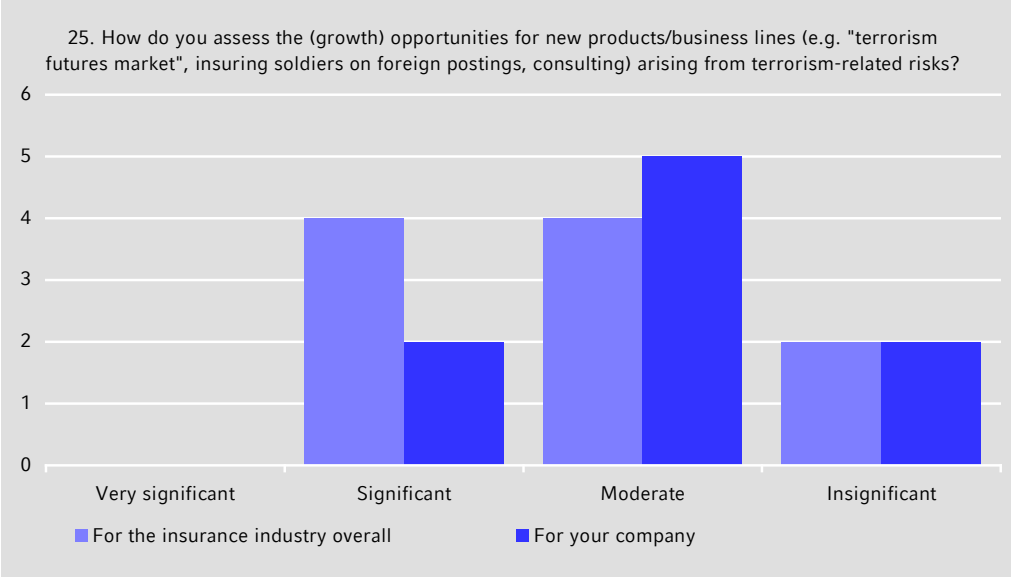


Source WestLB Equity Markets

Insurers see growth potential

Looking at the results of our survey, we notice that more than half the companies see growth opportunities for new products and/or business areas (Question 25). Nevertheless, respondents are again more inclined to ascribe significant upside potential to the market as a whole than to their own company. This could be because our sample was restricted to European insurers and the respondents saw US companies as having the greater opportunities. However, it could also simply be related to the conservatism bias, well known from behavioural economics. It is also interesting that the two insurers which indicated significant potential for their own firms were from Italy (RAS and Generali). This could be due to the terrorist attack on Italian soldiers in Iraq, which attracted a great deal of public attention.

Survey – terrorism risks and the product side



Source WestLB Equity Markets

Conclusion – insurers and terrorism risks

Parallels with climate change risks

On the claims side, there are many parallels with climate change, which is probably due to the special nature of irregularly occurring major loss events. However, the picture looks different for insurers' management of terrorism-induced risks. Here, the parallels to the gene tech topic clearly predominate. In both cases companies appear to be extremely uncertain and are having difficulty in arriving at differentiated assessments of risk. The result is that risk exclusion is the main tool used to manage terrorism risks. The parallels to gene technology are quite obvious here as well as the clear contrast to the climate change issue, where pricing, selection, and research prevailed.

Maintaining a 'calm hand' to be welcomed not just on performance considerations but also on ethical grounds

On the investment side it is noticeable that the insurers have apparently learnt from the experiences of 11 September, with the companies that indicated they reacted on a case-by-case basis to individual events in the minority. Taken together, the approaches of maintaining a 'calm hand' and a systematic approach towards management of terrorism risks predominate. We welcome this not just from performance considerations but also on ethical grounds.

Emerging markets – a sustainability nexus

When studying the emerging markets, a wide array of important sustainability issues come into play, such as globalisation, population growth, democratisation, terrorism and the health risks arising from epidemics (SARS, bird flu). The emerging markets also play a special role in climate change, both as a contributor to and a victim of this phenomenon. The proportion of global CO_2 emissions originating from the emerging markets is expected to increase considerably as a result of their well above-average economic growth and rising prosperity. One factor is the significant relationship between traffic density and per capita GDP, as demonstrated in a study by Tsinghua University in China (R^2 of 0.928).

Climate change: the proportion of global CO_2 emissions from the emerging markets will increase considerably

Imagine what the implications would be if traffic density in China were to reach the same levels as in western industrialised nations. Even if China's traffic density were to grow at a (seemingly quite realistic) rate of 6% p.a. up until 2030, the number of motorised vehicles (excluding motorcycles) would increase from approximately 18m at present to some 120m in 2030. If energy consumption per vehicle were to remain unchanged, this would mean that energy consumption in transport alone would increase to 363m t in 2030 – around five times the level for 2000. The Energy Information Administration is predicting that energy consumption for the whole of Asia (ex Japan) will increase from 85 quadrillion Btu in 2001 to 174.6 quadrillion Btu in 2025, and that CO_2 emissions will rise from 1.1bn t to 3.3bn t.

Global energy consumption and CO_2 emissions, 1990-2025E

Region	Energy consumption (quadrillion btu)				Carbon dioxide emissions (million metric tons)			
	1990	2001	2010E	2025E	1990	2001	2010E	2025E
Industrialized nations	182.8	211.5	240.1	288.3	2,844	3,179	3,572	4,346
Eastern Europe/Former Soviet Union	76.3	53.3	65.9	82.3	1,337	856	1,038	1,267
Developing nations								
Asia	52.5	85	110.1	174.6	1,089	1,640	2,075	3,263
Middle East	13.1	20.8	25	36	231	354	420	601
Africa	9.3	12.4	14.4	20	179	230	261	361
Central and South America	14.4	20.9	25.2	39	192	263	319	523
Total developing	**89.3**	**139.2**	**174.7**	**269.6**	**1,691**	**2,487**	**3,075**	**4,749**
Total world	**348.4**	**403.9**	**480.6**	**640.1**	**5,872**	**6,522**	**7,685**	**10,361**

Source Energy Information Administration (EIA)

Climate change: emerging markets will be particularly hard hit by abnormal weather conditions resulting from climate change

The emerging markets in East Asia are also among the regions that will be particularly hard hit by the abnormal weather conditions that are expected to result from climate change. Flooding, drought and tropical storms (cyclones) are the main causes of natural catastrophes in the tropical regions of Asia. According to the IPCC, the variability of precipitation during the Asian summer monsoon and the intensity of tropical cyclones are set to increase because of climate change. This – together with rising sea levels – means that lives and property in low-lying coastal regions of Southeast Asia will be at increasing risk from flooding, storms and landslides. Ten million people could stand to lose their homes (especially in Bangladesh and India). There is already an increased risk of severe drought in El Niño years in particular in India, Indonesia, Vietnam and the Philippines. The threat of tropical diseases such as malaria and dengue will also become greater as the environmental conditions for pathogens improve.

Above-average growth but also above-average risks

EM crises: knock-on effect due to highly integrated financial markets

The emerging markets are undoubtedly the world's fastest-growing region. However, it was painfully evident from the Asian crisis at the end of the 1990s and from Argentina's insolvency that the risks associated with them are disproportionately large. These countries remain very susceptible to financial crises, with far-reaching implications for the financial markets themselves, as well as for the real economy and the socio-economic environment. The impact of these crises often extends far beyond the borders of the countries initially affected. In a world which is growing ever closer – with internationally interconnected markets – knock-on effects can quickly occur. The highly integrated financial markets are clearly the main channel through which these effects are transmitted.

The main problem is the instability of public institutions

Institutions: the emerging markets are still lagging too far behind western industrialised nations

The main problem facing the emerging markets and the main source of the economic risks specific to these countries is the instability of their political systems and the inadequate quality of their public institutions and legal frameworks. Although significant progress has certainly been made in recent years, these countries are still lagging too far behind western industrialised nations. This was demonstrated by the findings of the Global Competitiveness Report 2003 published by the World Economic Forum.

Emerging markets – main problem is the inadequate quality of public institutions

	Public Institutions	Contracts and Law	Corruption		Public Institutions	Contracts and Law	Corruption
Argentina	88	99	65	Germany	9	9	10
Brazil	53	57	56	Finland	2	1	4
Bulgaria	62	92	35	France	23	27	23
China	52	60	50	Italy	46	49	47
Czech Rep.	47	61	41	Japan	30	38	21
Estonia	28	32	27	Canada	24	26	25
Hungary	33	39	28	Netherlands	11	11	11
India	55	35	80	Sweden	7	6	7
Indonesia	76	65	88	Switzerland	8	8	8
Korea	36	34	38	UK	12	10	12
Latvia	45	44	49	USA	17	17	24
Lithuania	41	58	34				
Malaysia	34	28	39				
Philippines	85	75	92				
Poland	58	66	53				
Rumania	86	83	90				
Russia	81	91	75				
Taiwan	21	24	19				
Thailand	37	30	45				
Turkey	63	52	69				
Ukraine	94	94	89				
Median	**53**	**58**	**50**	**Median**	**12**	**11**	**12**

Source World Economic Forum

World Economic Forum competitiveness rankings

The selected western industrialised nations rank significantly better in all three areas than the selected emerging markets, with a difference of around 40 points in the median. This means there is still a lot to do to further strengthen investor confidence. In the case

of Central and Eastern Europe, EU accession will certainly act as an important catalyst towards achieving this. This is also shown by the performance of the Baltic States, with Estonia, for example, having progressed to a level well above that of Italy, a G7 country.

EM-specific risks will tend to decrease

Increasing prosperity leads to a growing need for insurance

What will the future bring for the emerging markets? First of all, it is likely that many of the countries in this rather heterogeneous group will continue to achieve above-average growth. This is due in large part to the continuing global trend of outsourcing and of transferring production from industrialised nations to the emerging markets. The emerging markets will be the industrial societies of the 21st century. However, we are now also seeing that not only simple production jobs are being transferred, but also highly qualified positions in services (e.g. research and IT jobs going to India). The prosperity of the emerging markets will therefore continue to increase, and with it demand for insurance products and services. At the same time, the political, institutional and legal frameworks and their financial systems will stabilise further, and EM-specific risks will tend to decrease.

This scenario will, of course, bring attractive growth potential for insurers. This explains why it is hard to find internationally active insurance companies that do not have a significant presence in these markets. The guiding principle here seems to be: 'secure market share now and derive the benefits later'.

Insurers play a very important role in supporting the development process in the emerging markets, both as an investor and as a risk intermediary. The assumption and diversification of risks has a high economic value in emerging and rapidly growing systems which are not yet fully consolidated.

Sustainability issues: significant reputation risks for insurers

Insurers operating in the emerging markets have to expect to be confronted with certain sustainability requirements. Bribery and corruption, human rights, labour conditions, relations with local communities and environmental protection are issues that are monitored particularly closely by NGOs and sustainable investors. Insurers which do not have a clear corporate social responsibility concept and/or do not credibly put such a concept into practice – or are unable to communicate these efforts externally – may face considerable reputation risks in addition to the usual business risks. We asked companies about this as part of our survey:

- (Question 36) Is your company involved in any projects to support sustainable development in the emerging markets? If so, what are they?

Swiss Re is the only company to present a comprehensive list of sustainability projects in the emerging markets

Half of the companies surveyed did not provide any response or admitted that they do not support any projects. Three simply named a few individual projects as examples, including micro insurance in India, support for Life & Health in China and promotion for the Forest of Life project in Brazil. Swiss Re was the only company to provide us with a comprehensive list of the projects it supports and thus stood out once again in a positive light. It supports projects in various African, Asian and Latin American countries, including environmental projects, schemes to improve the water supply, climate change initiatives and humanitarian projects ranging from micro financing to the issues of HIV and ethnic integration.

Restrictions on capital investments

Investment regulations (congruence principle) restrict the investment of policyholders' funds

There are limited opportunities for insurers to share in the superior growth potential offered by the emerging markets through capital investments. This is not because investors do not want to seize these opportunities but rather that they are not allowed to. Investment regulations for insurers and, in particular, the so-called 'congruence' principle, restrict the amount of money that can be invested in the emerging markets. But, conversely, the congruence principle also implies that insurers can invest more in the capital markets of the emerging markets from the moment that they or their subsidiaries have generated sufficient income (insurance premiums) in these countries.

New products

We are, of course, also interested in whether there are any openings for new products reflecting the specific risks of the emerging markets. However, this appears to be the case to a limited extent only. The main demand is for the traditional range of property and personal insurance products, although there will of course be some differences in risk selection, risk exclusion and pricing. Here, the local considerations and risk profiles have to be taken into account.

The focus is on customised standard products

The legal framework conditions are the first aspect which has to be addressed. When creating personal insurance products, it makes a significant difference whether, for example, the legislator demands a refund guarantee for interest paid or even a minimum rate of return. In addition, life expectancy – and thus the pricing of life insurance and pension products – differs between countries. It should therefore be clear that we are not talking about new products here but about standard products that are customised in line with the specific national insurance parameters (mortality, minimum rate of return, sum insured, etc.).

Political risk insurance is an example of a truly new product

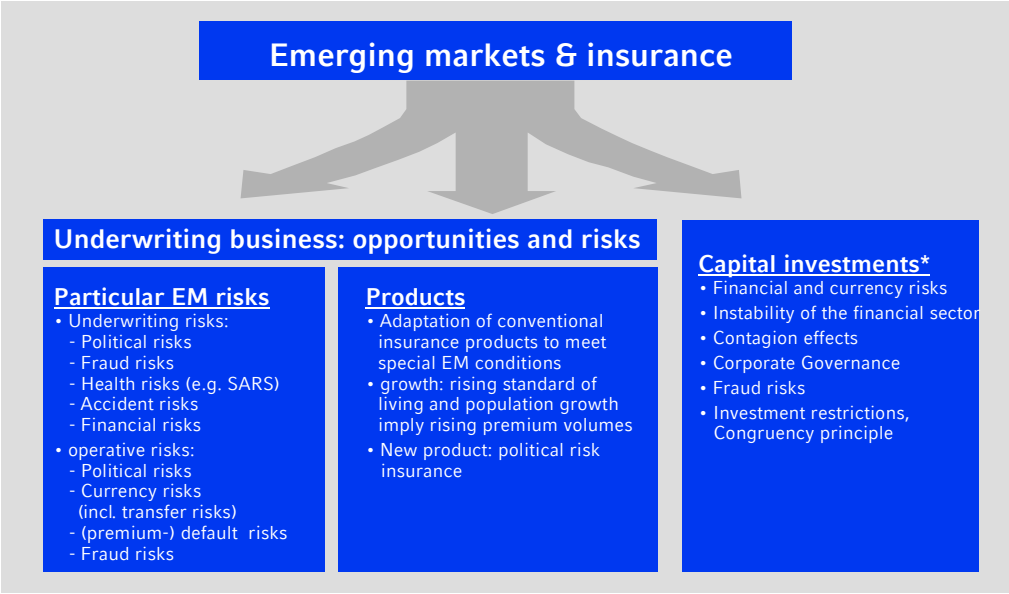
However, we must not forget to mention at least one truly new EM specific product here – political risk insurance (PRI) – although it is extremely uncertain whether this could really develop into something with significant market potential. A deal involving Zurich Emerging Markets Solutions (ZEMS) as underwriter and Brazil's third largest private bank, Unibanco, has recently attracted attention. ZEMS provided support for the launch of a $200m ten-year bond issue by the bank. In 2003, ZEMS also accompanied a bond issue by Brazil's largest drinks manufacturer, AmBev.

Political risk insurance provides companies with easier access to the capital markets

PRI provides companies with much easier access to the capital markets. Moody's rated the Unibanco bond Baa1, well above its overall B2 rating for Brazil. The Argentinian crisis made it much more difficult for companies in South America to raise capital. PRI policies, which include cover against convertibility and expropriation risks, may provide a solution to the financing dilemma and help to get the national economies of crisis-hit countries back on a more stable footing.

The chart below summarises the key issues relating to insurance companies and the emerging markets. Some aspects will be examined in greater detail below. We will then conclude with a review of our survey results.

Emerging markets – risks and opportunities for insurance companies



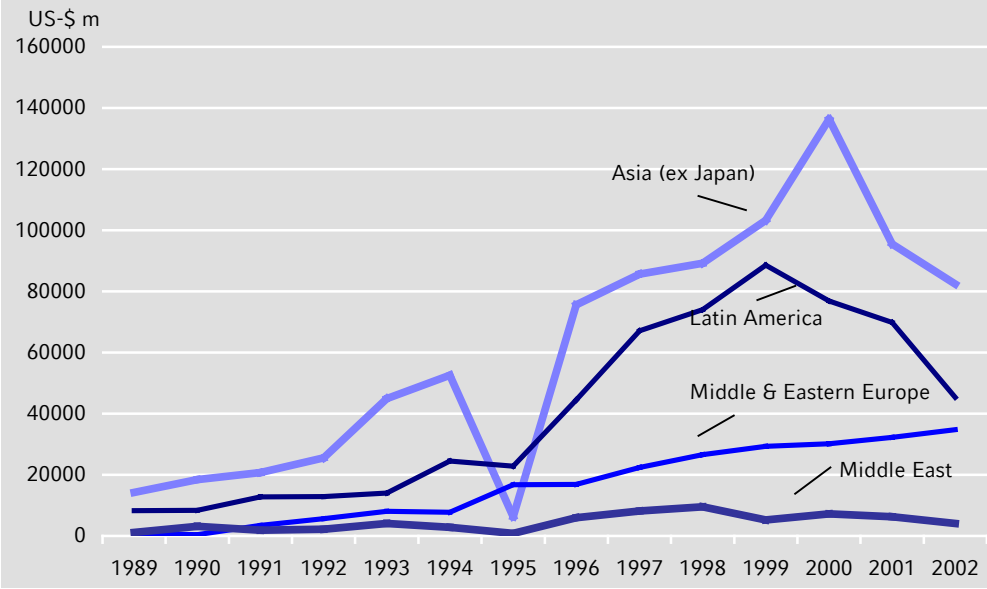
* the factors listed are those which may influence the market value and/or performance of insurers' capital investments

Source WestLB Equity Markets

En vogue again after the crisis

With the spread of globalisation, the emerging markets are attracting more and more attention from internationally active companies and investors. Since the start of the 1990s in particular, inflows of capital and direct investments have increased significantly, although they were severely impacted by the Asian crisis in the late 1990s.

Direct investments in selected regions



Source IMF

The growing strength of developing economies in Asia, Latin America and Central and Eastern Europe is stimulating demand for products and services, while the opening up of

the markets, along with international trade agreements and increasingly efficient and transparent capital markets, are providing improved access for companies and investors.

Two aspects of the emerging markets are of particular interest to insurance companies. Firstly, there is rising demand for insurance products as a result of growing prosperity and increasing trade. Secondly, there is the need to determine how attractive these countries really are as a place for capital investments. Once again, however, it is important to note that the industry-specific regulations are setting clear limits here.

High growth potential in the emerging markets

Ongoing liberalisation makes it easier for insurers to operate in these markets

According to Swiss Re, the average growth in both life and non-life insurance in the emerging markets during the 1990s was more than double that in industrialised nations. The increasing liberalisation of the insurance industry in the emerging markets is allowing or making it easier for insurers to operate there. Since the early 1990s, most Latin American and Central and Eastern European countries have begun to open up their insurance markets to foreign companies. In Asia, the liberalisation process began at the end of the 1990s, following the financial and economic crisis.

Industrial insurance is a way into the market

Industrial insurance, in particular, has a key role to play in the opening up of new markets. It is required by the globally active companies entering these emerging markets and often results in primary insurers following their clients into these markets. Demand for additional insurance products and services has also grown significantly in recent years. The expertise of foreign life and health insurers is greatly sought after, particularly in Central and Eastern Europe and Latin America, where privatisation of the social security systems has created a need for a wide variety of life, health and accident insurance products. As a result, foreign insurers hold a particularly large share of the market in these countries.

Emerging markets offer an alternative to insurers' saturated domestic markets

Another factor is that the EU is a saturated insurance market that generates part of its growth simply through premium increases (in particular, life insurers are currently benefiting from the growing percentage of elderly people in society and the greater need for pension provision). The prospect of large growth opportunities, coupled with the fact that many insurers' domestic markets are to some extent saturated, especially in the non-life business, is prompting globally active companies to look around for new market opportunities abroad. They hope to generate growth opportunities in the long term by rapidly securing market share. An example of this is the US insurer AIG, which operates in almost all of the countries of Eastern Europe. According to Swiss Re, almost half of the premiums earned by foreign companies in the emerging markets at the beginning of 2000 went to some of the world's largest insurers.

For companies operating at a regional level, neighbouring markets or those with which there are historical ties are also attractive. For example, many Austrian insurers operate in Central and Eastern Europe; US and Spanish firms have a strong presence in Central and Latin America; and Japanese insurers are sounding out the Asian markets.

Premium income has so far been minimal

In addition to opportunities for growth, other issues which globally active insurance companies take into account are aspects of risk diversification and the exploitation of economies of scale and superior expertise. However, they must also determine the degree to which products, services and distribution channels will need to be adapted to

the specific conditions and cultural differences of these markets – which is a further cost factor. In other words, insurers must ascertain the extent to which economies of scale can really be generated. If we look at the total premium income of European insurers, we see that their level of activity in the emerging markets is still very limited.

Emerging markets – gross domestic product, inflation and current account

	GDP Change in %			CPI Change in %			CA balance/GDP in %		
	2002A	2003E	2004E	2002A	2003E	2004E	2002A	2003E	2004E
Latin America									
Argentina	-10.9	5.8	4.0	25.9	13.7	6.3	9.6	6.4	4.1
Brazil	1.5	1.1	3.7	8.4	14.8	6.7	-1.7	0.0	-1.3
Mexico	0.9	1.2	4.1	5.0	4.6	4.3	-2.3	-1.7	-2.8
Asia									
China	8.0	8.0	8.0	-0.5	0.5	1.0	2.0	1.6	1.7
South Korea	6.3	3.0	4.0	3.4	3.2	3.0	1.3	0.4	0.3
Malaysia	5.2	5.0	5.0	0.6	1.8	1.8	6.0	5.2	4.9
Philippines	4.6	3.5	4.0	3.4	3.5	3.8	5.4	6.0	5.0
Thailand	4.2	4.5	4.8	1.8	1.2	1.7	6.4	8.7	7.2
Central and Eastern Europe									
Poland	1.3	2.9	4.5	1.9	0.7	1.5	-2.8	-3.1	4
Russia	4.3	6.3	5.5	16.0	13.8	11.8	9.7	7.1	3.1
Czech Republic	2.0	2.5	3.0	1.9	1.0	2.0	-6.5	-5.3	-4.7
Hungary	3.2	2.8	3.3	5.3	4.5	6.5	-4.2	-5.6	-4.0
Turkey	7.8	5.4	3.7	45.0	23.5	15.5	-0.9	-2.6	-1.3

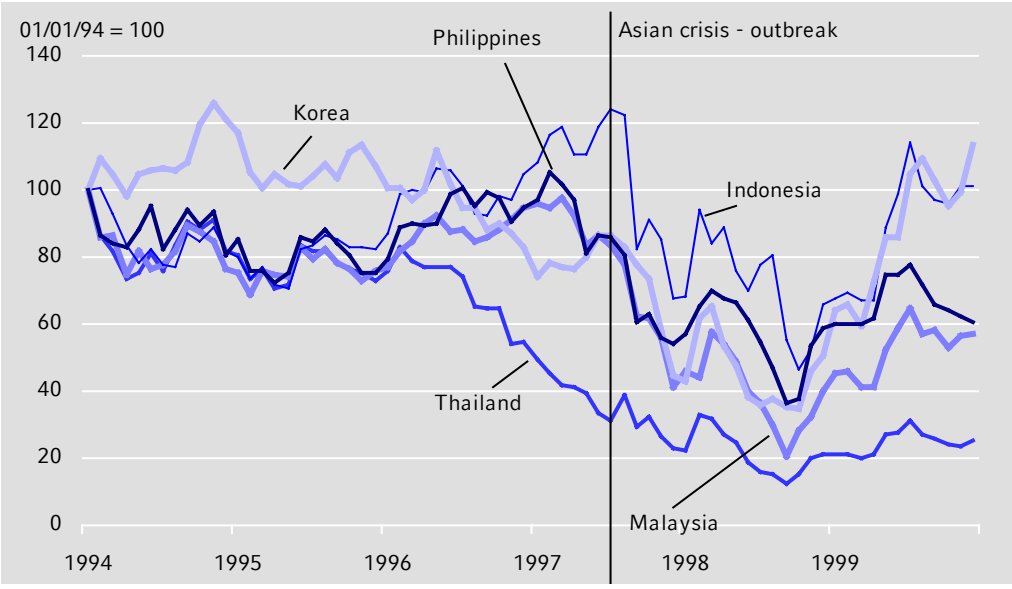
GDP: gross domestic product; CPI: consumer price index; CA: current account

Source WestLB, EIU

Risk of financial crises

The recent financial crises in Argentina and Venezuela have demonstrated that the emerging markets are still very susceptible to economic shocks. As with similar crises in the 1990s (the Mexican 'Tequila Crisis' in 1994/95 and the Asian crisis in 1997/98), they were accompanied by currency collapses, stock market crashes and sharp downturns in economic performance.

Asian crisis – stock markets in Southeast Asia



Source Datastream

EM crises: knock-on effects threaten financial markets worldwide

The repercussions of these crises are seldom restricted to the region in question, with the knock-on effects often impacting neighbouring areas. Depending on the state of the global economy and financial market conditions, these crises may also pose a serious threat to financial markets worldwide. At the beginning of the Argentinean crisis, for example, the global economy was itself on the verge of recession and market risk aversion had increased enormously after the TMT bubble burst. This meant the markets reacted particularly nervously to the crisis.

Various risks relating to the assets and the liabilities sides of insurers' economic balance sheets

Financial crises such as these entail many kinds of risk for the insurance industry. Firstly, demand for insurance products and services falls, new business declines and corporate insolvencies also impact premium income. Secondly, claims become more expensive due to the significantly increasing prices. While this usually occurs immediately, there is a delay before insurance premia can be adapted to the new price levels. On the liabilities side, this sort of price increase also makes it necessary for insurers to record higher provisions. At the same time, stock market crashes and rising interest rates lead to losses on the investment side. Insurers are accordingly faced with a growing solvency risk. An asset/liability mismatch can have an additional negative impact on solvency.

Risk management measures

Insurers operating in these markets have to be aware of the potential risks and volatilities and must adapt their products and risk provisioning accordingly. Suitable measures include shortening the terms of policies, linking investments to inflation, strictly reviewing claims and using stability clauses in the reinsurance business and life insurance products which transfer part of the investment risk to the policyholder.

Overview of risks in emerging markets

	Risk evaluation*		General risk indicators**			RER vs. US$	Main risk factors
	Moody's	S&P	TFD/GDP %	DS/Exp %	STFD/IRES %	Real overvaluation	
Countries	Current	Current	2004E	2004E	2004E		
EM/Latin America							
Argentina	Ca	DS	50.2	75.4	80.0	X	Reforms, debt servicing
Brazil	B1	BB	47.3	78.1	45.0	X	Reforms
Mexico	Baa1	A-	23.7	15.0	32.5		Reforms
EM/Asia							
South Korea	A3	A+	24.8	8.3	35.9		
Malaysia	A3	A+	46.3	6.5	21.0		
Philippines	Baa3	BBB	76.1	20.1	39.6		Internal security, budget deficit
Thailand	Baa1	A	38.2	`12.8	30.2		
EM/Central and Eastern Europe							
Poland	A2	A-	37.0	26.8	29.1		Budget deficit
Russia	Baa3	BB+	35.1	13.4	37.1		Reforms
Czech Republic	A1	AA-	32.2	7.7	43.4		Budget deficit
Hungary	A1	A+	39.5	16.4	49.3		Budget deficit
Turkey	B3	B+	43.3	59.2	47.0	X	Reforms

* long-term government bond in local currency; ** the underlying data in US dollars

TFD: total foreign debt
GDP: gross domestic product
DS: debt servicing for foreign debt
Exp.: exports

STFD: short-term foreign debt
IRES: international reserves
RER: real exchange rates

Source Bloomberg, WestLB Equity Markets

Definition of risk classes

Indicator	Criterion	Risk
Total foreign debt/gross domestic product (%)	Less than 50%	Low risk
Total debt servicing/exports (%)	Less than 20%	Low risk
Short-term foreign debt/international reserves (%)	Less than 75%	Low risk
Real exchange rates	Overvaluation exceeding 20%	Devaluation

Source WestLB Equity Markets

Emerging markets – an attractive investment for insurers?

Legal restrictions on investments

The opportunities and risks for EU insurance companies resulting from pure portfolio investments in the emerging markets are limited due to regulatory requirements. (We have described this in a rudimentary way above.) The so-called 'opening clause' limits the use of investments in markets outside the EU to 5% or 7.5% of the total amount of capital invested. Under the EU directive on insurance investments, these limits may only be exceeded if a perfect foreign exchange and interest rate hedge is in place. In view of the high risk of volatility, as well as the fact that financial markets are often not sufficiently developed in the emerging markets, perfect hedges cannot usually be achieved.

Congruence principle

This regulation is based on the congruence principle, a basic insurance principle that applies almost globally. A major reason for this is the fact that actuarial risks should not be multiplied with external risks. Policyholders also have no choice in this matter. It is solely in the case of unit-linked life insurance products – as opposed to capital sum life insurance – that the policyholder has the theoretical option of selecting the investment. Insurers who offer policyholders a selection of funds are thus providing an opportunity to invest in the emerging markets. With this unit-linked insurance, however, the investment risk is transferred fully to the policyholder. This is one of the reasons why under IAS/IFRS, contributions from the unit-linked life insurance business cannot be recorded as insurance contributions and are treated as a pure savings product.

Insurers want to secure their market share as early as possible

In order to be able to participate more significantly in the EM's capital markets, insurers must gather insurance contributions in these countries. These contributions can then be reinvested locally under the congruence principle. As a result of the strong economic growth, increasing prosperity and the subsequent marked increase in demand for insurance products and services in these countries, the insurer's assets under management there will grow significantly. More 'local money' will then flow into the capital markets and will ultimately provide for greater stability. This will also benefit external investors. The large, internationally active insurance companies already have an extensive presence, with subsidiaries in many emerging markets. The idea is that companies which secure market share now may derive enormous benefits later.

Branches in emerging and other markets

Aegon	AGF	Allianz	AXA	Converium	Generali	Hannover Re	Munich Re	SCOR	Skandia	Swiss Re	ZFS
Hungary	Argentina	Argentina	China	Argentina	Argentina	China	Argentina	Brazil	China	Argentina	None
	Brazil	Brazil	Philippines	Brazil	Brazil	Malaysia	Brazil	Malaysia	Mexico	Brazil	
	Malaysia	China	South Korea	Malaysia	Czech Republic	Mexico	China	Mexico	Poland	China	
	Mexico	Czech Republic	Thailand	Mexico	Hungary	South Korea	Czech Republic	Russia		Mexico	
	Poland	Malaysia	Turkey		Mexico		Malaysia			Poland	
	Russia	Mexico			Philippines		Poland			Russia	
	Slovakia	Philippines			Poland		Russia			South Korea	
	Thailand	Poland			Slovakia		Slovakia				
	Turkey	Russia			Turkey		South Korea				
		Slovakia					Thailand				
		South Korea									
		Thailand									
		Turkey									
		Hungary									
Activities in other markets											
	Chile	Bulgaria	Indonesia		Colombia		Bulgaria	Colombia	Chile	Various African countries	Chile
	Colombia	Chile	Morocco		Ecuador		Chile	Ivory Coast	Colombia	others	
	Cyprus	Colombia			Guatemala		Estonia		Cyprus		
	Indonesia	Croatia			Israel		Israel				
	Laos	Cyprus			Peru		Jordan				
	Lebanon	Indonesia			Romania		Latvia				
	Morocco	Laos			Slovenia		Lithuania				
	Tunisia	Lebanon					Venezuela				
	Various African countries	Pakistan									
	Venezuela	Romania									
		Various African countries									
		Venezuela									
		Vietnam									

Source Companies

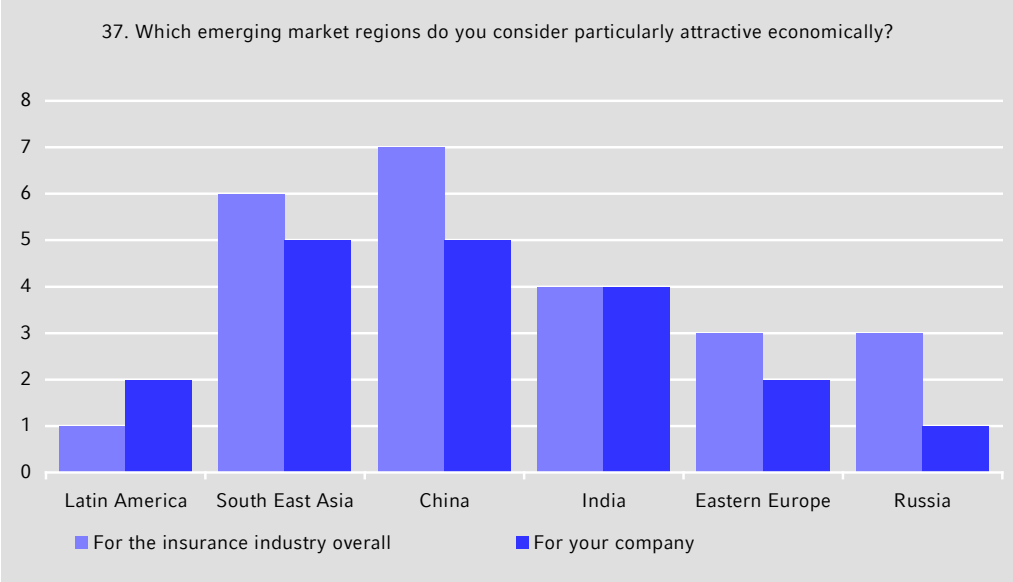
Survey results

We asked the companies surveyed how they rate the opportunities and risks in the emerging markets and where they see business potential.

Asia and China are ahead of Eastern Europe

We will start by looking at the markets which the companies considered particularly attractive (Question 37). The result was unequivocal. Insurers see by far the greatest growth potential in Asia, particularly in China. The factors which make these markets appear so attractive are population size and growth in conjunction with economic growth. Other regions lag far behind by comparison. What is surprising is that Eastern Europe is rated relatively cautiously, despite the fact that our survey is targeted exclusively at European insurers. We would have expected rather more enthusiasm in view of the EU's imminent eastward enlargement and high growth, e.g. in Russia. One aspect which may cause insurers concern about Russia is doubts about the progress of democratisation (e.g. with regard to the freedom of the press) and about the country's legal security, which have come increasingly to the fore in recent times.

Survey – emerging markets and how they're seen by the insurance industry*



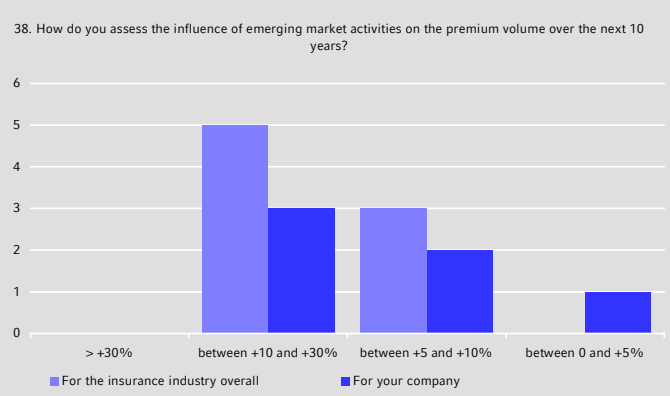
* More than one answer could be given.

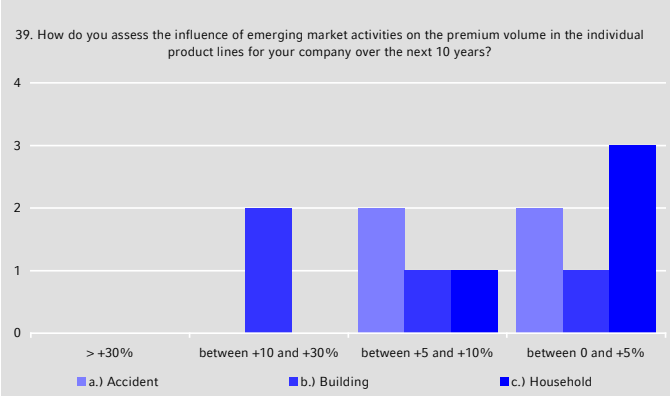
Source WestLB Equity Markets

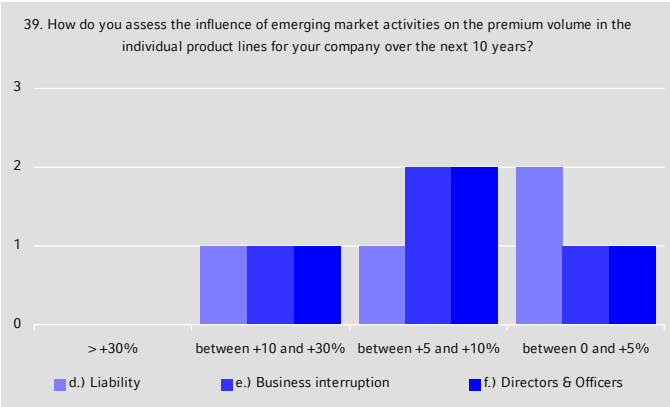
The majority of companies anticipate a significant impact on premium volumes

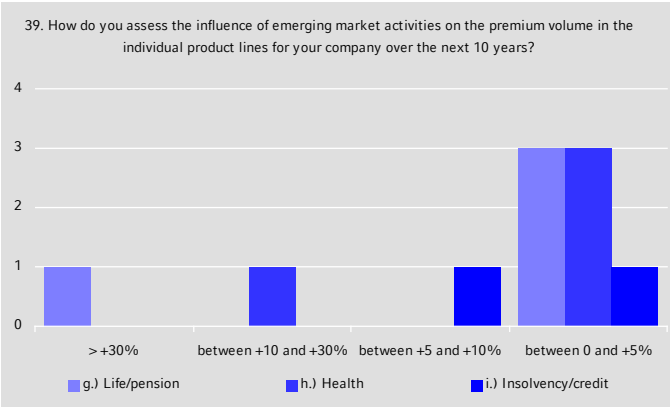
When evaluating the future importance of the emerging markets for the insurance industry, the first striking aspect is the fact that the majority of companies anticipate that these markets will have a significant impact on premium volumes (Question 38). This applies to the significance of the emerging markets perceived for the entire industry as well as the significance perceived for their own company. However, there are again substantial divergences between the industry and the individual company views. Some companies tend to place more confidence in the market than in themselves. Unfortunately, the results of our survey do not indicate whether – as in the case of terror risks – this is attributable to the fact that insurers from the US or Japan, for example, are accorded competitive advantages if they operate in Asia. An alternative explanation would be the conservatism bias known from behavioural economics.

Survey – emerging markets and the underwriting business









Source WestLB Equity Markets

Personal insurance viewed as offering low potential

Looking at the individual product areas reveals that personal insurance (life/pension and health) in particular is considered to have low potential (Question 39), which admittedly came as something of a surprise. After all, the demand for personal insurance may grow sharply in view of the fast-rising prosperity in many Asian economies. The only company not to share the view that there is low potential is Generali, which expects the emerging markets to contribute over 30% of the future premium volume in the life/pension segment. The company's optimism may be related to the fact that China recently granted it a licence to operate in the Beijing region.

Cautious attitude prevails

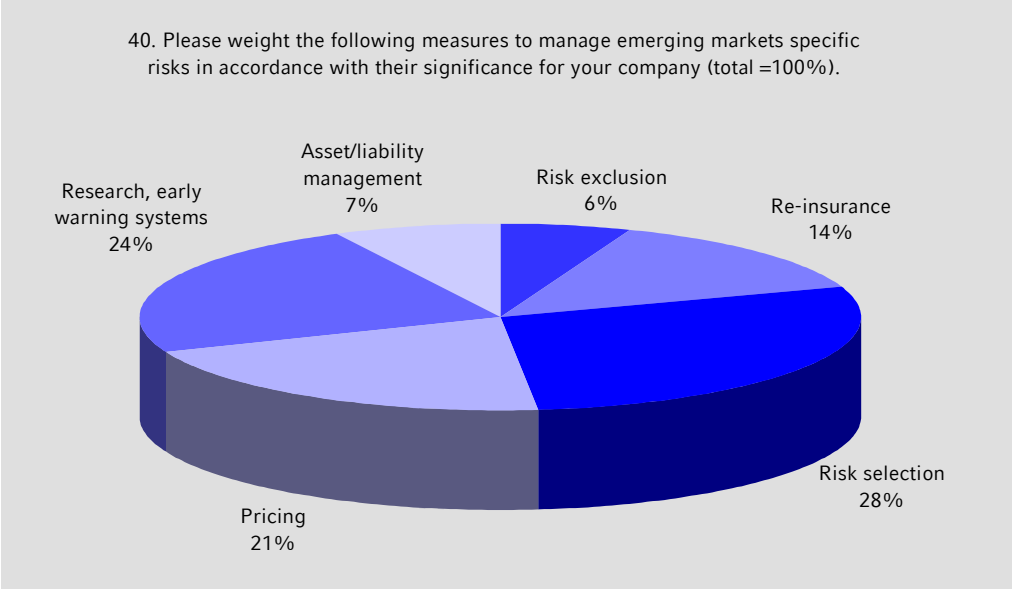
The survey otherwise provided a very mixed picture. The main emphasis of answers lies in the 'low growth' area, which is in line with the responses to the questions about the general importance of emerging markets for their own company. The message once again is: "yes to growth, but please don't expect too much of my company". The insurers clearly adopted a cautious approach here.

Risk exclusion is considered to be of low importance

We will discuss below which measures can be implemented in managing the specific risks related to the emerging markets (Question 40). Compared to the other topics, there is one issue here which is particularly striking: the exceptionally low importance assigned to risk exclusion (only 6% on average). This may be attributable firstly to the high growth potential associated with the emerging markets. Secondly, there may be a prevailing sentiment amongst the companies that they have the risks of the emerging markets firmly under control. This is also suggested by the comparatively high

importance assigned to research, pricing and selection. Being optimally informed about local operating conditions is obviously also regarded as a decisive factor for success. This interpretation is supported by the responses to Question 42. It is also noticeable that reinsurance is assigned greater importance here than for the other topics. Asset and liability management are considered less important, which is somewhat surprising given the high correlation between investments and the underwriting business in the emerging markets (e.g. the Asian crisis at the end of the 1990s).

Survey – emerging markets and the underwriting business*



* N = 5

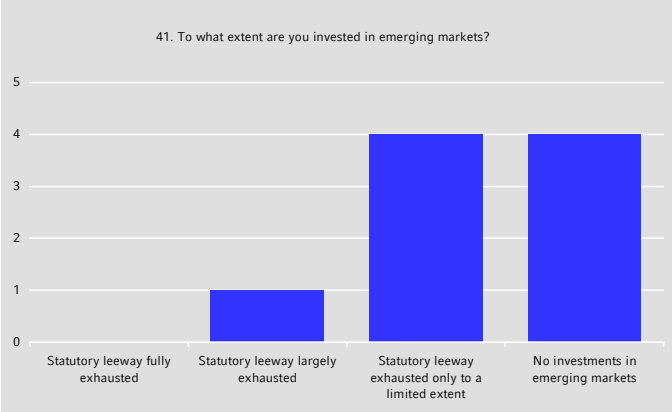
Source WestLB Equity Markets

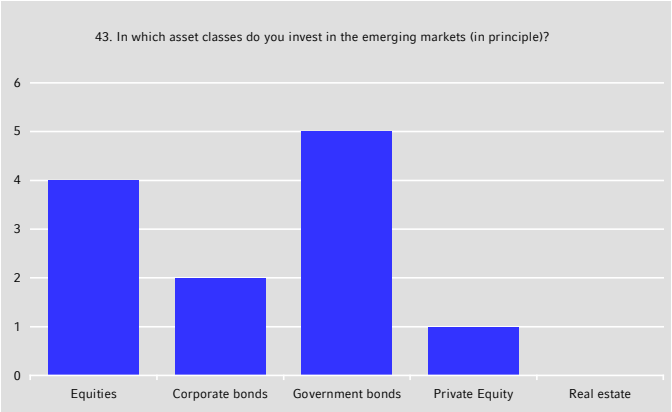
Legal scope for investments is far from exhausted

When it comes to investments, it is astonishing at first to see how little insurers have invested in the emerging markets (Question 41). This may be attributable to bad experiences during the Asian crisis at the end of the 1990s and to Argentina's collapse, which has not yet been forgotten. All of the early warning mechanisms failed here, including the rating agencies. Insurers may therefore still be thinking 'once bitten, twice shy'. This may be comprehensible in emotional terms but – given the high growth potential (particularly in Asia) identified by the companies themselves – is incomprehensible from a strategic perspective.

In respect of our question about exhausting the legal scope for investments, it should be noted that no such legal regulations currently apply to pure reinsurers. However, that will change this year, when the regulation of the insurance industry extends to include them. The responses from reinsurers should therefore be interpreted as if these regulations were already in effect.

Survey – emerging markets and capital investments*





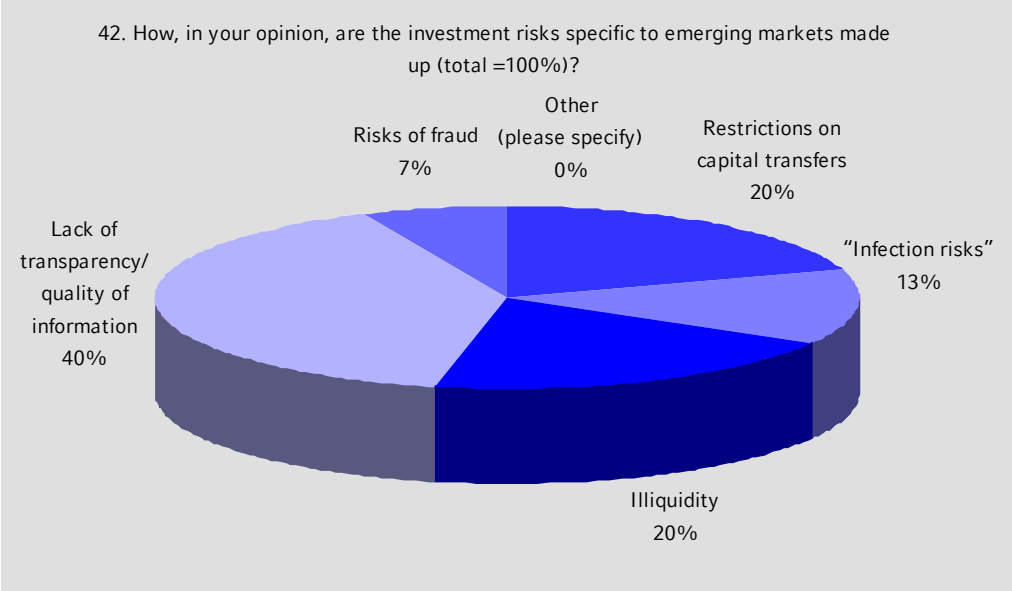
* More than one answer could be given to Question 43.

Source WestLB Equity Markets

Emphasis on government bonds and shares

The companies surveyed invested in all of the asset classes defined by us except for real estate (Question 43). The main emphasis was on government bonds and equities. The fact that corporate bonds fared relatively badly may be due to their strong correlation with shares. The two asset classes may well be regarded as substitutes for one another, especially when evaluating downside risks. Given that equities have unlimited upside potential, their opportunity/risk profile is evidently considered more attractive. If we look at the individual insurers, we can see that Swiss Re is the only company to invest in all investment classes (excluding real estate).

Survey – emerging markets and capital investments*



* The question was explicitly about weighting on % (sum = 100%); thus, the chart reflects the average weightings attributed to the single measurements * N = 3

Source WestLB Equity Markets

Conclusion – insurance and emerging markets

Emerging markets offer significant opportunities for the insurance industry

The emerging markets will offer significant opportunities for the insurance industry in the next ten years, according to the results of our survey of European insurance companies. The typical response was that insurers see more opportunities for the industry as a whole than for their own companies. This could be related to the fact that

the survey sample was limited to European companies and that they believe that their competitors from the US and/or Japan insurers are better positioned to exploit the existing opportunities.

Southeast Asia and China are considered the most attractive regions despite the EU's eastward enlargement

There was a clear consensus that Southeast Asia and China are the most attractive regions. The only factor reflecting the impact of the Asian crisis in the late 1990s is the low level of the insurers' capital investments in this region. While the legal scope for investments is limited, it is still far from being exhausted. It is quite surprising that insurers are not too excited about the growth potential in Eastern Europe despite the EU's imminent enlargement and strong growth, e.g. in Russia. This could be related to faltering democratisation in Russia and to the persistence of considerable legal uncertainty in the country.

Transparency, information quality and research play a particularly important role

In terms of both the underwriting business and capital investments, the responses clearly demonstrate that transparency, information quality and research play a particularly important role when managing the risks specific to the emerging markets. The product range will scarcely differ from that in the more mature industrialised nations. The focus is on the generally high market potential, driven by population growth and increasing prosperity.

Company profiles

Company profiles

Closing prices as of 23 February 2004

Aegon

Key data

Relative	1m	3m	12m
In %	-5.5	+2.4	-14.3

12 month price range	€5.87-€12.98
Rating	UNDERPERFORM
Target price	€12.2
Price target	€11
No. shares in issue	1,444.6m
Free float	88.31%
Market cap.	€17,624m
Reuters-code	AEGN.AS
Bloomberg-code	AGN NA
DJ STOXX	243.662

Sustainability rating: A+

Company Name	Total score	Governance	Environment	Products
Aegon	0.85	1.0	0.5	-0.2
Average	-0.24	0.01	-0.51	-0.25

Sustainability indices: DJSI EURO STOXX, DJSI EURO STOXX ex. Alcohol, Tobacco, Gambling, Armaments & Firearms, DJSI STOXX, DJSI STOXX ex Alcohol, Gambling, Armaments & Firearms, DJSI World, FTSE4GOOD Europe Index, FTSE4GOOD Global Index, Humanix 175 Europe, Humanix 200 Global

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

In our view, Aegon is suffering more from lower interest rates and spreads than other competitors. While corporate bond spreads remain very low, making it difficult to sell fixed annuities at a decent price, VA sales are suffering from tax changes (mutual funds are benefiting now from tax relief on dividends, variable annuities are not). Aegon's competitors have reacted by giving minimum income benefits. Aegon stopped this practice earlier last year, causing a 51% slump in VA sales. While Aegon is again earning 225bp margin on fixed annuity products, it is being beaten by US competitors (like AIG) that offer better crediting rates. This has caused the loss of some relationships with banks. Direct marketing, one of Aegon's stars, which contributes 20-25% of Aegon's US sales, is suffering from the US 'no-call list' initiative. Around 45% of all Americans have applied not to be called any longer, which affects around 8% of Aegon's US business. Overall, we feel that there is a certain wait-and-see attitude towards Aegon USA, while more attention is being devoted towards smaller markets, like Taiwan. We remain sceptical for the time being.

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AGF

Sustainability Rating: A

Key data

Relative	1m	3m	12m
In %	+5.5	+13.8	+44.8

12 month price range	€21.27-€52.7
Rating	NEUTRAL
Target price	€52.6
Price target	€50
No. shares in issue	169.1m
Free float	33.2%
Market cap.	€8,896m
Reuters-code	AGFP.PA
Bloomberg-code	AGF FP
DJ STOXX	243.662

Company Name	Total score	Governance	Environment	Products
AGF	0.46	0.8	-0.2	-0.2
Average	-0.24	0.01	-0.51	-0.25

Sustainability indices: ASPI - Advanced Sustainable Performance Indices, DJSI EURO STOXX, DJSI EURO STOXX ex. Alcohol, Tobacco, Gambling, Armaments & Firearms, DJSI STOXX, DJSI STOXX ex Alcohol, Gambling, Armaments & Firearms

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

The preliminary sales figures exceeded expectations by 3% with the life insurance business increasing by 3.6% and the non-life business up 7.4%. Overall, the company hopes to free up capital in the range of €600m (around 7% of its total allocated capital) by focusing on its core operations, reducing investment risks and deconsolidating its banking exposure. In the overall context of AGF's plans to increase profitability in the medium term, we regard the measures taken as important steps.

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AMB Generali

Sustainability Rating: B+

Key data

Relative	1m	3m	12m
In %	-2.0	+1.4	+3.3

12 month price range	€31.24-€68.89
Rating	OUTPERFORM
Closing price	€64
Price target	€68
No. shares in issue	53.6m
Free float	25.3%
Market cap.	€3,432m
Reuters-code	AMBG.F
Bloomberg-code	AMB2 GR
DJ STOXX	243.662

Company Name	Total score	Governance	Environment	Products
AMB Generali Holding	-1.08	-0.8	-1.2	-0.2
Average	-0.24	0.01	-0.51	-0.25

Sustainability indices: FTSE4GOOD Europe Index, FTSE4GOOD Global Index

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

Allianz sold the 9.5% (5.1m shares) stake in AMB over the market. The free-float increased from 25.5% to 35%, which should make AMB more interesting for investors. In our view it is good news that the market absorbed more than 5m shares, with the AMB share losing only €1. Against the background of an expectation of a slightly positive 2003 result on 11 March, we have increased the target price from €66 to €68.

As Standard & Poor's has confirmed its 'AA' rating (negative outlook) for AM Life Insurance and AM Insurance (non-life), AMB Generali has once again proven that the company and its subsidiaries belong to the financially most strong, most solid insurance group in Europe, namely Generali.

For the full year 2003, we expect a positive net profit of €18m or EPS of €0.34. Following the tax burdens in 2001-2003, we expect the current financial year to generate more positive results again. Our estimate of €289m is slightly below the target of €300m.

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Alleanza

Key data

Relative	1m	3m	12m
In %	-0.9	+0.3	-11.1

12 month price range	€6.48-€9.57
Rating	NEUTRAL
Closing price	€9.51
Price target	€9.60
No. shares in issue	846.3m
Free float	52.7%
Market cap.	€8,048m
Reuters-code	ALZI.MI
Bloomberg-code	AL IM
DJ STOXX	243.662

Sustainability rating: B+

Company Name	Total score	Governance	Environment	Products
Alleanza Assicurazioni	-1.14	-0.8	-1.3	-0.2
Average	-0.24	0.01	-0.51	-0.25
Sustainability indices: Humanix 175 Europe				

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

The solidity of Alleanza's results has been proven again with the Q3 result. Whilst the consensus estimated a rise of +69% in net profit to €287m, we estimated +71% to €291m and Alleanza reported a rise of +75% to €298m. This reflects the strong operational business and stronger investment income, in our view. For valuation reasons, we are downgrading the stock from outperform to Neutral because we believe the share price only offers 8% upside potential. For 2003 we expect a net profit of around €370m.

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Allianz

Key data

Relative	1m	3m	12m
In %	-7.3	+6.5	+27.1

12 month price range	€41.09-€110.8
Rating	OUTPERFORM
Closing price	€105.2
Price target	€120
No. shares in issue	304.9m
Free float	87.8%
Market cap.	€32,075m
Reuters-code	ALVG.F
Bloomberg-code	ALV GR
DJ STOXX	243.662

Sustainability Rating: A+

Company Name	Total score	Governance	Environment	Products
Allianz	0.52	0.8	0.0	-0.5
Average	-0.24	0.01	-0.51	-0.25
Sustainability indices: ASPI – Advanced Sustainable Performance Indices, DJSI EURO STOXX, DJSI EURO STOXX ex. Alcohol, Tobacco, Gambling, Armaments & Firearms, DJSI STOXX, DJSI STOXX ex Alcohol, Gambling, Armaments & Firearms, DJSI World, FTSE4GOOD Europe Index, FTSE4GOOD Global Index, Humanix 175 Europe, Humanix 200 Global				

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

Internal growth has to be the driver, particularly in life. In P&C there have not been many price decreases. However, the premium growth for 2003 is likely to be low, given that Allianz realises around 85-90% of its turnover in mature economies with low GNP growth. In life, Allianz is thinking about increasing the shareholders' part of the profits by pushing the policyholders' guarantees out towards the end of the contracts.

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AWD

Key data

Relative	1m	3m	12m
In %	+3.6	+12.7	+124.5

12 month price range	€9.55-€29.7
Rating	BUY
Closing price	€29.4
Price target	€34
No. shares in issue	37.9m
Free float	48.91%
Market cap.	€1,114m
Reuters-code	AWDG.DE
Bloomberg-code	AWD GR
DJ STOXX	243.662

Sustainability Rating: B+

Company Name	Total score	Governance	Environment	Products
AWD Holding	-1.48	-1.3	-1.3	-0.2
Average	-0.24	0.01	-0.51	-0.25

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

For the current financial year, AWD expects an EBIT margin of around 10%. Our own optimistic estimate for 2004 is 10.38%. AWD estimates growth in 2004 will come in at a minimum of +10%. The higher margin of 9.8% that has already been published together with the preliminary figures for 2003 is a clear sign of strength and profitability. This underlines our positive view on AWD.

We believe AWD will remain a growth stock. There are currently no plans for any acquisitions. At present, 1,100 financial advisors are taking training courses. Upon completion, AWD will have about 10% more financial advisors at its disposal. We are leaving our Buy rating unchanged with a target price of €34.

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AXA

Key data

Relative	1m	3m	12m
In %	-2.9	+8.7	+23.7

12 month price range	€8.93-€19.12
Rating	UNDERPERFORM
Closing price	€18.93
Price target	€15
No. shares in issue	1,795.1m
Free float	79.61%
Market cap.	€33,981m
Reuters-code	AXAF.PA
Bloomberg-code	AXA GR
DJ STOXX	243.662

Sustainability Rating: B++

Company Name	Total score	Governance	Environment	Products
AXA	-0.36	0.2	-1.1	-0.3
Average	-0.24	0.01	-0.51	-0.25

Sustainability indices: ASPI – Advanced Sustainable Performance Indices, FTSE4GOOD Europe Index, FTSE4GOOD Global Index, Humanix 175 Europe, Humanix 200 Global

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

AXA is facing difficulties acquiring MONY. MONY confirmed that 12 lawsuits had been lodged to block the takeover bid by AXA. These suits have delayed the procedure till May. 2003 numbers were higher than expected on an operating level. However, the RoE of 4.0% remains very weak and means that AXA has to improve operating performance further.

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CNP

Key data

Relative	1m	3m	12m
In %	-3.0	+8.3	-5.0

12 month price range	€30.18-€46.98
Rating	OUTPERFORM
Closing price	€45.75
Price target	€50
No. shares in issue	137.9m
Free float	27.25%
Market cap.	€6,307m
Reuters-code	CNP.PA
Bloomberg-code	CNP FP
DJ STOXX	243.662

Sustainability rating: B+

Company Name	Total score	Governance	Environment	Products
CNP Assurances	-0.76	-0.2	-1.4	-0.2
Average	-0.24	0.01	-0.51	-0.25

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

While the H1 results and the stable earnings outlook were not surprising, there is some further good news to follow: French pension reform. This will probably boost the company's H1 2004 business. The pension business has already risen by 21.3% in H1 2003. CNP has also written back €105m in impairments on stocks, and there is a good chance that another €300m will follow if equity markets remain stable.

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Converium

Key data

Relative	1m	3m	12m
In %	-2.6	-4.6	-16.9

12 month price range	CHF52-73.75
Rating	OUTPERFORM
Closing price	CHF67.4
Price target	CHF80
No. shares in issue	39.9m
Free float	100%
Market cap.	CHF2,689m
Reuters-code	CHRN.S
Bloomberg-code	CHRN SW
DJ STOXX	243.662

Sustainability rating: B+

Company Name	Total score	Governance	Environment	Products
Converium	-0.78	-0.8	-0.4	-0.2
Durchschnitt	-0.24	0.01	-0.51	-0.25

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

We feel that the sharp share price fall following the FY results was overdone. Current trading levels price the stock at cost of capital of 12.2% according to our model which is almost a 0.6%-age point premium to the implied cost of equity of its peers. We acknowledge that the company has disappointed investors over the last quarters, but this is also the case for some of its peers. Even if one is not convinced of the company's ability to create value, we don't think that a discount to book value which we estimate to be CHF 72/share for 2004 is justified. Even our target price of CHF 80/share only corresponds to the expected NAV/share in 2004 and does not reflect the company's good growth prospects. We believe management explanations, that the reserve movements on which most of the FY result criticism focuses, are the result of prior conservative reserving. We expect the Q1 results to start showing the good underlying profitability of Converium's portfolio. This should help restoring investors' confidence in the medium-term. Unfortunately, the Q1 results were a setback for Converium on its way to achieve this quickly.

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Generali

Key data

Relative	1m	3m	12m
In %	-2.7	-3.0	-26.3

12 month price range	€18.65-€24.4
Rating	OUTPERFORM
Closing price	€22.14
Price target	€25
No. shares in issue	1,253.0m
Free float	86.4%
Market cap.	€27,741m
Reuters-code	GASI.MI
Bloomberg-code	G IM
DJ STOXX	243.662

Sustainability rating: B+

Company Name	Total score	Governance	Environment	Products
Assicurazioni Generali	-1.24	-1.0	-1.2	-0.2
Average	-0.24	0.01	-0.51	-0.25

Sustainability indices: FTSE4GOOD Europe Index, FTSE4GOOD Global Index

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

Unicredito is selling its stake in Generali via an exchangeable bond. The bank intends to exchange the bond for Generali shares at the end of 2005. Unicredito holds 3.7% in Generali, while Capitalia owns 3.7% and Monte Paschi has 1.8%. A derivative solution to decrease the holding in Generali became likely as soon as the banks announced they were keeping their voting rights. As we have previously commented, we do not expect to see a stock overhang in the short or medium term, but at the end of 2005 there should be some new shareholders. This will be positive news for Generali.

For 2003 we expect a net profit of €975m, which is slightly above the three-year-plan target of €931m for 2003.

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Hannover Re

Key data

Relative	1m	3m	12m
In %	+3.7	+9.2	+0.3

12 month price range	€17.5 - €30.9
Rating	BUY
Closing price	€29.55
Price target	€36
No. shares in issue	105.6m
Free float	28.2%
Market cap.	€3,120m
Reuters-code	HNRGn.DE
Bloomberg-code	HNR1 GR
DJ STOXX	243.662

Sustainability Rating: B+

Company Name	Total score	Governance	Environment	Products
Hannover Re	-0.65	-0.2	-1.3	-0.2
Average	-0.24	0.01	-0.51	-0.25

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

Admittedly, following the long-awaited increase in freefloat we would have expected a quicker decrease of Hannover Re's undervaluation. However, the increase in liquidity was a milestone in our view in terms of attractiveness of the stock for institutional investors. This should have a significant short- to medium-term positive valuation impact in our view. In terms of profitability we expect Hannover Re, having been the industry benchmark in 2003, to be able to defend the top spot in 2004. In the current year we consider the two most important issues for Hannover Re to be profitability improvement in the Program Business and a continuation of the reduction in reinsurance recoverables. We currently calculate a fair value of €42/share.

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Mediolanum

Key data

Relative	1m	3m	12m
In %	-10.0	-14.4	+5.3

12 month price range	€3.47 - €6.73
Rating	NEUTRAL
Closing price	€5.79
Price target	€6.60
No. shares in issue	725.0m
Free float	35.2%
Market cap.	€4,198m
Reuters-code	MED.MI
Bloomberg-code	MED IM
DJ STOXX	243.662

Sustainability Rating: B+

Company Name	Total score	Governance	Environment	Products
Mediolanum	-1.22	-0.9	-1.3	-0.2
Average	-0.24	0.01	-0.51	-0.25

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

Mediolanum's preliminary 2003 turnover figures were in line with our estimates. The positive net fund inflow figures indicate a success in our view. A slightly positive share price impact appears to be likely. As we see no real surprises, we are sticking to our Neutral recommendation and target price. The profitability figures will be presented together with the final results. For the full year 2003 we expect a net profit of €109m.

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MLP

Key data

Relative	1m	3m	12m
In %	-4.4	+11.9	+86.7

12 month price range	€5.74 - €20.8
Rating	UNDERPERFORM
Closing price	€19.1
Price target	€14
No. shares in issue	108.6m
Free float	56.6%
Market cap.	€2,074m
Reuters-code	MLPG.F
Bloomberg-code	MLP GR
DJ STOXX	243.662

Sustainability Rating: B+

Company Name	Total score	Governance	Environment	Products
MLP	-0.68	-0.2	-1.3	-0.2
Average	-0.24	0.01	-0.51	-0.25

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

MLP is confident that it will achieve its full-year 2003 pre-tax target of €65m, despite only having earned €34.2m in the first three quarters. The company ascribes this discrepancy to the traditional hunting for fiscal advantages and better premium conditions for disability insurance if clients subscribe for these policies at the end of the year. Nevertheless, we remain sceptical about Q4 sales prospects. The reduced number of sales staff is somewhat worrying.

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Munich Re

Sustainability Rating: A+

Company Name	Total score	Governance	Environment	Products
Munich Re	0.70	0.3	1.3	-0.3
Average	-0.24	0.01	-0.51	-0.25

Sustainability indices: ASPI – Advanced Sustainable Performance Indices, DJSI EURO STOXX, DJSI EURO STOXX ex. Alcohol, Tobacco, Gambling, Armaments & Firearms, DJSI STOXX, DJSI STOXX ex Alcohol, Gambling, Armaments & Firearms, DJSI World, ESI Europe, ESI Global, FTSE4GOOD Europe Index, FTSE4GOOD Global Index, Humanix 175 Europe, Humanix 200 Global

Source WestLB Equity Markets, nachhaltiges-investment.org

Key data

Relative	1m	3m	12m
In %	-4.3	-13.3	-12.1

12 month price range	€50.57-€105.5
Rating	NEUTRAL
Closing price	€95.25
Price target	€100
No. shares in issue	229.6m
Free float	74.3%
Market cap.	€21,868m
Reuters-code	MUVGn.DE
Bloomberg-code	MUV2 GR
DJ STOXX	243.662

News & comments

Following the euphoria after the capital increase announcement, the 9m figures were a return to reality. The figures showed a healthy situation in reinsurance but more deep-rooted problems at the primary operations than we previously anticipated. We think that Munich Re is committed to turning the ship 'Ergo' around although the company was relatively silent on concrete measures so far, apart from the expected cost synergies of c. €300m p.a. from 2005 onwards as a result of a common IT system at Ergo. In its reinsurance operations on the other hand, we are optimistic that the good margin level can at least be maintained until 2005. We were assured that Munich Re strictly adhered to its policy of focusing on margins instead of volume during the non-life renewals. A continuation of such a policy should support medium-term profitability. Although we expect a continued reduction in its now around 18% stake in HVB Group (HVMG.DE, Target price €23, Buy), assuming a successful capital increase, we see the further development at its primary business to be the major share price driver in the short- to medium-term. However, we feel that investors would appreciate the prospects of improvements. This is why we would welcome Munich Re communicating clear targets and steps on how to turn the ship around. We remain cautious ahead of the preliminary figures on 17 March, but we see Munich Re as a potential medium- to long-term turnaround candidate.

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Nürnberger Bet.

Sustainability Rating: N/A

Company Name	Total score	Governance	Environment	Products
Nürnberger Bet.	N/A	N/A	N/A	N/A

Source WestLB Equity Markets, nachhaltiges-investment.org

Key data

Relative	1m	3m	12m
In %	+2.2	-9.1	-20.3

12 month price range	€56 - €71
Rating	NEUTRAL
Closing price	€67
Price target	€70
No. shares in issue	11.5m
Free float	100%
Market cap.	€772m
Reuters-code	NLVGn.F
Bloomberg-code	NBG6 GR
DJ STOXX	243.662

News & comments

Somewhat surprisingly, Nürnberger Bet pre-announced its FY 2003 results in February. Whereas top-line development met our expectations, the bottom-line failed to meet our forecast. However, FY 2003 results at least saw the company returning to profitability. Furthermore, with unrealised losses in the life unit having fallen to -€55m (-€300m) the group seems to have digested a large part of the three year capital market downturn.

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RAS

Key data

Relative	1m	3m	12m
In %	-1.0	+0.4	-4.8

12 month price range	€10.02-€14.95
Rating	NEUTRAL
Closing price	€14.81
Price target	€15
No. shares in issue	670.5m
Free float	44.4%
Market cap.	€9,843m
Reuters-code	RASI.MI
Bloomberg-code	R IM
DJ STOXX	243.662

Sustainability Rating: B++

Company Name	Total score	Governance	Environment	Products
RAS	-0.06	0.6	-1.1	-0.2
Average	-0.24	0.01	-0.51	-0.25

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

RAS has got a three-year plan with clear growth and profitability targets. After the acquisition of BNL Investimenti, the number of financial advisors has exceeded the target, which also accounts for the increase in the targets in the Personal Financial Services (PFS) division. We believe the company will stick to the plan, and its fulfilment is widely accepted.

In our view, RAS is certainly one of the most transparent primary insurers in Europe. We view the stock as a quality play. For investors with a longer investment horizon, the potential dividend over the next three years can be expected to be attractive. The company plans to completely pay out the excess capital after deducting the costs of the three-year plan amounting to €265m.

For the financial year 2003 we expect a net profit of €537m. This is in line with the plan figures targeting between €520m and €550m. Bloomberg consensus estimates amount to €550m.

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SCOR

Key data

Relative	1m	3m	12m
In %	+12.7	-0.1	-37.0

12 month price range	€1.15 - €2.86
Rating	UNDERPERFORM
Closing price	€1.65
Price target	€1.40
No. shares in issue	819.3m
Free float	81.2%
Market cap.	€1,352m
Reuters-code	SCOR.PA
Bloomberg-code	SCO FP
DJ STOXX	243.662

Sustainability rating: B+

Company Name	Total score	Governance	Environment	Products
SCOR	-1.26	-1.0	-1.4	-0.2
Average	-0.24	0.01	-0.51	-0.25

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

The successful capital increase should have bailed out Scor and the future now looks brighter than it did six months ago in our view. However, we feel that the visibility is still low and many uncertainties remain. In addition, Scor's rating situation, despite recent upgrades, is still difficult. Ratings in the 'BBB' (S&P), 'BB' (Fitch) or 'Ba' range (Moody's) are still far from attractive for most classes of business in our view and given the track record over the last quarters, further reserve additions cannot be ruled out. The renewal round figures came in below our expectations, reflecting in our view clients' concerns about the rating situation. We expect Scor to underperform its peers in the short-term.

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Skandia

Sustainability rating: A

Company Name	Total score	Governance	Environment	Products
Skandia Forsakring	0.32	0.3	0.3	-0.2
Average	-0.24	0.01	-0.51	-0.25
Sustainability indices:	ESI Europe, ESI Global, FTSE4GOOD Europe Index, FTSE4GOOD Global Index, Humanix 50 Sweden			

Source WestLB Equity Markets, nachhaltiges-investment.org

Key data

Relative	1m	3m	12m
In %	+1.2	+15.6	+42.2

12 month price range	SEK15.3-34.4
Rating	NEUTRAL
Closing price	SEK33.7
Price target	SEK28
No. shares in issue	1,023.5m
Free float	92.6%
Market cap.	SEK34,493m
Reuters-code	SDIA.ST
Bloomberg-code	SDIA SS
DJ STOXX	243.662

News & comments

On 24 December, Skandia announced the sale of its Japanese operations for SEK 1.4bn to Millea Holdings. This step shows that Skandia's new strategy is only to be active in markets where the company has a promising competitive position. However, the strengthening of the company's liquidity position, which had more than halved by 09/2003, may have been another reason for this move. The predominant issue at the moment, apart from the capital market development on which Skandia's sales are highly dependent, is the intensification of the discussions surrounding its management and possible suits from shareholders. We recommend remaining cautious.

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Swiss Life

Sustainability Rating: A+

Company Name	Total score	Governance	Environment	Products
Swiss Life Holding	0.81	1.0	0.4	-0.2
Average	-0.24	0.01	-0.51	-0.25

Source WestLB Equity Markets, nachhaltiges-investment.org

Key data

Relative	1m	3m	12m
In %	-6.7	-2.4	+112.1

12 month price range	CHF42.15-256.5
Rating	UNDERPERFORM
Closing price	CHF235
Price target	CHF210
No. shares in issue	23.5m
Free float	80.8%
Market cap.	CHF5,523m
Reuters-code	SLHn.VX
Bloomberg-code	SLHn VX
DJ STOXX	243.662

News & comments

The failed sale of of Banca del Gottardo (BdG) to Unicredito leaves Swiss Life with some residual risks in its balance sheet in our view. We feel, that the failure of the long-awaited sale makes further goodwill writedowns for Swiss Life likely. The current amount of goodwill for BdG in Swiss Life's books amounts to CHF 600m. We think, that in the very long run, a successful turnaround is not unlikely, but for the medium term we expect Swiss Life to underperform its peers. For the full year 2003 we expect a net profit of CHF 159m, which is close to IBES consensus of CHF 161m.

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Swiss Re

Key data

Relative	1m	3m	12m
In %	+2.2	+9.0	-12.1

12 month price range	CHF51.1-95.65
Rating	NEUTRAL
Closing price	CHF94.55
Price target	CHF93
No. shares in issue	310.4m
Free float	100%
Market cap.	CHF29,346m
Reuters-code	RUKN.VX
Bloomberg-code	RUKN VX
DJ STOXX	243.662

Sustainability Rating: A+

Company Name	Total score	Governance	Environment	Products
Swiss Reinsurance	1.05	0.5	1.8	-0.2
Average	-0.24	0.01	-0.51	-0.25

Sustainability indices: DJSI STOXX, DJSI STOXX ex Alcohol, Gambling, Armaments & Firearms, DJSI World, ESI Europe, ESI Global, FTSE4GOOD Europe Index, FTSE4GOOD Global Index, Humanix 175 Europe, Humanix 200 Global

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

Compared to its peers, Swiss Re delivered only little newsflow over the last two quarters, apart from the H1 result that it released at the end of August. Following the solid H1 result, we expect the Financial Services unit to continue delivering strong results following a restructuring year in 2002. For the non-life business we expect a further improvement in CR as the quality of the business in-force continuously improves. The question is, by how much will Swiss Re decide to replenish its equalisation reserve, which is a considerable influencing factor for the CR. With their half-year figures, they abstained from an increase. In Life & Health, we expect a slightly better H2 than H1, which was negatively impacted by Health business. We expect a slight improvement in this unit. Overall, we are optimistic, that Swiss Re as the second best rated reinsurer among the Top 5 will continue to benefit from the flight to quality.

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Zurich Financial Services

Key data

Relative	1m	3m	12m
In %	+11.3	+17.0	+39.1

12 month price range	CHF91.5 - 214
Rating	NEUTRAL
Closing price	CHF214
Price target	CHF225
No. shares in issue	144,0m
Free float	100%
Market cap.	CHF30.816m
Reuters-code	ZURZn.VX
Bloomberg-code	ZURN VX
DJ STOXX	243.662

Sustainability Rating: A

Company Name	Total score	Governance	Environment	Products
ZFS	0.28	0.9	-0.7	-0.5
Average	-0.24	0.01	-0.51	-0.25

Sustainability indices: DJSI STOXX, DJSI STOXX ex Alcohol, Gambling, Armaments & Firearms, DJSI World, FTSE4GOOD Europe Index, FTSE4GOOD Global Index, Humanix 175 Europe, Humanix 200 Global

Source WestLB Equity Markets, nachhaltiges-investment.org

News & comments

The FY figures for 2003 showed a return to strength. The fact that no further reserve additions for Centre were necessary, which was investors' main concern ahead of the figures, surely will improve sentiment and confidence. The results also showed a stronger than expected return to profitability. This is especially true for the non-life business, whereas the life unit, despite showing a strong earnings improvement, still didn't earn its CoC in 2003. Management announced it would tackle this issue in the current year. We also have the impression that a sale of Centre is on top of the agenda for 2004 which should calm down investors' fears once and for all, should management succeed.

Despite the better than expected result and an increase in price target, we have downgraded the stock to Neutral. Following the justified share price jump following the result release we don't think that the remaining share price potential still justifies an Neutral recommendation.

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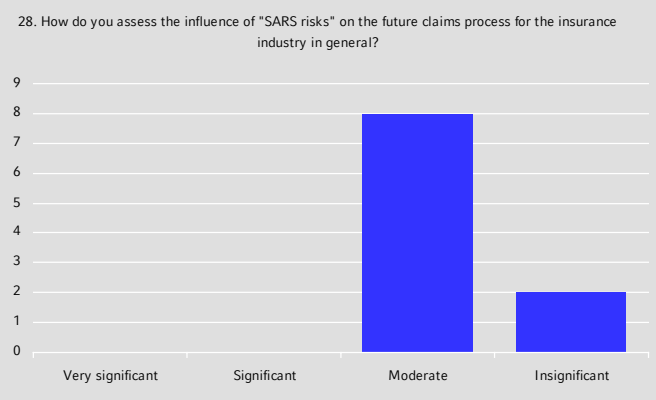
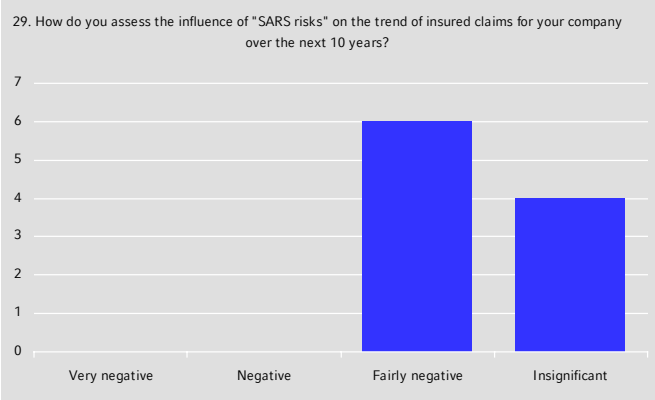
Appendix

Appendix

Survey results 'SARS risks'

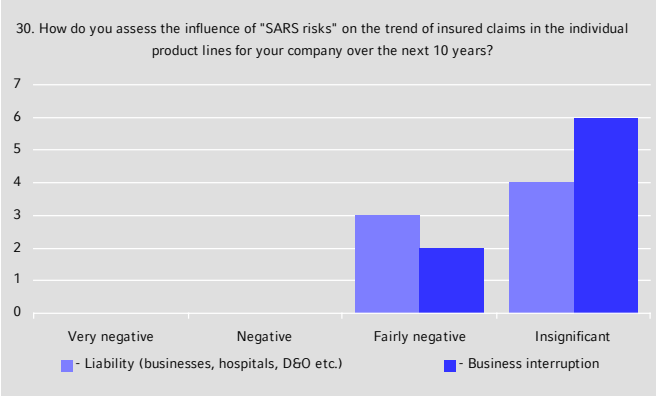
Survey – insurers & 'SARS risks'

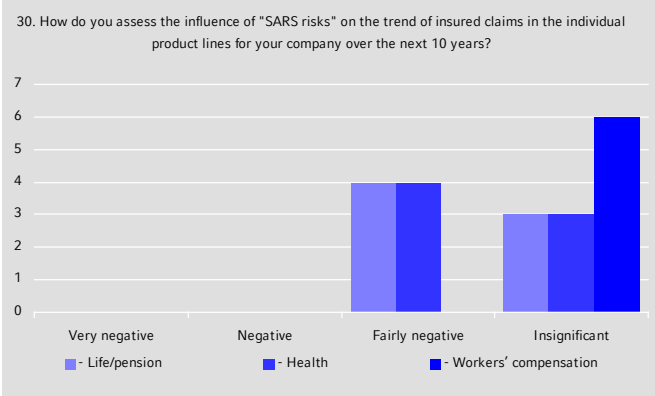




Source WestLB Equity Markets

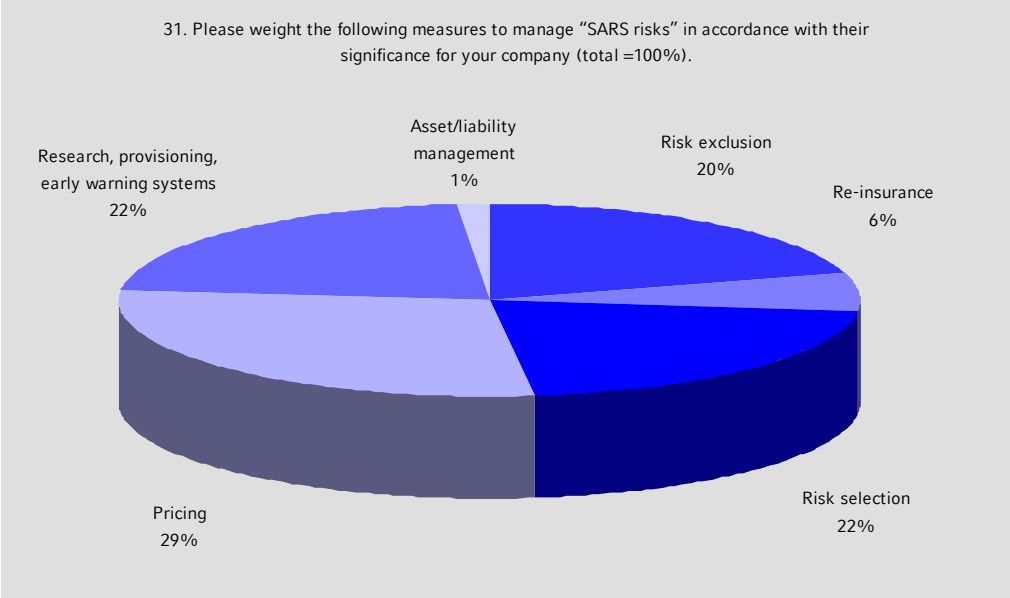
Survey – insurers & 'SARS risks'





Source WestLB Equity Markets

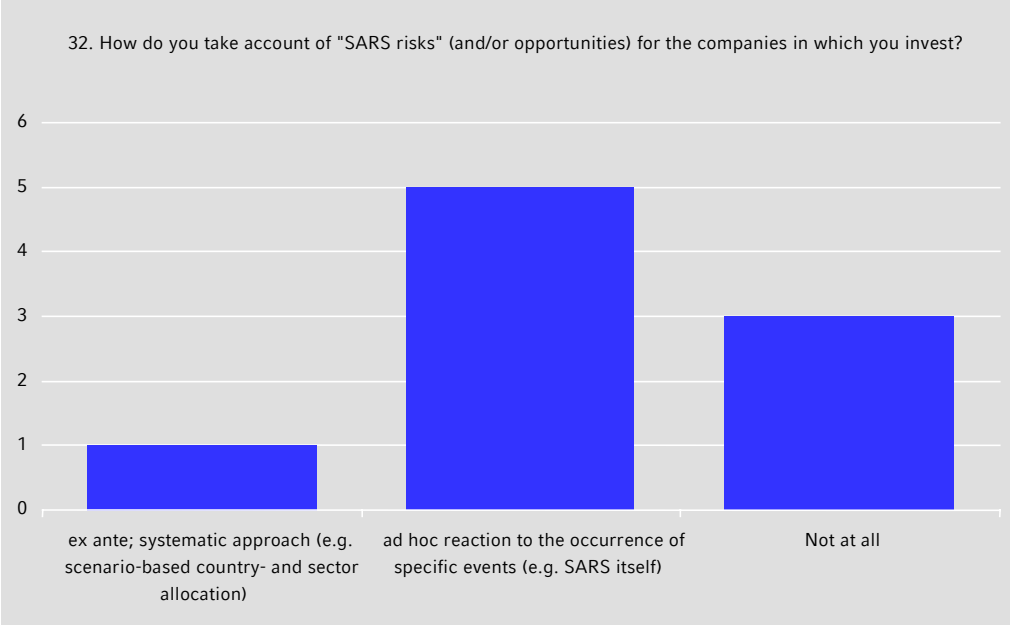
Survey – insurers & 'SARS risks'*



* The question explicitly asks about the weighting in % (total = 100%); the diagram thus reflects the average weighting of the individual measures; * N = 8

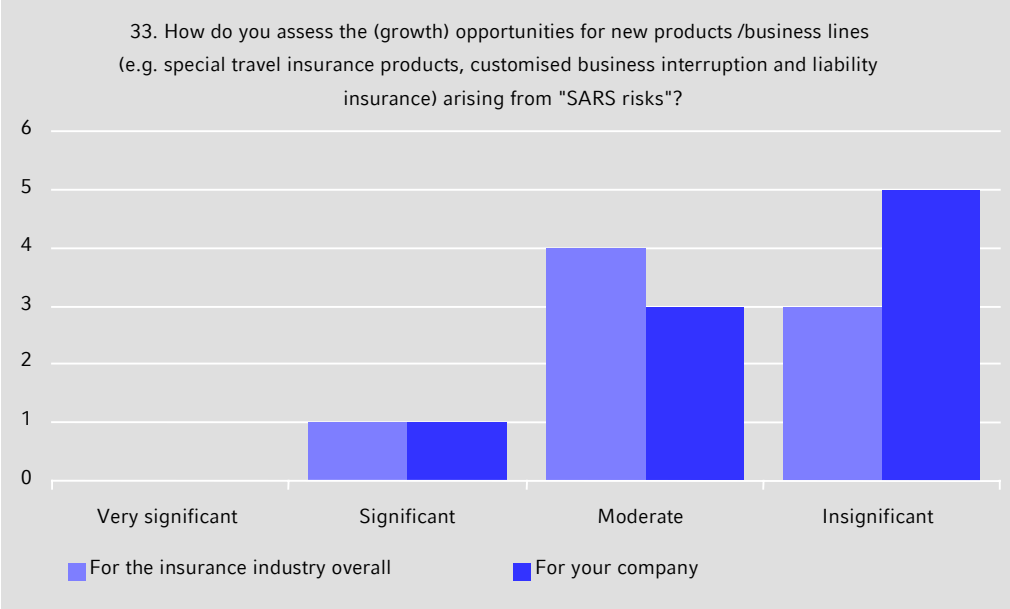
Source WestLB Equity Markets

Survey – insurers & 'SARS risks'



Source WestLB Equity Markets

Survey – insurers & 'SARS risks'



Source WestLB Equity Markets

Abbreviations

General

BTU	British Thermal Unit: 3413 BTU = 1 kWh bzw. 1 BTU = 1.053 Joule
CAPM	Capital Asset Pricing Model
CCL	Climate Change Levy in UK
CCP	Climate Change Program in UK
CCX	Chicago Climate Exchange
CDM	Clean Development Mechanism
CDP	Carbon Disclosure Project
CFCs	Chlorofluorocarbons
CO_x -	Carbon Oxide
CSR	Corporate Social Responsibility
CSP	Corporate Social Performance
D&O	Directors & Officers
DEFRA	Department for Environment, Food & Rural Affairs (UK)
DJSI	Dow Jones Sustainability Index
ECCP	European Climate Change Program
EEA	European Environment Agency
EIA	Energy Information Administration
EJ	Exajoule = 10^{18} Joule = 278 TerraWh
EM	Emerging Markets
EnEV	German Energy Saving Law
ETS	Emission Trading System
FAO	Food and Agriculture Organisation
FQS	Finite Quota Share
GDP	Gross Domestic Product
GDV	German National Insurance Association (Gesamtverband der Deutschen Versicherungswirtschaft)
GHG	Greenhouse gases
GM	Geneticaly Modified
GtC	Gigatonnes Carbon
GMO	Genetically Modified Organisms
HGB	German Commercial Code (Handelsgesetzbuch)
HIV	Human Immunodeficiency Virus
IAM	Integrated Assessment Models
IAS	International Acounting Standard
IEA	International Energy Agency
IFRS	International Financial Reporting Standard
IPCC	Intergovernmental Panel of Climate Change
MIT	Massachusetts Institute of Technology
Mcap	Market Capitalisation
MVaR	Market Value at Risk
MW	Megawatt
NAP	National Allocation Plan
NGO	Non-Governmental Organizations
NIPA	National Income and Product Accounts
NO_x	Nitrous Oxide
PAM	Policy Analysis Market
ppm	particle per million
PRI	Political Risk Insurance
SAM	Sustainable Asset Management
SARS	Severe Acute Respiratory Syndrome
SLT	Spread Loss Treaty
SRES	Special Report on Emissions Scenarios

SRI	Socially Responsible Investing
TMT	Technology, Media, Telecommunications
UNEP	United Nations Environment Programme
UNEP FI	United Nations Environment Programme Finance Initiatives
UNFCCC	United Nations Framework Convention on Climate Change
USS	Universities Superannuation Scheme
WEC	World Energy Council
WHO	World Health Organisation
WRI	World Resource Institute
WTC	World Trade Center
WTP	Willingness To Pay

'Kyoto' gases

CO_2	Carbon dioxide
CH_4	Methane
N_2O	Nitrous oxide
SF_6	Sulphur hexafluoride
HFCs	Hydrofluorocarbons
PFCs	Perfluorocarbons

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Useful links

Climate change

Federal Environment Ministry (Germany): http://www.bmu.de
CDP: http://www.cdproject.net/
CERES: http://www.ceres.org/
DEFRA: http://www.defra.gov.uk/
EEA: http://www.eea.eu.int/
EIA: http://www.eia.doe.gov/
EIRIS: http://www.eiris.org/
European Commission: http://europa.eu.int/comm/
EurActiv: http://www.euractiv.com/
GHG Protocoll Initiative: http://www.ghgprotocol.org/
IPCC: http://www.ipcc.ch/
SAM: http://www.sam-group.com/
UNEP FI: http://unepfi.net/
UNFCCC: http://unfccc.int/
Federal Environmental Agency (Germany): http://www.umweltbundesamt.de/
US Department of Energy: http://www.doe.gov/
WRI: http://www.wri.org/

Natural disasters (early warning systems)

CEOS-DMSG (Division of Earth Observation Satellites-Disaster Management Support Group): http://disaster.ceos.org/index.cfm
CRESTA (Catastrophe-Risk-Evalutating and Standardizing-Target-Accumulation): http://www.crest.org
ENVISYS (Detection of Marine Oil Spill in Radar Satellite Images): http://www.nr.no/envisys/
EU-IESI (Institute for Environment and Sustainability - National hazards project): http://natural-hazards.jrc.it
GSHAP (Global Seismic Hazard Assessment Programme): http://seismo-ethz.ch/GSHAP
GVP (Global Volcanism Programme, Smithsonian Institution): http://www.volcano.si.edu/gvp
PDC (Pacific Disaster Center): http://www.pdc.org/iweb/
TCP (World Weather Watch - Tropical Cyclone Programme - Severe Weather Information Centre): http://severe.worldweather.org
UNEP-DEWA (UN Environment Programme - Division of early warning assessment): http://www.unep.org/dewa

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