

Topics

Climate change

Solvency II

Occupational disability



Münchener Rück
Munich Re Group



Time for a rethink

Climate change is undoubtedly one of the most talked-about subjects in the world today, even more so since the onslaught of Katrina & Co. in 2005. Just how important this subject has become is highlighted by Professor Hans Joachim Schellnhuber in an interview with Topics. The fact is that huge claims payments are not the only impact climate change will have on the insurance industry. It will also have a vital role to play in tackling the consequences of climate change and will be looking to develop new business fields with major potential (see section beginning on page 4).

Making risks manageable and assuming them is the insurance industry's core business. But how much capital does an insurer have to make available if it is to honour its promises to policyholders? From 2010, such requirements will be governed by the new Solvency II directive. Starting on page 22, Henrik Bjerre-Nielsen, Director General of the Danish Financial Supervisory Authority and Chairman of CEIOPS, explains why Solvency II will thoroughly revamp and modernise the insurance system. The crucial advantage of Solvency II is that it will make the economic risk more transparent.

The risk conundrum. In 2001, Germany abolished state occupational disability benefits for people born after 1 January 1961. But governments everywhere are having to scale back their social security programmes. It is now up to the private insurance industry to fill this gap. In his interview with Topics, Bernd Raffelhüschen, professor of economics, agrees that this is a step in the right direction. Occupational disability insurance is a growing market, but it also has its pitfalls. To find out why, read the articles starting on page 32.

Dr. Torsten Jeworrek
Member of the Board of Management
responsible for Corporate Underwriting/Global Clients



In 2005 the water temperature in the Caribbean was some 1.5°C warmer than the long-term average and there were 27 tropical cyclones around the world. Unfortunately, beach chairs aren't much use against the vagaries of today's weather.



Climate change

More heatwaves, more droughts, more rain – the consequences of global warming will soon be felt everywhere. Extreme weather events have forced insurers to reassess and to examine their risk management.

Status

The situation is serious

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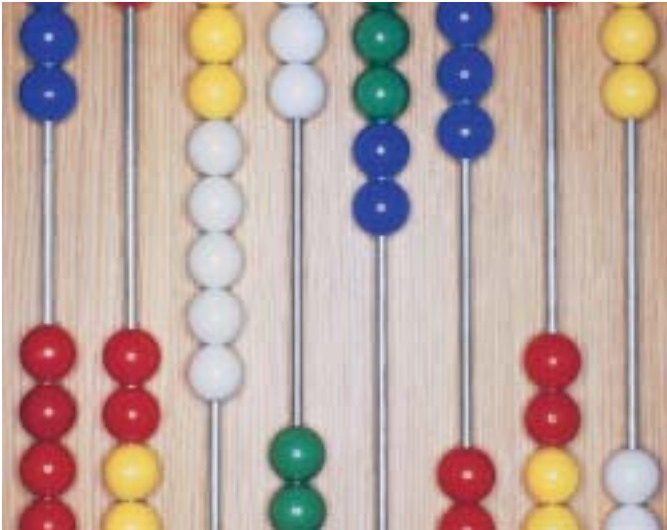
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A Munich Re initiative

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Solvency II

The EU is currently developing new supervisory rules with far-reaching consequences for the insurance industry. Solvency II may entail considerable effort for the industry, but at the same time the project also offers enormous opportunities.

Towards a better reflection of risks

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Reinsurance offers great flexibility and corporate independence

A commentary by Munich Re Board member Dr. Thomas Blunck

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Occupational disability

As many governments gradually withdraw from the coverage of occupational disability, the insurance industry is striving to fill this gap through innovative and intelligent products.

Using our resourcefulness to solve problems

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Know-how for profitable business

A statement by Munich Re Board member Dr. Wolfgang Strassl

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Climate change

Hurricanes, floods and droughts – 2005 is almost unparalleled in terms of the intensity and frequency of its natural catastrophes. This “annus horribilis” has at least given fresh impetus to the discussion on climate change. While scientists are at pains to stress the enormity of the situation, the insurance industry has been forced to conduct a rethink. Catastrophe scenarios previously considered highly unlikely now have to be included in the risk-assessment process.

Bleak outlook: Hurricane Katrina alone is likely to cost the private insurance industry some US\$ 45bn.



Status

The situation is serious

Extreme weather events will soon be a regular occurrence, says Hans Joachim Schellnhuber in an interview with Topics. It may not be possible to stop climate change but we must do everything we can to curb it, warns the physicist and climate impact researcher. Otherwise, it won't just be the insurance industry that is stretched to the limit.

An interview with Prof. Hans Joachim Schellnhuber

Topics: Professor Schellnhuber, you claim that the climate is one of the most bewildering systems of all. Is it even possible to make reliable predictions for such a fragile structure?

Prof. Hans Joachim Schellnhuber: The planetary environment is a highly non-linear system which may barely react at all to some anomalies and dramatically to others. Computer simulations show that this system is becoming critical as a result of global warming. The danger is that major processes and regions will change radically. We cannot say when exactly this will happen. A climate scientist would rather be struck dead than categorically state that the Gulf Stream will, for example, cease to function on 17 April 2042.

Topics: Simulation calculations show that climate change is proceeding faster than previously assumed – just how serious is the situation?

Schellnhuber: The crisis does appear to be approaching faster than we scientists expected. Some large regions – so-called hot spots – are warming up at an incredible pace, such as the Arctic and the western Antarctic. The melting of the Greenland ice is unexpectedly strong, the sea level is rising faster and the complex structure of ecosystems and species is changing drastically. In the Caribbean, some 80% of all reef-forming corals have died.

Topics: What impact will this have on the mean global temperature?

Schellnhuber: The political objective of the EU is to limit climate change to a maximum of 2°C above the pre-industrial level. This gives us about 1 to 1.5°C scope at this present time. However, warming of 4 to 5°C would double the natural difference between ice age and warm age. This

would no longer constitute a warm age but a “hot age”, which would be likely to change the world completely. Unfortunately, current calculations, including those by the Max Planck Institute for Meteorology in Hamburg, tend to suggest the latter scenario is more likely. If we continue as we have done, warming will reach 3, 4 or even 5°C by the end of this century. And that is beyond anyone’s control.

Regrettably, there is a tendency for people to deny the existence of climate change until it is too late.

Topics: What climatic consequences do we face from an increase in the mean global temperature?

Schellnhuber: Extreme weather events will become much more frequent. 2005 saw the first two hurricanes ever in Europe, a phenomenon that no one had expected. Heat-waves like the one in 2003 will no longer be exceptional – in 80 years every second summer may be like that. It will also rain more often, mostly in the form of torrential rain-fall, as warming will cause greater evaporation of the oceans. The tendency is that arid areas will become more arid and humid regions more humid.



Hans Joachim Schellnhuber is Director of the Potsdam Institute for Climate Impact Research and Professor of Physics at the Universities of Potsdam and Oxford. He is a leading adviser to the German and British governments on issues related to climate change. In May 2005, he was made an honorary Commander of the British Empire (CBE). This award was presented to him on behalf of Queen Elizabeth II by Sir Peter Torry, British Ambassador to Germany. Since 2005, Prof. Schellnhuber has also been a member of the US National Academy of Sciences.

Topics: Were the 27 tropical cyclones in 2005 or the scale of the record-breaking Hurricane Katrina a consequence of a changed climate and thus man-made?

Schellnhuber: If you look at the data, you can clearly identify a link between sea surface temperatures and the formation of hurricanes. It is a fact that the Caribbean in 2005 was 1.5°C warmer than usual. The question as to whether man has had a hand in the increase in sea surface temperatures I would answer with a cautious yes. It is likely that last year – incidentally the hottest since temperature recordings began – saw the coming together of two highly unfavourable factors for the Caribbean: the anthropogenic warming of the last decade and a natural increase in temperature. There are also patterns in the ocean which recur every 50 years, for example. When both developments move in the same direction, they produce extremes.

Topics: Can the human contribution to climate change be quantified?

Schellnhuber: This has already been done for the 2003 heatwave. The results showed that 50 to 60% was man-made. In general, one can say that the global warming of recent decades is two-thirds attributable to mankind.

Topics: If climate change cannot be stopped, how should we face up to the problem?

Schellnhuber: Regrettably, there is a tendency for people to deny the existence of climate change until it is too late. Others believe that the insurance industry can help to soften the impact of climate change – in the form of solidarity networks. Of course, insurance mechanisms play an important part when the “earth system” becomes more critical. Unfortunately, we cannot stop climate change now. Even if all emissions were stopped tomorrow, the sea level would continue to rise for 1,000 years. Climatic damage is a fact of life and adjustment will definitely be needed. How-

ever, we advocate keeping this adjustment to a minimum. After all, you cannot move London to the Scottish Highlands or change the course of the rivers in northern Italy.

Topics: What goals should be pursued then?

Schellnhuber: Well, I once suggested the idea of compulsory climate insurance for every single citizen. The industrial countries as the biggest emitters would have to pay in, while the private sector would provide the services.

Topics: A bit like the “coal penny” in Germany?

Schellnhuber: Why not? I very much doubt that the present insurance system could cope with the impact of climate change. If it really does warm up by 4°C, then the insurance industry will also be stretched to its limits.

Topics: What dangers do you see?

Schellnhuber: Major geostrategic problems, for example. Many poor countries like Pakistan or Somalia could not cope with a drastic change in the climate – in part because they would be deemed uninsurable under the conventional insurance system. If you only provide insurance where people can afford to pay the premiums, it might well result in international tensions.

Topics: Prevention is expensive but then so is climatic damage. How many more hurricanes do there have to be before more is done to prevent global warming?

Schellnhuber: The USA is a perfect example of how catastrophes can give people a real wake-up call. The events in

New Orleans brought about a complete change in public opinion. Previously, neoclassical economists dominated the cost debate. They have calculated that we would need to spend 5–10% of gross world product to slow down climate change. At the same time, they put the costs of climate change at under 1% of gross world product. However, our latest calculations indicate that quite the opposite is the case: stabilising the carbon dioxide content of the atmosphere at around 450 ppm, which is equivalent to 2°C, can be achieved for much less than 1% of gross world product. The climatic damage we can expect if we continue along the lines of “business as usual” would cost us about 10% of gross world product. In other words, stabilising the climate is justified for economic reasons alone.

Science for sustainability Potsdam Institute for Climate Impact Research

The Institute

The Potsdam Institute for Climate Impact Research (PIK) analyses issues connected with climate change, climate impact and sustainable development. PIK was founded in 1992 and now employs some 140 staff. The interdisciplinary nature of the institute’s work is reflected in its total of five scientific departments: Integrated Systems Analysis, Climate System, Natural Systems, Social Systems and Data & Computation.

The institute’s work

At PIK, researchers in the field of natural and social sciences work together to study global climate change and its impacts on ecological, economic and social systems. The earth system’s capacity to withstand global warming and the adjustments needed to combat climate change are central considerations in the institute’s work. This work is financed with an annual sum of €6m, half from the national government and half from the regional governments. This is boosted by individual project funds.

Network

PIK is part of a global network concerned with matters of worldwide environmental change. It exchanges views and ideas with decision-makers in business, politics and in the public domain. It is also a member of the Munich Climate Insurance Initiative, established by Munich Re in 2005 (see MCII article on page 19).



Europe and the USA have been using the atmosphere as a free rubbish dump for over 200 years now. We cannot prohibit China from developing industrially.

Topics: The Kyoto Protocol came into effect in March 2005. Is this just a symbolic drop in the ocean?

Schellnhuber: I like to compare the Kyoto Protocol with a huge tanker embarking on a voyage to bring aid across the oceans to a crisis area. The ship is being piloted out of the harbour by tugboats and on the bridge there are hundreds of captains, each with a different idea of what course to take. Then we also have stowaways and saboteurs on board – I am deeply concerned that this tanker might not get there in time. We will have to decide in the next 10 to 15 years what energy systems we want to use and rely on for the rest of this century. Thanks to the Kyoto Protocol, emissions by the industrial countries will be curbed somewhat. However, the countries currently developing very quickly, such as China and India, could yet drive the ship towards the rocks.

Topics: Significantly, China and India are not signatories to the Kyoto Protocol, although by 2015 China will have higher emission figures than the USA.

Schellnhuber: Quite right. We expect climate gases in developing countries to have increased by 110% from 1990 to 2010. Globally, we will then have 50% more climate gases than in the base year. However, Europe and the USA have been using the atmosphere as a free rubbish dump for over 200 years now and our affluence is very much based on the use of coal and oil. We cannot prohibit China from developing industrially. There are two ways out of this dilemma: either the industrial countries exceed their ecological targets, which is unrealistic from today’s perspective. Or we offer developing nations technological partnerships to give them the chance to develop more quickly on an ecological basis. Stanford University has initiated a US\$ 200m programme solely for the purpose

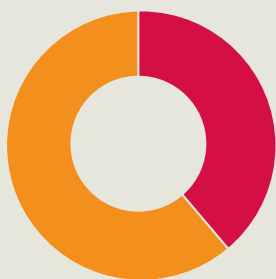


No speed limit for China: The Kyoto Protocol has not set any CO₂ emission-reduction targets for China with its billion-plus population.

Anticipated results in the Kyoto period

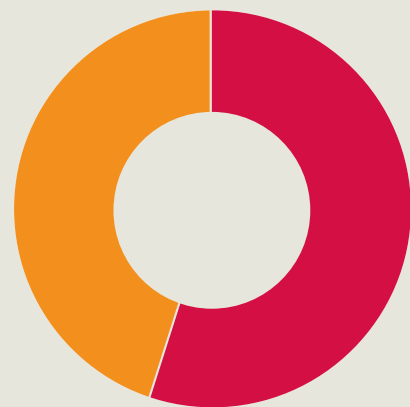
Emission of climate gases: Changes in distribution and growth

1990



Emerging countries	39%
Industrial countries	61%
Total	30.20 billion tonnes

2010



Emerging countries	55%
Industrial countries	45%
Total	45.15 billion tonnes

Source: PIK

Despite the targets set by the Kyoto Protocol, carbon dioxide emissions continue to increase throughout the world. By the end of Kyoto period, global emissions of climate gases will have increased from 30.2 billion tonnes in 1990 to 45.15 billion tonnes in 2010. One particularly striking aspect regarding these figures is the shift in emissions from the indus-

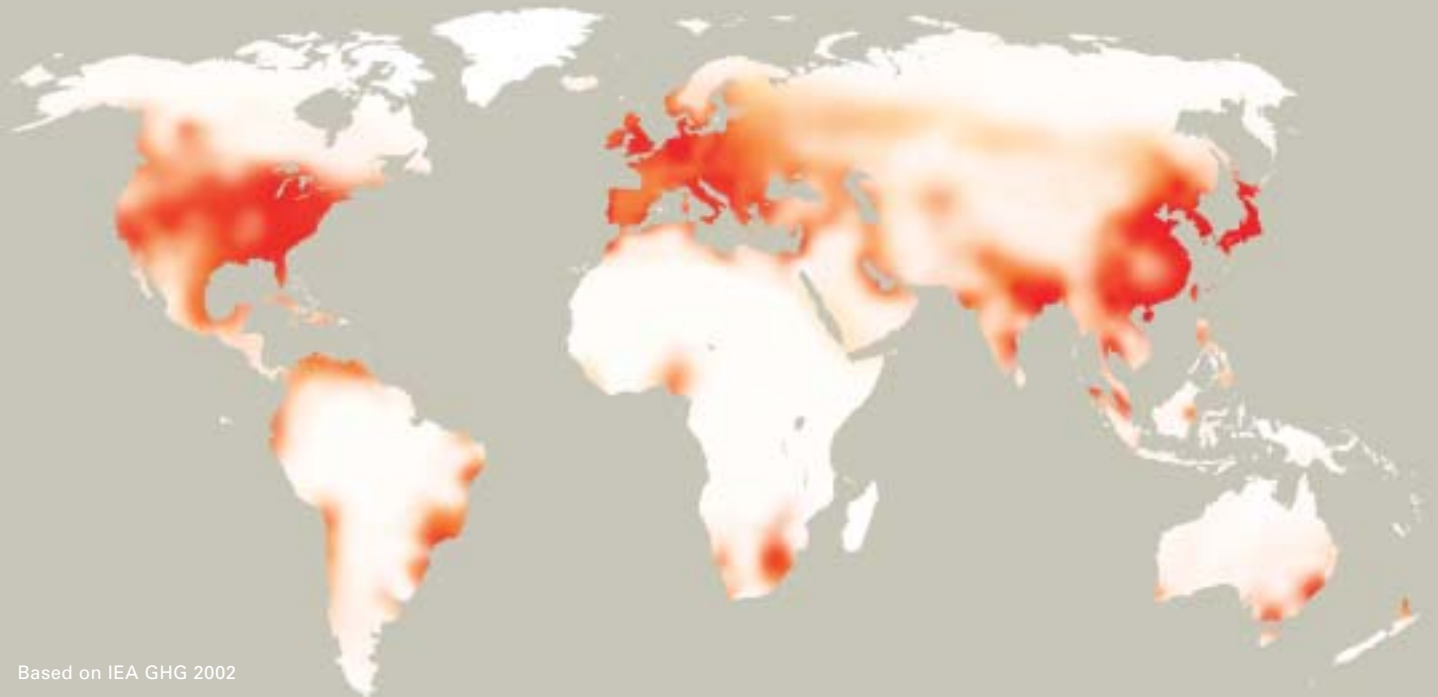
trial countries to the developing nations. This is primarily due to emerging countries like China. The Chinese economy is growing at breathtaking speed and is accompanied by a corresponding growth in the emission of climate-changing gases. By 2010, developing countries will be responsible for over half of all emissions.



Playing with fire: Carbon dioxide is created through the burning of coal or gas to produce heat or energy and the combustion of petrol in car engines. It is the main cause of man-made global warming.

Heated climate

Global distribution of the world's biggest CO₂ emitters



Based on IEA GHG 2002

Industrial nations such as the USA and Canada have always been considered the principal drivers of global warming – every year they account for a large proportion of the world's carbon dioxide emissions (marked in red). However, a new problem is now becoming apparent, as emerging economic powers such as China and India place an added burden on the

atmosphere. As the energy problem is of a global nature, given dwindling natural resources and the environmental burden that results every time energy is produced, an end to our reliance on fossil fuels must also be sought in the form of a global solution. Bioenergy could be the answer to our energy needs in the future.

of conducting energy research. Perhaps such technological partnerships will see the Americans overtake us in terms of climate protection in a few years. Meanwhile, we will continue to work on the Kyoto Protocol.

Topics: What do you think is the technology of the future?

Schellnhuber: I am convinced that carbon-dioxide sequestration, i.e. the separation of CO₂ during the energy-making process, is certainly at least part of the solution. We could use biomass as a primary source of energy, for example turning sugar beet into fuel and then capturing the carbon released. This would actually result in a net withdrawal of CO₂ from the atmosphere, as every plant lives on carbon. Biomass and sequestration could well be the energy forms of the future.

Sequestration may currently still be a technological utopia. But we cannot afford to let any option pass us by, as far-fetched as it may sound at present.

Topics: Are renewable energies the most important thing in the long term?

Schellnhuber: Biomass is also a renewable energy. In the long term, mankind is definitely dependent on renewable energies, especially solar energy. Sequestration is more of a solution for the medium term. However, over the space of a century we could combine the two, which would reinforce the effect and help to withdraw some of the carbon from the atmosphere. Perhaps we might then even be able to keep warming below 2°C. What is more, sequestration is not a dangerous technology. If one stores carbon in depleted gas or coal fields, it would at worst come to light again in thousands of years. This may currently still be a technological utopia. But we cannot afford to let any option pass us by, as far-fetched as it may sound at present.

Topics: Many people are predicting the ultimate catastrophe – a new ice age for Europe, entire countries that disappear into the sea. How real are these dangers?

Schellnhuber: An ice age like that depicted in the film *The Day After Tomorrow* is fantasy in my opinion. Just like Munich Re, I have my own world map of natural hazards. It shows the Achilles heels of our planet, i.e. the systems that could change beyond recognition: the ice sheets, the Asian monsoons, El Niño or the Amazon rainforest. Overall, global warming will be stronger than any regional cooling. For me, the ultimate catastrophe would be the rapid melting of the great ice sheets in Greenland, the western Antarctic or perhaps even the eastern Antarctic. That could produce a rise in sea levels by 10 to 15 metres in a few centuries. The situation is serious. We have the technological and financial capacity to get to grips with the problem of climate change. But do we have the required political will and foresight? Personally, I have my doubts.

CO₂ sequestration – The dream of a cleaner world

The greenhouse gas carbon dioxide alters the conductivity of the atmosphere – the radiated thermal energy is partially trapped in the lower atmosphere and thus raises the average temperatures on the earth's surface. This augments and speeds up climate change. CO₂ emissions contribute about 60% to the man-made greenhouse effect. A possible solution to this problem may be at hand in the form of a new technology – CO₂ sequestration. This is the process that removes carbon dioxide from fossil-fuel emissions. The carbon dioxide is then stored for a long period of time and thus isolated from the atmosphere.

The technology involves three stages:

- Separation of CO₂ before or after the combustion process (CO₂ sequestration)
- CO₂ capture and transport
- Long-term storage at suitable sites

Possible storage sites include geological formations such as saline aquifers or depleted oil and gas fields. Research is currently being conducted into the possibility of ocean storage of CO₂ – either by dissolving CO₂ in large volumes of sea water or by forming lakes of liquid CO₂ in topographical depressions beneath the ocean floor. The potential storage capacities are enormous and many times greater than global CO₂ emissions. However, there is still a significant lack of practical experience on a grand technological scale, especially with regard to the CO₂ separation process and whether storage concepts are reliable and safe in the long term.

Insurance

The risk of (climate) change: Hot times ahead

The concentration of climate gases is increasing, and with it the challenges facing the insurance industry. In short, stable reinsurance capacity will not be possible in the future without risk-adequate insurance prices. The solution to this problem may well be risk partnerships between primary insurers and reinsurers and the capital markets.

Ernst Rauch

The subject of climate change is by no means new to scientific research. In fact, it is over 20 years since leading academic institutions started research into the processes that are triggered by an increase in the concentration of climate-damaging trace gases in the atmosphere. Many of these studies were, or rather should have been, of major significance for the insurance industry. However, the results were mostly of a qualitative nature only and involved projections far into the future – too far for some risk carriers to take seriously.

The 2005 watershed

This situation altered dramatically in 2005. Even before the record losses from Hurricane Katrina, studies had been published which analysed the changed hurricane exposure in the North Atlantic and investigated natural as well as man-made influences on the sea surface temperature. The conclusions arrived at in these studies were so specific and definitive that the insurance industry was left in no doubt about the need for quantitative adjustments to its hurricane risk models. Munich Re included elements of these scientific works, such as the changed hurricane frequency, in its risk evaluations for the renewals at 1 January 2006.

A look at the loss years 2004 and 2005 raises the following question: Were climate researchers in fact not forthright enough in the predictions they made? To find out, let us go back 16 years to an article on climate change in a Munich Re publication on windstorms, which offered a detailed summary of the state of knowledge on this subject at this time.

Munich Re's special publication "Windstorm" from 1990

"A warmer atmosphere and warmer seas result in greater exchange of energy and add momentum to the vertical exchange processes so crucial to the development of tropical cyclones, tornadoes, thunderstorms and hailstorms. Accordingly, such natural hazards will increase not only in frequency and intensity, but also in duration and the size of the areas at risk. This applies above all to tropical cyclones, which will penetrate moderate latitudes and thus also affect areas so far not exposed to this risk. Hence, risk conditions are not only growing worse in the population centres and industrial regions along the north-east coasts of the USA, Australia and New Zealand or in the whole of Japan already exposed to such hazards in the past, but possibly also along the coasts of Western Europe, which [...] might even be reached by a full-fledged hurricane. [...] Last but certainly not least, water temperatures in some parts of the South Atlantic will reach the critical threshold of 27°C already mentioned, opening up the door for the development of tropical cyclones so far not encountered in that part of the world. It goes without saying that such cyclones would then present a tremendous hazard along the coast of Brazil."

Glaciers becoming a thing of the past: The Harding ice field in Alaska is clearly showing the effects of climate change – the ice is melting.



Chronicle of climate change

The mean global temperature has risen by 0.7°C over the last 100 years and by 0.3°C in the last 20 years alone. That is equivalent to a one-hundred-year increase of 1.5°C.

2001 to 2005 were among the five warmest years since temperature readings began.

According to preliminary estimates by the World Meteorological Organisation, 2005 was in global terms the second-warmest year ever recorded. If one considers only the northern hemisphere, 2005 was the warmest year ever recorded.

The mean surface temperature of the tropical oceans has risen by 0.5°C since 1970.

The CO₂ content of the atmosphere increased by more than a third during the main phase of industrialisation following 1800.

Since the end of the 19th century, the surface area of inland glaciers has decreased worldwide by about 50%.

In the last 25 years the Arctic sea ice cover (measured every year at the end of September) has diminished by some 8%.

Indeed, we have witnessed events in recent years which make the predictions back then appear almost optimistic. These exceptional meteorological phenomena include:

2002: the hundred-year floods on the Elbe in Germany and neighbouring countries

2003: the summer heatwave in Europe with over 35,000 fatalities

2004: the then highest losses from hurricanes in the North Atlantic in a single season

2004: the highest recorded number of tropical cyclones with landfall in Japan in a single year

2004: the first tropical cyclone in the South Atlantic with landfall in Brazil

2005: the highest number of tropical cyclones (27) and hurricanes (15) in a single season in the North Atlantic

2005: the strongest hurricane ever recorded in the North Atlantic (Wilma, 882 hPa central pressure), the fourth strongest (Rita) and the sixth strongest (Katrina) in a single season.

2005: the most northerly and easterly hurricane ever (Vince), which formed in October near Madeira

2005: the first tropical storm ever (Delta) to reach the Canary Islands

This catalogue of disasters clearly shows that some of the long-term changes in weather patterns that experts had predicted back in the early 1990s have taken just a few years to become reality.

Challenges for the insurance industry

Now risk carriers agree that there is a need for change. New frequencies and intensities of extreme weather events must be incorporated in risk measurement and in the calculations to determine price and accumulation. The next stages of this process are crucial:

- Classify the changed circumstances according to hazard – windstorm, flood, hail – and region
- Quantify the changes more precisely, both for smaller and more frequent events and for less frequent and more intense or catastrophe (accumulation) events

Science provides the impulses required to re-evaluate risks. However, the responsibility for decisions based on the findings of climate research rests with the risk carriers. When science can only provide an imprecise guide to the expected changes or probabilities, it is up to the insurance industry to develop its own answers to the problem. The key to risk evaluation, i.e. weighing up arguments for an optimistic or conservative assessment, will be to avoid making decisions which are detrimental to the principle of caution.

Innovation complements tradition

Rising mega-loss potentials are testimony to the need for alternative forms of risk transfer. The two most widespread products currently used in the market are both non-traditional:

- Risk-swap: the exchange of risks between insurance companies. For example, windstorm Europe against earthquake Japan with one or more insurers
- Cat bonds: the transfer of risks to the capital market

The trading volume of both products has risen steadily in recent years, and they constitute a useful addition to traditional reinsurance and retrocession solutions. However, the insurance industry's capacity for innovation has by no means been fully exploited just yet. In order to become more efficient, alternative risk transfer products need to be standardised further and reach additional investor groups.

Risk partnership for sustainable solutions

The range of catastrophe covers can only develop further in the long term if the insurance and reinsurance markets pursue this objective together with the capital markets. One thing is certain: the risk partnership will need to be redefined and will have to focus on the following fields of activity:

Reducing the loss susceptibility of insured risks

This includes amending and monitoring building regulations and land-use restrictions in areas at risk, such as those exposed to storm surge and flooding. Such changes will concern owners and/or operators of insured property as well as public institutions responsible for approving building land. The insurance industry can play a key advisory role here thanks to its wealth of experience in dealing with losses. As a result, loss-minimisation measures will be taken into account in the risk-measurement process and will directly benefit insureds in the form of cheaper premiums.

Risk-adequate premiums

A steady supply of natural catastrophe covers is only possible if the claims paid out by insurers do not exceed their risk premium revenues in the long term. Prices must be adjusted so that they keep pace with changes in risk. Intervening in the insurance industry's freedom to set prices would be counterproductive. Instead of protecting consumers, this would in fact bring about a reduction in the cover on offer in the medium term.

Insurers must accept the challenges posed by the risk of climate change and make sure they accord it sufficient consideration in the risk-management process. Given a partnership involving all risk carriers and a fair distribution of the burden, ample insurance and reinsurance cover will continue to be available at affordable prices.

Ernst Rauch, a Munich Re windstorm and climate expert, is head of the department Natural Hazards, Weather and Climate Risks in Geo Risks Research. He is a geophysicist and evaluates and models global meteorological risks.



Other Munich Re publications on the subject of climate change and hurricanes

Hurricanes – More intense, more frequent, more expensive A Munich Re special publication

Summary

Climate cycles and global warming are causing the surface temperatures of the oceans to rise. The consequences? A growing risk from hurricanes. The North Atlantic in 2004 and 2005 was dominated by tropical cyclones bringing new meteorological and loss records. The insurance industry now has to adapt its risk management, not least due to the secondary hazards such as storm surge and flood. The most important aspect of this process will be to develop adequate insurance solutions for future scenarios. After all, the next storm is sure to come.

Order number 302-04891, published 2006.



Annual review: Natural catastrophes 2005

Topics Geo from the knowledge series

Summary

Weather-related catastrophes dominated events in 2005, and accounted for 97% of the approximately 650 natural hazard loss events recorded. Loss amounts also reached unprecedented levels, with insured losses of US\$ 92bn and overall losses as high as US\$ 210bn. The annual review provides a detailed description and analysis of the hurricanes in the Atlantic, floods in India and the Alps and the earthquake in Kashmir. A climate review also summarises all meteorological and climatological aspects of 2005.

Order number 302-04772, published 2006.

Opinion

“We need to reassess the risk”

In an interview with Topics, Dr. Torsten Jeworrek argues that the more frequent extreme weather events throughout the world need to be given greater consideration in risk models. He also believes that an important lesson to be learned from Hurricane Katrina is to consider the inconceivable in risk evaluations.

An interview with Dr. Torsten Jeworrek

Topics: Tropical cyclones caused enormous damage in 2004 and 2005 – US\$ 80bn worth in the USA alone. Were these exceptional events or portents of a new trend?

Dr. Torsten Jeworrek: On the one hand, the record losses of recent years can be attributed to the fact that insured losses have increased enormously. However, the hurricane losses also reflect the general trend that weather events have been increasing in frequency and intensity for several years now. Today we are seeing areas affected that we previously considered to be devoid of exposure. For example, in the past two years tropical cyclones have caused losses on the Canary Islands and in Brazil.

Topics: Is climate change responsible for these developments?

Jeworrek: We have to distinguish between two important factors. Firstly, weather extremes are increasing throughout the world, which as far as we are concerned has been clearly shown to be a consequence of climate change and partially man-made. The second aspect concerns the North Atlantic. Surface temperatures in the North Atlantic are subject to natural fluctuation over a period of several decades. As we have been in a warm phase of the Atlantic multidecadal oscillation since the mid-1990s, we have a coming together of two factors which contribute to hurricane activity.

Topics: What consequences do these weather extremes have for the insurance industry?

Jeworrek: They bring increased loss potentials and loss frequencies. This results in increased demand for reinsurance capacity and a need for higher prices in many regions. Risk management is especially important in this connection. The bar is being raised continuously – state-of-the-art

is the top priority. Starting with excellent risk assessment in underwriting through to risk management at Group level, we have to be extremely disciplined in consistently implementing our scientific and technical expertise.

Topics: What specifically can our clients expect: Higher NatCat prices? Event limits?

Jeworrek: Regions and hazards that are expected to produce changes in the risk will have to undergo price adjustments – based on the resulting higher technical demands and costs of the risk capital required. However, this will not mean an across-the-board increase for global catastrophe business. We will modify our models to ensure they are appropriate to a region’s and a client’s prospective exposure. Event limits to restrict a reinsurer’s liability in proportional business are an essential part of modern risk management.

Topics: Do you expect less pronounced fluctuations in future price cycles?

Jeworrek: Yes, we do. Firstly, there is now a much greater awareness of the role of loss estimates and exposure. Furthermore, rating agencies and regulators are calling for improvements in processes for modelling, capital requirements and risk management, both for insurers and reinsurers. This pressure is bound to produce more disciplined treatment of the risk and flatter price cycles.



We readjusted our loss models for the renewal at 1 January 2006.

Topics: Is a general reassessment of the risk necessary?

Jeworrek: There is no doubt that hurricane exposure has increased significantly. We must therefore continue the process of factoring this increased exposure into risk management and risk models. Many models are based on retrospective analyses. However, recent climate research indicates that exposure can no longer be presented in terms of a long-term average but must be calculated on a prospective basis. Even if the necessary improvements are made, modelling capabilities will still be subject to uncertainties, and companies will have to make allowance for these uncertainties by taking a conservative view in their risk management.

Topics: A question on risk management: Was Munich Re overly optimistic in its risk assessments in the past two years?

Jeworrek: Our internal risk evaluations, especially for windstorm covers, have always been conservative. Hurricanes hit the North Atlantic in 2004 and 2005 with a frequency and intensity that we had not fully anticipated in our risk-measurement calculations. We therefore readjusted our loss models for the renewal at 1 January 2006. Also, our 30 geoscientists and meteorologists continue to work together with the world of science to develop our models further.

Topics: Although simulations had clearly demonstrated the consequences of a hurricane in New Orleans, nobody expected a catastrophe on this scale. What are the lessons from Katrina?

Jeworrek: We underestimated the flood risk in our model. However, large commercial risks and industrial risks in the USA nearly all have flood cover. This is what makes the modelling of flood risks so important. Katrina, and the flooding of large parts of New Orleans that it produced, involved loss elements that we had not seen with the major hurricanes of recent years, not even in the case of Hurricane Andrew in 1992. We may have placed too much faith in the technological flood control in New Orleans, which proved to be over-optimistic on our part. An important lesson from Katrina therefore is to include the so-called inconceivable in risk evaluations.

Topics: Munich Re has placed catastrophe bonds totalling €110m for windstorms in western Europe. Are such forms of alternative risk transfer suitable instruments to diversify risks and reduce peak risks?

Jeworrek: For Munich Re, ART products such as cat bonds complement traditional retrocession instruments by passing risks on to the capital markets. Munich Re is very active in the use of these instruments, for example through the issue of PRIME capital bonds in 2000 to cover earthquake in California, hurricanes in the USA and windstorms in Europe, or the AIOLOS cat bonds for winter storms in Europe placed in the 4th quarter of 2005.

We work hard to retain our opinion leadership, our constant objective being to ensure that our clients profit from our knowledge.



Topics: Do ARTs have major potential as a new business field and are they likely to become more widely used as an investment instrument?

Jeworrek: The market is developing slowly but surely. For reinsurers, alternative risk transfers increase price transparency and reduce capital intensity, and as such can be a component of risk and capital management. In practice, the limited number of cat bond investors has tended to handicap some transactions in the past. However, the situation has since improved significantly. A few years ago when Munich Re issued its first cat bond, there were little more than 100 investors willing to invest in an insurance risk. There are a lot more investors on the market today. On the other hand, placing the cover has become increasingly complex, mainly because there are no standardised products.

Topics: What are the advantages of placing underwriting risks on the capital markets?

Jeworrek: It helps us as a large reinsurer to diversify our risk. It also enables the market to help ease capacity shortfalls in areas with peak exposures. And thirdly, if standardised instruments bring about permanent price transparency, daily trading will help to improve price discipline.

Topics: Are pool solutions to cover natural hazards on the agenda?

Jeworrek: Pool solutions already exist in some countries. Switzerland, for example, already has its Elementar-schadenpool (natural perils pool). Norway, France and Spain have similar pool solutions. Japan has set up an earthquake pool for residential buildings, which shares liability between the insurance sector and the state. The

USA has established the Federal Flood Insurance Program, which provides flood insurance in particularly exposed areas. Generally speaking, however, pool solutions should only be established as a last resort for the cover of peak risks – ultimately it is always the state that bears the liability. We believe that the private insurance industry should be the first port of call, as its know-how clearly makes it the superior risk carrier.

Topics: Will Munich Re continue to merit its present status as opinion leader in the field of natural catastrophes?

Jeworrek: Our expertise in geo risks makes us the global leader in the reinsurance industry. Scientific knowledge and a global network of scientists are what make us special. We work hard to retain our opinion leadership, our constant objective being to ensure that our clients profit from our knowledge. Opinion leadership is not an end in itself. We translate our findings into appropriate insurance solutions and excellent risk management.

Topics: Munich Re has set up the Munich Climate Insurance Initiative. What is the purpose of this association?

Jeworrek: The initiative's objective is to find global insurance solutions to the developments that cause climate change. It will develop products ranging from microinsurance to climate property cover. MCII shows that we are looking beyond traditional reinsurance business to find new and innovative solutions in an ever-changing risk environment. It is the only one of its kind in the world and brings together key global players from the insurance industry, UN organisations, NGOs and science, all with excellent credentials for the job in hand.

Topics: Climate change has certainly raised the profile of renewable energies. Are there sufficient insurance solutions for this segment?

Jeworrek: We give our full and active support to technologies that use renewable energies. This includes the cover of wind power plants, which we have provided for quite some time now, and support for exploration projects in the field of geothermal power. A prime example of this is the cover of a geothermal drilling project in Unterhaching near Munich, for which Munich Re was the sole reinsurer. Technological progress is always relevant to insurance, whether we are talking about credit insurance for projects or fire and engineering coverage solutions for new types of power plant. We are extremely active in this area.

Dr. Torsten Jeworrek

Member of the Board of Management
responsible for Corporate Underwriting/Global Clients



**Time to act:
Munich Climate Insurance Initiative (MCII)**

A Munich Re initiative

Climate change threatens the living environment and health of millions of people. Particularly at risk are the poorest of the poor, for whom insurance protection simply does not exist.

MCII was founded in April 2005. Its objective is to develop insurance solutions for the ever-growing losses from weather-related extreme events. Initial efforts will be concentrated on developing countries – poor people must be given the chance to protect themselves against the consequences of climate change. The basic idea of the project is to create a balance between the emitters of greenhouse gases and the developing countries that are increasingly confronted with the consequences of climate change.

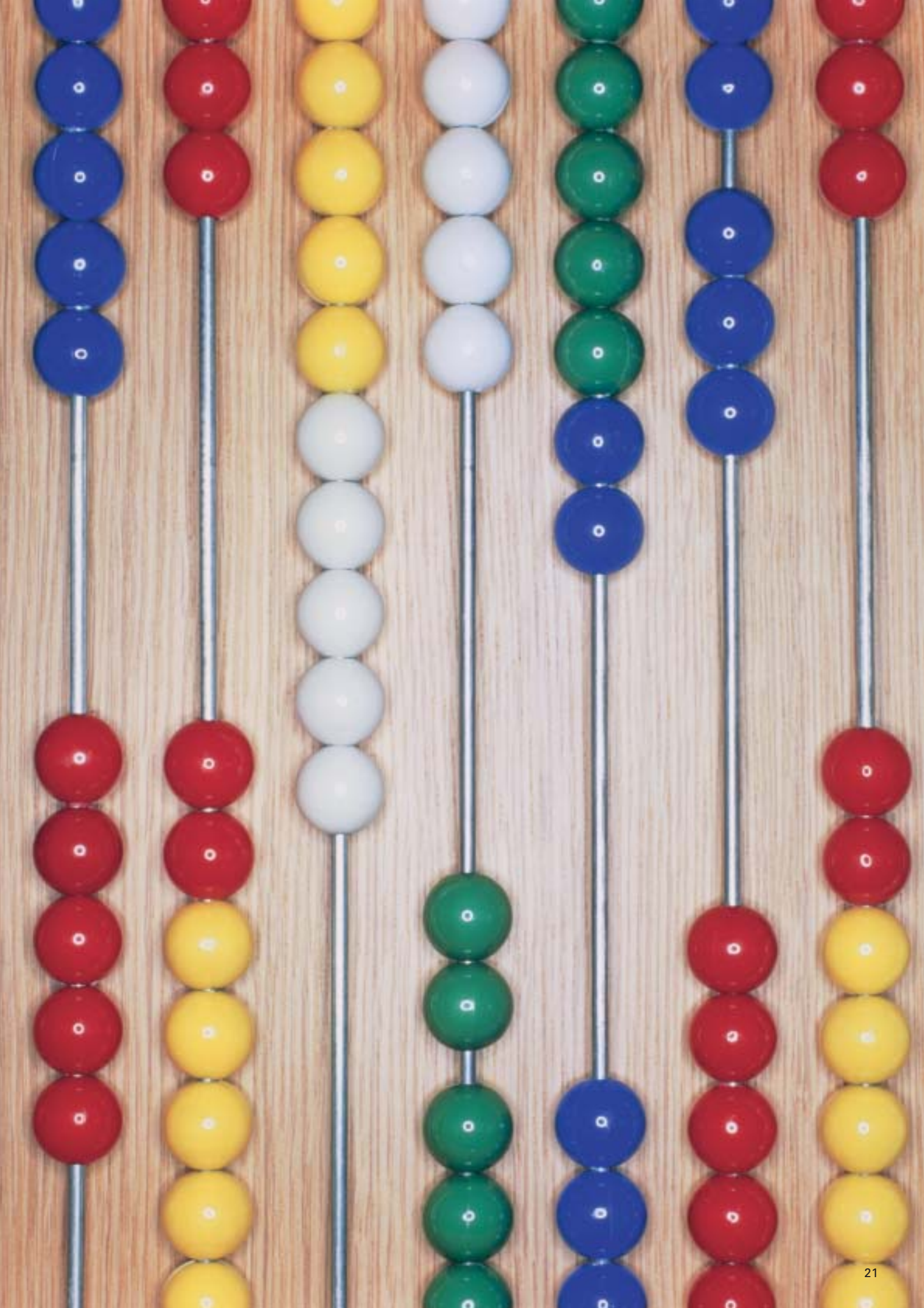
The initiative brings together insurers, climate experts, economists and independent organisations. Representatives of MCII include

- Germanwatch,
 - International Institute for Applied Systems Analysis (IIASA),
 - Munich Re and the Munich Re Foundation,
 - Potsdam Institute for Climate Impact Research (PIK),
 - The Energy and Resources Institute (TERI),
 - Tyndall Centre for Climate Change Research,
 - United Nations Framework Convention on Climate Change (UNFCCC),
 - World Bank,
 - World Meteorological Organization (WMO)
- and other renowned institutions, companies and experts.

Solvency II

Harmonisation, modernisation, transparency – these are the EU Commission’s objectives with the Solvency II Project. The current supervisory rules are being thoroughly revised and placed on a broader basis. The changes are likely to have far-reaching consequences, which will force insurers to critically analyse not just individual products but entire business segments. One thing is certain: reinsurance will play a key role in risk management in the future.

Difficult calculation: In order to achieve an optimal balance between solvency and profitability, simple analysis tools are no longer adequate given the greater risk capital requirements involved.



Status

Towards a better reflection of risks

Perfect solution or dynamic process? Henrik Bjerre-Nielsen, chairman of CEIOPS and Director General of the Danish Financial Supervisory Authority, is convinced that the willingness to compromise and a pragmatic, step-by-step approach are the key success factors for implementing Solvency II within the targeted time-frame. Bjerre-Nielsen met with Munich Re's Dr. Rolf Stölting to discuss changed capital requirements, internal risk models and the potential impact of Solvency II on the insurance industry.

Dr. Rolf Stölting interviews Henrik Bjerre-Nielsen

Dr. Rolf Stölting: CEIOPS celebrated its second anniversary in November 2005. What do you consider to be the committee's most important milestones?

Henrik Bjerre-Nielsen: Most importantly, we have been able to respond to the European Commission's Calls for Advice almost within the set deadlines, providing recommendations on the cornerstones of the future solvency rules. We have made a lot of progress, but there are still big challenges ahead. Many questions have not even been asked, and we will have to explore them in great depth if the Commission is to meet the 2007 target for submitting a proposal for a directive.

Stölting: Do you think this time-frame is realistic?

Bjerre-Nielsen: It is a very ambitious goal. All parties involved – the Member States, the European Parliament, the Commission, and, of course, the insurance industry, have to be willing to compromise. Obviously, we also need some luck, because it is a complicated process. But it also depends on our approach and ambitions. Do we see this as a dynamic process? Or do we want to build something perfect from the start? In the latter case, it would be very difficult to meet the deadline. Solvency II is a giant step forward. We also have to be aware that risks are dynamic, and that you cannot design a prudential system that never needs to be amended.

Stölting: Will Solvency II be implemented in 2010 as planned?

Bjerre-Nielsen: I hope so, because we urgently need to get this done. If we do not succeed, some countries will try to improve their systems from a national point of view. We already see this in the UK, the Netherlands and my own country, Denmark. The present system is outdated, and the longer we have to wait for the new one, the more difficult it will be to find a common solution. And we need to have a common solution in order to have a common insurance market.

Stölting: What does Solvency II mean for the supervisory authorities and the insurance industry as a whole?

Bjerre-Nielsen: The new system will be more risk-sensitive, i.e. capital requirements will provide a better reflection of an insurer's individual risk profile. And it will also be more dynamic. Moreover, we'll no longer have a "one fits all" system. We will encourage major insurers to develop internal models, while smaller companies will have the option of using a standard formula. So insurance companies will have some choice as to which rules they are going to apply. I suppose that on the supervisory side there will be a need for more competences in risk assessment, particularly in the assessment of financial risks. If we want to have a common European insurance market, supervisory practices will have to converge too.

Stölting: There are some signs that solvency capital requirements will probably be higher than today. What does this mean for individual insurers and for the industry in general?

Bjerre-Nielsen: That is difficult to say. On the one hand, you might assume that solvency requirements would increase because there is a better reflection of risks. On the other hand, insurers are aware that today's solvency

Changes in capital requirements may have an impact on the pricing of some products.

Henrik Bjerre-Nielsen



requirements do not adequately fit the risk profiles. Hence many insurers already have a level of capital that far exceeds the level of capital required by regulation. Finally, we are also trying to find a more harmonised approach for evaluating technical provisions. Some countries require a lot of prudence in the assessment of technical provisions – at least that is what they claim – while others are more realistic. If the level of prudence in technical provisions is

Calls for advice

In the last one and a half years, the European Commission has submitted various “calls for advice” to CEIOPS covering a total of 23 different subjects. These papers provide an initial indication of what the future solvency system will look like. They contribute to further discussion and help smooth the way for the first draft of the expected framework directives.

The first wave of consultation centred on subjects concerned with the second pillar of Solvency II (supervisory processes) such as risk and control management. It also dealt with the future requirements involved in the supervisory processes. The second wave focused on issues relating to the first pillar (capital requirements) such as underwriting reserves, the requirements for a standard approach, internal models and the recognition of reinsurance in Solvency II. The third wave covered subjects connected with all three pillars, including eligible capital, procyclicality and regulations for small and medium-sized insurance companies.

For further information, visit the CEIOPS website at www.ceiops.org.

lowered in some countries, it means capital will be freed up. Overall, I do not think there will be a lot of need for additional capital in the insurance sector. There may be a need for a different allocation of the available capital.

Stölting: How do you expect capital allocation will change?

Bjerre-Nielsen: Smaller insurers may decide due to higher capital requirements to keep less risk on their own books, and buy reinsurance cover. In this way, the risk is transferred within the industry to other (re)insurers whose capital requirement may be lower due to their internal models.

Stölting: Do you expect consequences for insurance products and prices?

Bjerre-Nielsen: That depends on how the individual risks are reflected. Changes in capital requirements may have an impact on the pricing of some products. However, in this area too the relationship is not simple, as insurers may base their pricing decisions on their own capital requirements which may exceed the capital required by regulation.

Stölting: Many insurance companies are developing internal models that will have to be certified. Are there criteria in place for this process?

Bjerre-Nielsen: We are working on this issue. Let me refer you to our response to Call for Advice No. 11. I must emphasise it is a very difficult issue. It is a delicate matter to clearly divide responsibility between the company management and the supervisor. However, supervisors should encourage the use of internal models for calculating solvency capital in order to enhance risk management. Consequently, we should also be willing to approve them to be used for calculating the solvency capital – provided the models fulfil certain criteria.

Stölting: The supervisory authorities can intervene if an insurer fails to meet the stipulated solvency margin. Have you already considered what measures will be taken in such cases?

Bjerre-Nielsen: In my country we have a traffic light system: green, yellow, red. In supervision, the world is not only black or white. This is why a traffic light system is also being envisaged for Solvency II. As long as a company exceeds the Solvency Capital Requirement, there is no need for supervisory action as such. Once it goes below the SCR, the supervisor and the company itself are required to review the situation and take action. If the company moves further away from the SCR and approaches the Minimum Capital Requirement (MCR), the supervisors become increasingly impatient. They will strongly insist on the management taking additional action. Between the SCR and the MCR, there is what may be called the “yellow zone”, where there is already a high risk. If a company reaches the MCR or moves below it, the traffic light switches to red. The supervisors’ patience is exhausted. They will take “ultimate supervisory action”, which in practice means that the company’s licence to write new business is withdrawn.

CEIOPS is the Committee of European Insurance and Occupational Pensions Supervisors. It was established in 2003 by the European Union and is composed of representatives of national supervisory authorities and the insurance industry from 28 European countries. CEIOPS advises and supports the European Commission in all matters related to the contents and practical application of Solvency II. In addition, it will be monitoring the implementation of Solvency II in the Member States. CEIOPS has established a series of project groups to deal with the varied and complex issues involved.



CEIOPS is in favour of fully recognising a range of risk-reducing instruments. The EU Commission has stated that reinsurance is one of the key tools for this purpose.

Dr. Rolf Stölting

Stölting: Does this mean that the future MCR will inevitably have to be lower than today’s solvency capital under Solvency I?

Bjerre-Nielsen: Yes – probably, if we ignore the amount of prudence in technical provisions. We have given the MCR some thought, but it is too early to give definitive answers.

Stölting: CEIOPS is in favour of fully recognising a range of risk-reducing instruments. The EU Commission has stated that reinsurance is one of the key tools for this purpose. From a primary insurer’s point of view, is reinsurance under Solvency II sufficiently acknowledged as a risk-reducing measure?

Bjerre-Nielsen: As regards reinsurance, CEIOPS continues to follow the view of the IAIS (International Association of Insurance Supervisors). For the supervisor, it is most important what kinds of risk a company assumes, regardless of whether it is a primary insurer, a reinsurer or a company active in both areas.

Stölting: How can it be ensured that the supervisory measures are handled consistently in all the different countries?

Bjerre-Nielsen: Again, this is a dynamic process. At the initial stage, we start out with a minimum level of convergence. As time goes by, there will be more and more convergence in firstly insurance regulation and secondly supervisory practices. However, it is not realistic to expect that complete harmonisation between supervisory authorities will be attained from one day to the next when Solvency II is implemented in 2010.

Stölting: Quantitative impact studies are very important in view of the assessment of technical provisions. Should CEIOPS's role as an adviser to the EU Commission be expanded?

Bjerre-Nielsen: Yes, because I think that most of these data can only be collected by national supervisors. They are in the country and can collect and analyse the data and ensure that they are treated with the required secrecy. I believe that insurers in most countries would rather share the data with their national supervisors than submit them directly to the Commission.

Stölting: As head of an authority responsible for banking and insurance supervision, how would you compare and contrast Basel II with Solvency II?

Bjerre-Nielsen: This is difficult to answer at this point because we do not know exactly what Solvency II will look like. But I think that according to the Framework for Consultation, the Commission wants to have a system which is consistent with Basel II – to the extent possible and necessary. As the head of the Danish supervisory authority, I do not have any problem with that, and of course we are trying to find solutions in line with our political mandate.

Stölting: Is the underlying objective of Solvency II the same as in Basel II, i.e. protecting the customer, in this case the policyholder?

Bjerre-Nielsen: It is a matter of presentation. In Solvency II, we are trying to develop a system where the probability of an insurer defaulting on its obligations over the next 12 months does not exceed 0.5 percent. Perhaps this is expressed differently in banking. But the underlying principles are the same. And in order to achieve this goal, you need to have capital requirements which are an adequate reflection of the underlying risks. At least with respect to internal models, the banking rules and Solvency II have a lot in common. The same holds true for the relationship between the home and the host supervisor, and the approval of internal models. Conceptually, such models,



Insurers in most countries would rather share the data with their national supervisors than submit them directly to the Commission.

Henrik Bjerre-Nielsen

which are part of Basel II, are something which actuaries have been doing for decades in other areas. As the head of an integrated supervisory authority, I have the advantage that I do not have to make a sharp distinction between insurance, banking and securities supervision – I am in charge of all three.

Henrik Bjerre-Nielsen is Director General of the Danish Financial Supervisory Authority, which is responsible for banking, insurance and securities supervision. He chairs the Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS), based in Frankfurt.

Dr. Rolf Stölting is an actuary and expert on solvency issues at Munich Re. He is Munich Re's representative on many European committees involved in Solvency II, such as the Consultative Panel, the European actuarial association "Groupe Consultatif", and the International Actuarial Association.

Insurance

Reinsurance brings substantial relief

The insurance industry faces enormous changes in the future as companies will have to gear their capital more closely to the risks assumed. This is the fundamental principle of the EU's Solvency II directive, which includes investment decisions as well as underwriting in measuring a company's risks. Although implementation of the directive will inevitably involve considerable effort, it also offers a variety of opportunities.

Kathleen Ehrlich, Dr. Clemens Frey, Bernd Horsch, Ralf Kürzdörfer

Volatile capital markets, falling interest rates, a rising number of large losses and accelerating deregulation of insurance markets have certainly had a significant impact on the equity capital base of many insurance companies. In the light of these difficult conditions and in order to put the insurance industry on a firm footing for the future, the European Commission has launched the Solvency II Project. The objective of this initiative is to modernise solvency rules and to stipulate new capital requirements for insurance companies.

Solvency II completes the transformation from a purely quantitative assessment framework to an approach that now includes qualitative elements of risk management. The new rules will take account of developments in the field of risk management and investment management, and of modelling approaches from financing and actuarial mathematics. Unlike Solvency I, the directive will not only evaluate underwriting risks but also investment risks and other quantifiable risks. Insurers that invest in riskier assets than others will see their solvency capital requirements increase accordingly. Other risk categories such as operational or liquidity risks will be addressed qualitatively.

Maximum harmonisation

In spite of all the uncertainties involved, it is already safe to say that the amount of solvency capital required will be higher than under the current Solvency I regime and will be based more closely on the individual overall risk profile. On the other hand, the minimum capital requirements are likely to remain at around the level of Solvency I. Altogether, Solvency II will cover a much broader spectrum of risks. It will not only permit extensive control of risk exposure but will also provide a risk-adequate basis of assessment for solvency requirements.

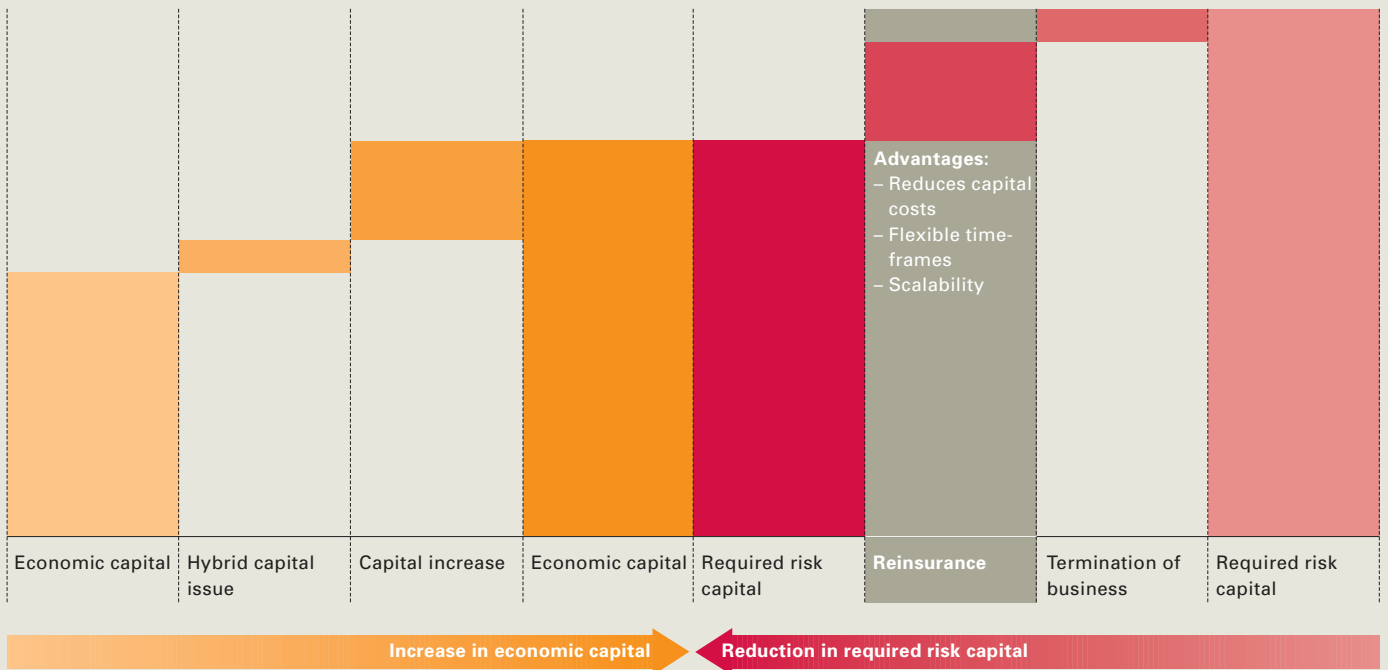
Like the Basel II process for banks, the project is based on the three pillars of "solvency assessment", "supervisory review" and "market discipline" (transparency and disclosure). A fundamental objective of Solvency II is to harmonise European supervisory rules and to eliminate the coexistence of inconsistent national supervisory systems – with far-reaching consequences. Unlike Solvency I, this will involve more than formulating minimum requirements to be subsequently translated into each respective national law. Rather, the Commission's objective is to seek maximum harmonisation and to create a level playing field which will go a long way to removing competitive distortions within the EU. This would make it unnecessary for individual countries to introduce their own additional regulations.

The more accurately a model represents the actual risk position, the easier it will be to ensure optimal use of capital and effective management of a company.

The first pillar of the system concerns the holistic, quantitative assessment of insurance companies' risk situation. This chiefly involves examining the reserving and solvency situation of an insurance company. Reserving practice is to be standardised by means of methodological requirements and certain risk margins. In order to regulate overall solvency, the different risk classes and their specific features will first be examined individually and then aggregated to form an overall risk. The second pillar involves qualitative requirements. Insurers will have to meet specific standards regarding investment and risk-management processes, but supervisory processes will also have to comply with certain requirements. The main components of the third pillar are transparency and disclosure. In establishing Solv-

Boost capital or reduce risks

Options available to insurers under Solvency II



Solvency II imposes stricter capitalisation requirements. At the same time, risk capital must be optimised in relation to the business written, i.e. it must not be measured too conservatively or too generously. There are two options in the event of shortages. Insurers can take appropriate measures to increase their economic capital – or they can reduce the

required risk capital, for example by shedding business or using reinsurance. The advantage of reinsurance here is that it can be deployed flexibly and according to specific needs.

Source: Munich Re

ency II, it will be vital that all participants are clear about all measures applied by the supervisory authorities. Transparency is not just a requirement placed on the insurance companies but a fundamental component of the entire Solvency II initiative.

In the future, insurance companies will be able to choose whether they want to determine the solvency capital requirement (SCR) by means of a standard formula or on the basis of an internal model. Generally speaking, an internal model provides a much more accurate reflection of the risk situation and of the effects that risk transfer measures may have. The EU Commission’s plans reward the use of internal models with lower capital requirements, thus providing an incentive to develop such models. However, the development, implementation and incorporation of individual company models will involve significant cost and effort. Internal models might be worth the effort for large and medium-sized companies but most European companies are likely to start off using a standard formula to determine solvency.

Internal models do have the advantage, though, of being able to identify risk drivers and reveal business segments that add or destroy value. The risk model will therefore become a significant competitive factor. The more accurately a model represents the actual risk position, the

easier it will be to ensure optimal use of capital and effective management of a company. Insurers that decide to use internal risk models will have a clear edge in this regard.

The greater transparency of risks will bring structural changes which will require insurance companies to critically analyse not only individual products but also entire business segments. This process will also affect other areas such as product design, marketing and sales. At the same time, asset-liability management tools acquire increasing importance as well. This is because the EU Commission has stipulated that risks which arise as a result of a mismatch of assets and liabilities must also be given explicit consideration.

Diversification reduces capital requirements

Solvency II will also strengthen the use of the appropriate performance yardstick. Success will not be measured in terms of generating a high premium volume but according to whether a high return on risk capital is achieved. This is all the more likely in view of the fact that the insurance industry’s overall regulatory capital requirements will rise. However, an individual company’s capital requirement will be reduced through the use of diversification effects. These can be systematically influenced by means of risk transfer, which will increase the importance of individually tailored reinsurance. In addition, under Solvency II reinsurance will

The German Insurance Association's standard formula

There are already examples of standard formulas in Europe and throughout the world. These include the US model of the National Association of Insurance Commissioners (NAIC), the British model to calculate the enhanced capital requirement (ECR) and the regulations of the Australian Prudential Regulation Authority (APRA), in force since mid-2002. In Germany, the German Insurance Association (GDV), in collaboration with the German Federal Financial Supervisory Authority (BaFin), has developed a discussion proposal for a European standard formula. One of the principal ideas behind this formula is to calculate solvency capital on a more risk-adequate basis than under Solvency I, and in particular to incorporate diversification effects in this calculation.

The extent of the diversification effects for individual insurers strongly depends on the size of their portfolio and on their business model. Thus, the volatility of claims expenditure falls in line with portfolio growth and diversity. Also, the broader the geographical sphere of activity, the more likely it is that positive and negative deviations from the desired business performance will be evened out.

The GDV's proposed "Discussion paper for a Solvency II-compatible standard approach" contains the following features:

- Consideration of companies' individual claims history: This offers companies a significant incentive to improve their technical profitability and risk management without having to establish a complex internal model.
- Transparent use of correlation factors between risk classes and lines of insurance business: Correlation factors in the GDV model are calculated conservatively (i.e. they can

also be used for extreme situations) and can be read directly from the formula.

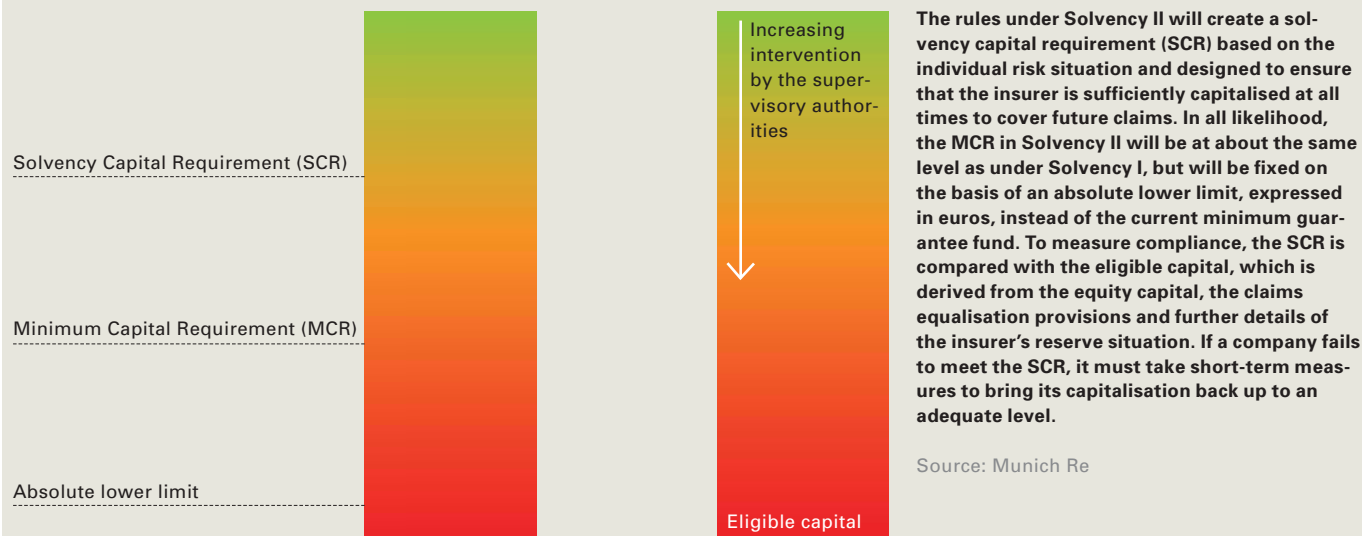
- Representation of diversification effects: In some standard approaches, risk capital is simply added together so that diversification effects between lines of insurance business or risk classes remain invisible. In such cases, there is no distinction between the calculation for high and low diversification of portfolios. In spite of significant differences in their risk situation, specialist insurers handling only few classes of business and broad-based companies are treated the same. By contrast, the GDV standard approach uses a root formula to calculate capital aggregation, which makes it possible to directly see the diversification effect.
- Risk relief through reinsurance: The Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS) is calling for full recognition of reinsurance under Solvency II. In non-life in particular, non-proportional reinsurance has a significant risk-relieving effect if used properly. For reasons of principle, this effect may only be reflected on a limited basis in factor formulas, although the GDV discussion paper does try to represent reinsurance as far as possible.
- For life business, the GDV proposal models both proportional and accumulation reinsurance.
- Natural hazards: Although accumulation exposures are difficult to measure using a standard formula, windstorm exposure is still considered as an accumulation hazard in this standard approach. In spite of this, there is scope for extending the approach by considering further natural hazards (e.g. flood or earthquake).

The GDV standard formula goes some way to meeting the requirements for standard approaches set out by the EU Commission and CEIOPS. Naturally, it only presents a rough picture of an insurance company's individual risk situation. An internal model permits a far more accurate representation. The proposal should be seen as an attempt to find a middle way between more basic standard formulas and fundamentally more complex stochastic models (such as the Swiss solvency test or complete internal models). Compared with more simple approaches, this achieves greater risk adequacy of the required risk capital with only slightly higher complexity for insurance companies in terms of data requirements and calculation.

We can only estimate what form the future solvency rules will actually take. One thing is certain: small and medium-sized insurance companies will have to prepare for changes in risk management, product design and product range. Observation of economic principles in evaluating assets and liabilities is a significant step towards a risk-adequate, transparent and harmonised solvency system. The inclusion of diversification effects in the measurement of solvency and the consideration of possible impacts on the insurance market show that all concerned – actuaries, supervisory authorities and industry associations – will benefit from a modern solvency system geared to the requirements of the insurance industry.

If the light switches to yellow, supervision becomes active

Comparison of solvency capital requirement (SCR) and minimum capital requirement (MCR)



be considered in full in the calculation of the solvency margin. Reinsurance is therefore an effective risk-management measure which can provide substantial capital relief.

The new rules will increasingly focus the attention of clients and investors on capitalisation. Given the risk-return requirements, primary insurers face the challenge of optimising their risk capital in terms of the business to be written, i.e. of not measuring risk capital too conservatively or too generously. In the event of shortages, insurers can either turn to the capital markets and increase the available capital or reduce their required risk capital, for example through reinsurance or by shedding business.

Risk management – The decisive parameter

Solvency II will especially benefit those companies that, despite existing uncertainties, are already looking into the subject and creating a better basis for future operational and strategic decisions. This effort will be rewarded as it will facilitate preparation for future requirements in supervision and risk management and will thus make it easier to implement Solvency II when the time comes. It will also improve steering and control mechanisms throughout the company.

The requirement of greater transparency will permit more accurate analysis of risk management and will strengthen the economic need to adjust capitalisation to requirements. In future, reinsurance programmes will also be subject to altered criteria and individual solutions will be more sought after. Risk management will therefore become the decisive parameter in the structure and negotiation of reinsurance cover and the requirements insurers demand of their reinsurers will also increase as a result. Thanks to its

active involvement in committees engaged in structuring Solvency II and the development of its own risk model at an early stage, Munich Re has acquired extensive knowledge of the design process and potential implications of Solvency II. It is therefore ideally placed to offer all-round solutions and can demonstrate its value as an attractive partner in risk.

In its partnerships with clients, Munich Re is looking to step up dialogue with clients on the subject of Solvency II, so that we can tackle the changes together. One of the challenges we face is to integrate the data needed to manage a company on an exposure-oriented basis into the existing core administration systems or to represent the data with sufficient precision in supplementary systems that will enable us to model and evaluate this data. Even for companies in the vanguard of Solvency II, there still remains much to do in the years to come, not just in anticipation of the changed supervisory requirements, but above all in the companies' own interest with the view to improving risk-return management.

Kathleen Ehrlich and Dr. Clemens Frey (both DAV actuaries) work in Munich Re's Integrated Risk Management Division. They are concerned with the quantification of risks in the internal capital model, focusing principally on Solvency II and insurance supervision.

Bernd Horsch works in Munich Re's SFR Innovation Team. His tasks include analysing the implications of Solvency II for client companies. His main field of activity is product development for operational risks in the context of Basel II and Solvency II.

Ralf Kürzdörfer (DAV actuary) works in Munich Re's Life Divisional Unit, where his responsibilities include investigating the implications of Solvency II for life insurers and reinsurers.

Opinion

Reinsurance offers great flexibility and corporate independence

Solvency II will significantly change the importance of and demand for reinsurance cover. In addition to standard products, there will be increased demand in the future for solutions more closely geared to individual risk parameters and providing a high degree of flexibility.

Dr. Thomas Blunck

Under Solvency II, assessment of an insurer's capital requirements will be much more closely linked to its overall risk situation than is the case with Solvency I, which focuses primarily on the volume of premiums and claims to determine the required capital. In future, the individual risk structure of an insurance company may be determined either by means of an internal risk model or through a standard approach. Smaller companies are likely to opt for standard solutions to start with.

Implementing Solvency II may entail enormous effort but it will enable companies to identify their biggest risk drivers and to significantly optimise capital allocation. A must for every insurer preparing for Solvency II will be to implement a system of value-based management. Insurers need to be able to determine optimal returns on the capital employed in order to achieve long-term growth. Basically, the insurance industry has to prepare for three developments in particular:

- 1 The need for risk capital will tend to increase.
- 2 Insurers will be able to influence this demand to a certain extent by adjusting their portfolios.
- 3 Individual reinsurance solutions will play a more important role in covering capital requirements.

Options available to the insurance industry

One crucial aspect for individual insurers will be to strike the right balance between solvency and return. If risk capital is inadequate, management can take suitable countermeasures by reducing risks and withdrawing from certain markets or lines of business. However, such action may jeopardise future business opportunities. It would also have numerous negative effects, for example on sales organisations or the relative increase in fixed costs.

If insurers want to maintain business opportunities or if capitalisation is still too low after the portfolio has been adjusted, they must consider how they can best meet the solvency requirements. Of the three options available – reinsurance, capital increase and the transfer of risks to the capital markets – reinsurance offers the greatest level of flexibility and corporate independence. It can be deployed flexibly in terms of time and aligned to individual requirements, and permits solutions that “breathe” with the portfolio, whereas the alternative instruments still tend to be too rigid at present. A company's size and legal form will determine whether access to the capital markets is possible. Moreover, capital measures still tend to generate relatively high transaction costs, and measures which tie capital down for a period of several years make it very difficult to react flexibly to fluctuations and changes in the portfolio.

Implementing Solvency II may entail enormous effort but it will enable companies to identify their biggest risk drivers and to significantly optimise capital allocation.

Over the last few years, Munich Re has been able to build up an extensive compendium of knowledge on the Solvency II Project. It already has a wealth of experience in the development and use of internal stochastic risk models and their linking to value-based portfolio management. Integrated risk management with its far-reaching aspects is a fundamental pillar of our business model. Furthermore, our experts are actively involved in important national, European and international supervisory and technical bodies and ensure that knowledge and recommendations for action are translated into our operative business. Munich Re is thus ideally positioned to partner its clients through-



out the entire Solvency II process. This is also true of accounting issues. If the solvency requirements were not synchronised with the consequences of accounting on the basis of IFRS, a distorted picture would emerge that could conflict with the original intention of the Solvency II initiative.

Determining the structure of insurers' reinsurance programmes plays an important part in optimising their solvency capital requirements. For such cases, we have sophisticated and established modelling instruments to develop individual reinsurance programmes tailored to individual risk structures and solvency objectives. The results of this modelling provide insurers with the knowledge needed to set up a systematic strategy and to plan appropriate measures.

The more specifically structured the Solvency II rules become, the more new products, tools and services will be developed. Integrated offers could encompass all three components in some risk categories. Protection models also need to be considered for additional risk categories which have thus far not been a focal point of attention, such as credit risks or operational risks.

The trend towards individualised products will also affect business practices between insurers and reinsurers. Selective information will no longer be sufficient to properly assess the overall risk situation and find tailor-made solutions. The more transparent the portfolio structure and risks (such as interest rate, currency and market risks), the more needs-specific the reinsurance can be and the more risk-adequate the premium. Accurate and precise information is thus also very much in the interests of the insurer.

One thing is already abundantly clear: a reinsurer's product and service competence related to Solvency II will become ever-more significant from the cedants' point of view and cooperation will become closer and more intensive. Thanks to our excellent knowledge of Solvency II, we are ideally placed to accompany our clients as preferred partners along the path to the new solvency rules.

Dr. Thomas Blunck is a member of the Munich Re Board of Management responsible for the Special and Financial Risks Division and IT.

Occupational disability

An efficient system of covering occupational disability is more than just a prerequisite for a fully-functioning modern economy – it forms the very basis of social justice and economic stability. However, the state in many countries is increasingly withdrawing its support from this sphere and gradually shifting responsibility to the private sector. This opens up huge opportunities for the insurance industry. To take advantage of these, however, insurers will need to have excellent knowledge of the markets and their cycles.

Spare parts for humans: Thanks to modern medical technology, surgeons today are able to replace many injured or defective body parts. However, the risk of occupational disability has remained.



Status

Using our resourcefulness to solve problems

“Compulsory insurance disregards the fundamental individuality of decisions concerning personal financial security”. This is just one of many important insights to emerge from the Topics interview with the Freiburg-based economist Prof. Dr. Bernd Raffelhüschen. He believes our primary concern is to make young people understand that they must secure their financial future before it is too late.

An interview with Prof. Bernd Raffelhüschen

Topics: Life expectancy in the industrial countries has risen significantly in recent decades. At the same time, it has become increasingly difficult to provide adequate financial cover for such long lives. Just think, for example, of the situation with pensions, long term care and occupational disability. Where do you currently see the greatest need for action?

Prof. Bernd Raffelhüschen: One thing is certain. We have all known of the problems facing our social insurance systems for quite some time. Thankfully, the pensions problem has now been addressed. In my opinion, pension insurance and state funding have now been placed on a firm footing for the long-term future, although I do see problems in the short term. What I view more critically is long term care insurance, which is beset with problems both in the short term and the long term.

We had a promise from the state, but we always knew that this promise would be impossible to keep.

Topics: You said in an interview about long term care insurance that a 100% funded basis is every bit as wrong as a 100% pay-as-you-go basis. What do you regard as the ideal way to finance the system?

Raffelhüschen: It's difficult to say. A funded system which is fair in actuarial terms is certainly closer to a financially optimal solution than a 100% pay-as-you-go basis. Instead of today's situation of 90% pay-as-you-go and 10% funded, the ratio should be precisely the other way round, 10% pay-as-you-go and 90% funded. That would certainly put us on the safe side.

Topics: What advice would you give politicians to help get on top of this problem?

Raffelhüschen: They need to act promptly and take courageous decisions. As LTC has only been around for ten years or so, it is not possible for people to have paid contributions for their entire working lives. Once people have paid in for a long time and the system is firmly in place, reforms will not be so easy.

Topics: Demographic development and a need for reform are problems common to many industrial countries at this time. People are living longer, the welfare state is being cut back. Which country has coped best with this challenge?

Raffelhüschen: There are countries that have managed their social security systems better than Germany, but we must remember that there are very often different circumstances in these countries that have made this possible. Take Norway for example. The welfare state was burgeoning out of control there as well. However, the country could afford it because it has oil. The Irish also have a very solid social security system but Ireland has a higher birth rate. Germany has neither oil nor sufficient numbers of children – the only natural resource we have for solving our problems is our own resourcefulness.

Topics: Germany has shown greater courage in tackling occupational disability. In 2001, disability benefits were cancelled for workers born after 1 January 1961. Was this reform a step in the right direction?



Prof. Bernd Raffelhüschen is a professor of economics at the Albert Ludwig University in Freiburg and the University of Bergen (Norway). His principal areas of research include social policy and applied macro-economics. He contributes to a number of international research projects and is a member of the Rürup Commission and Chairman of the scientific think-tank Stiftung Marktwirtschaft.

Raffelhüschen: Absolutely. This risk now has to be covered privately, thus forcing individuals to make their own decisions regarding if and where they invest a part of their money. In this case, a solution based purely on private insurance is far better than pay-as-you-go occupational disability insurance exposed to the vagaries of demographic development.

Topics: **Company pension schemes in Switzerland and the Netherlands require employed staff to set aside a relatively high proportion of their salaries for compulsory occupational disability insurance. How do you judge such concepts compared with the German system?**

Raffelhüschen: One must bear in mind that compulsory insurance disregards the fundamental individuality of decisions concerning personal financial security. A state that takes such an all-embracing approach fails to consider the individual needs and preferences of its citizens.

Topics: **Occupational disability forces the early retirement of every fourth employee in Germany. However, only 18% of these people are covered against this eventuality. Why are the Germans, who otherwise tend to have a reputation for being overinsured, willing to take such a risk?**

Raffelhüschen: One needs to take a very close look at the statistics here. Occupational disability is age-related. For example, in the past the number of people taking early retirement due to occupational disability rose with age. However, the fact is that now it is only elderly workers that do not have to take out private insurance to cover their occupational disability risk, as they are still entitled to benefits under the old system. The most important thing is to make it perfectly clear to younger people that they have to cover the disability risk themselves. At some stage in their lives, it will be too late to do so.

Topics: **The risk of a construction worker suffering occupational disability at the age of 45 is much greater than, for example, that of a professor. The insurance industry has to take account of this in its product conditions and wording, although it frequently comes in for heavy criticism as a result. How do you view this situation?**

Raffelhüschen: This is quite simply the nature of the beast. A large risk is more expensive, a small one less so. If you standardise too much, you no longer cater for individual clients and you need to introduce compulsory mechanisms. It is therefore quite obvious that the construction worker has to pay a higher premium than the much less risky proposition of a professor. If a 25-year-old employee is financially stretched to pay his premium, then we have to help him. But this is not the insurance industry's job. It is the taxpayer who has to foot the bill.

Topics: **So, you wouldn't say that the insurance industry has so far failed to fill this gap.**

Raffelhüschen: No. To be quite frank, what is happening is that a generation is getting its come-uppance for a problem entirely of its own making. We had a promise from the state, but we always knew that this promise would be impossible to keep. And now it has been taken away. Let us just say that the promise could only have been kept if we had all taken an important decision: the decision to have more children.

Insurance

Long-term occupational disability – A growth market

Disability as a result of accident or illness can have dire consequences, not just for those afflicted by it but also for those who are financially dependent on the disability sufferers. New opportunities are emerging for the insurance industry as the state increasingly finds itself forced to withdraw its financial support for occupational disability. However, insuring this risk is by no means without its pitfalls.

Karl-Heinz Schaller

The importance of the private insurance sector in the field of disability largely depends on the kind of state social insurance system in place. In many countries, state disability benefits are only of a limited nature, as budget restrictions in particular have forced governments to make significant cutbacks in their social security programmes. Consider Germany, for example. The pension reform of 2001 abolished statutory occupational disability benefits for people born after 1 January 1961. The benefits for reduced earning capacity that these people are entitled to now amount to little more than “poverty relief”.

International trends

The Netherlands, traditionally a country with a generous state disability system, has steadily cut its workers’ disability benefits in recent years. 1 January 2006 saw the introduction of the new law “Wet werk en inkomen naar arbeidsvermogen” (WIA), which will phase in further cuts. The USA also provides only limited state support in the event of occupational disability. Anyone who is considered able to work in any way receives no benefits whatsoever from the Social Security Disability Insurance (SSDI). It is not surprising that the demand for insurance cover continues to rise as more and more people become aware of the gap in state benefits.

These developments offer the insurance industry huge growth opportunities. Profitable business development of occupational disability products, however, requires substantial know-how. The range of products on offer and competition over conditions and premiums have risen substantially since the mid-1990s. Also, the causes of disability have changed significantly in the last few years. Providers of disability policies therefore have to be highly competent, particularly in terms of risk management and along the whole value chain. Munich Re is able to offer its clients tailor-made and extensive support in the field of disability insurance.

A baker’s risk of becoming disabled is roughly four times higher than that of a tax consultant.

A holistic approach – The key to profitability

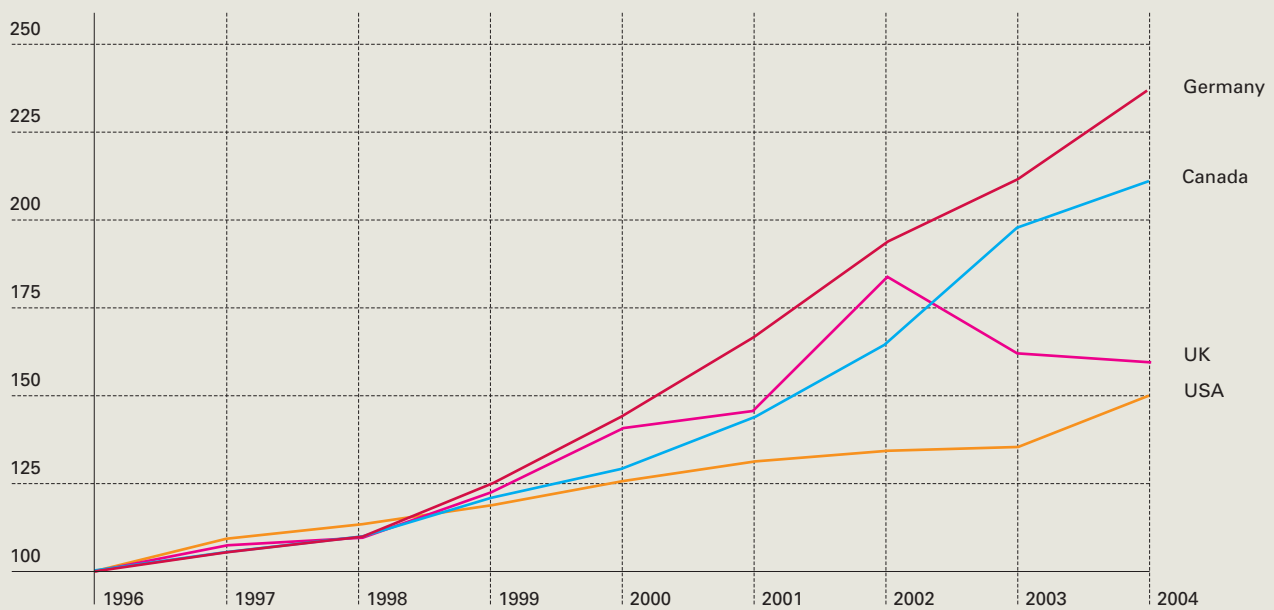
Through in-depth workshops, Munich Re works together with its clients to develop new product concepts based both on a company’s individual situation and on current and future market trends in general. The whole process requires input from a wide range of disciplines, including actuaries and specialists in other fields such as risk assessment and claims handling. This holistic approach is absolutely crucial for achieving profitable growth in disability insurance.



What price progress? When job pressure increases, so do psychosomatic illnesses. Half of all Germans complain about excessive pressure to perform and meet deadlines.

Highest growth is in Germany

Premiums for occupational disability are rising



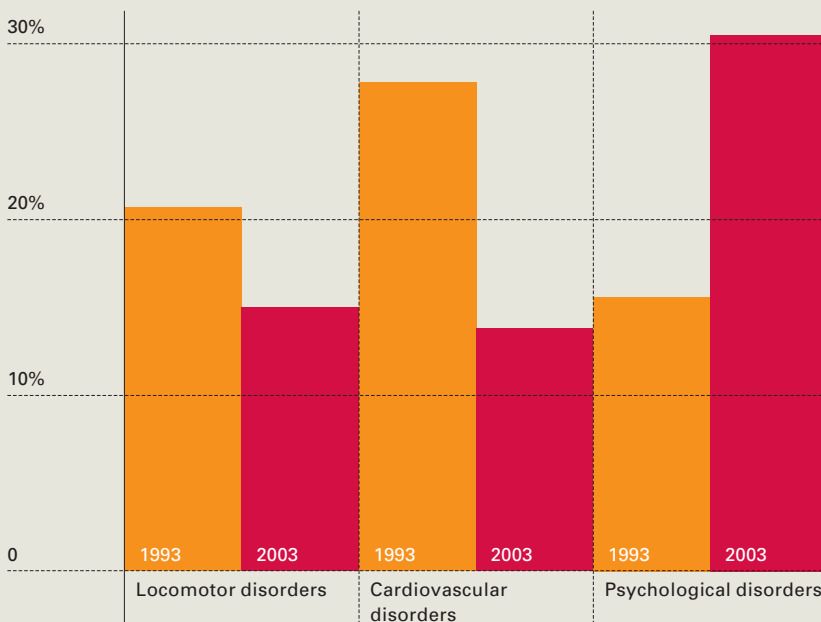
The level of premium income in occupational disability insurance largely depends on the system in place in any given market. In the USA, where the private sector has always played a major role in covering this risk, the revenues essentially reflect the number of people in employment and

expectations of future inflation. This is not the case in Germany. The pension reform of 2001 abolished state occupational disability benefits for people born after 1 January 1961. Since then, premium income has increased sharply.

Source: Munich Re

Diagnosis: Psychological problems on the rise

Causes of disability in statutory German pension insurance



In 1993, cardiovascular disorders were still the main cause of disability. At least 27% of male employees in Germany applying for disability benefit due to reduced earning capacity did so for this reason. Just ten years later, psychological disorders were the top cause of disability. In 2003, such complaints accounted for more than 30% of all occupational disability pensions, nearly double the figure ten years earlier. In the same period, cardiovascular disorders have almost halved. Musculoskeletal and locomotor disorders are also declining as causes of disability.

Source: Bundesversicherungsanstalt für Angestellte (BfA)

Occupation is a fundamental criterion for determining insurance premiums: the higher the disability risk from the occupation, the higher the calculated premium. For example, a baker's risk of becoming disabled is roughly four times higher than that of a tax consultant. An international system of classes has been established in which the various occupations can be allocated to one of four different categories, each with a separate rating. However, insurers have plenty of scope in allocating occupations to these categories, which they can deploy according to the needs of their clients.

Portfolio control

As the portfolios of individual companies are usually not large enough to obtain sufficiently clear-cut results for parameters such as occupation, occupational groups or rating, it is necessary to conduct pool assessments. Munich Re has extensive knowledge in this field. Our investigations help actuarial institutes and insurance associations to establish their accounting bases. We also perform portfolio analyses together with our clients in many markets and make the results available to participating companies. This permits accurate and timely identification of any changes in a company's portfolio and of market trends in general and makes it easier to take swift and effective measures to counter such developments. Studies of various primary insurers' portfolios have shown that the loss frequency of two companies operating in the same market can differ by more than 100%. The causes of such variations are not always immediately apparent, and therefore need to be analysed in detail.

Risk assessment

Risk assessment is of paramount importance in risk management. In addition to assessing the medical, occupational and leisure-time risks, it is also vitally important to keep the moral hazard to a minimum. Naturally, a disability benefit can only be applied for by someone with a health impairment. However, the extent of this impairment frequently depends on the subjective perception of individuals and thus also on their attitude and motivation. A significant factor here is just how much protection people enjoy in the case of disability. If there is only a minor difference between a person's income from work and the benefits from state, company or private disability insurance, there will be little motivation to try and find employment. Studies in the USA bear this out: if the level of benefits is over 70% of a person's last income, claims expectancy rises significantly.

The most important aspect of risk assessment is to ensure that the assessment bases are continuously adjusted in line with medical advances and changing lifestyles. For example, the increasing effects of obesity and high blood pressure as a result of disease or changes in lifestyle are difficult to assess objectively. Through MIRA, Munich Re offers an internet-based underwriting tool which rises to this challenge and takes account of all current developments. We have also compiled a new model application questionnaire which incorporates the above-mentioned changes.

Claims management in a state of flux

The principal concern with long-term disability insurance is to separate legitimate claims from unjustified claims. To do this, one needs extensive knowledge of medicine, law and occupational science. After all, it is first necessary to understand what practical effect a health impairment will actually have on a person's working activity in order to judge whether the disability criteria have been met. The key to this process is the definition of disability and its interpretation in law. In the USA and Canada, there are essentially three definitions which can lead to different decisions (see box text on the right). As courts appear to be taking an increasingly consumer-friendly stance, it is important to establish a high level of legal certainty even at the stage of product development.

Orthopaedic complaints, mental problems, cardiovascular disease and cancer rank as the principal triggers of disability benefits. In some countries, mental disorders have even overtaken orthopaedic problems as the most frequent cause of disability. As mental conditions are difficult to prove, they constitute a particular challenge for risk management.

Occupational disability insurance not only displays many country-specific features but also faces completely new risks as a result of the rapid changes taking place in the world of work.

We analyse the growing significance of orthopaedics and psychosomatics in new theme-centred and interactive workshops. These workshops highlight how complex these groups of diseases are and show what sort of measures can be taken in this sphere. We also develop questionnaires specially designed for psychiatric and psychosomatic diseases and define quality criteria for reports, which have to meet certain requirements to ensure an impartial and qualified assessment of benefit claims.

Rehabilitation service is also becoming increasingly important. Experience from countries such as Canada and the Netherlands shows that rehabilitation measures can frequently shorten the period of benefit payments. Such schemes benefit both policyholders and insurers.

The different definitions in the USA

These are examples of the three most prevalent definitions of disability in USA and Canada:

Pure own occupation

Due to accident or sickness, the inability to perform the material and substantial duties of your occupation.

Modified own occupation

Due to accident or sickness, the inability to perform the material and substantial duties of your occupation, and you are not working.

Any occupation

Due to accident or sickness, the inability to perform the material and substantial duties of any occupation you are reasonably suited by your education, training, and experience.

Each of these variations is combined with the following: "you are under the care of a physician appropriate to the treatment of the condition causing disability".

Companies that use the "any occupation" definition often feature the "own occupation" definition for the first two to five years of disability, and revert to the "any occupation" definition afterwards.

Conclusion and outlook

In recent years the insurance industry has assumed an increasing amount of social responsibility in its role as a risk carrier. As legislators in many countries have been forced to transfer the system of state benefits to the private sector, intelligent and innovative solutions are now needed more than ever. This is especially true of occupational disability insurance which not only displays many country-specific features but also faces completely new risks as a result of the rapid changes taking place in the world of work (see article on workers' compensation insurance on page 40). In light of these developments, the real challenge facing the insurance industry is to develop a system which is fair and equitable for insureds but at the same time maintains insurers' profitability in the long term.

Karl-Heinz Schaller is a section head in the Life and Health Division and is responsible for Germany and Switzerland. He is a specialist in the field of biometric risks.

The state in retreat

Unlike occupational disability insurance, workers' compensation insurance is legally compulsory. In other words, employers have to provide workers' compensation coverage for their staff. However, given the changes in working conditions, life expectancy and causes of disease, many state systems have not been able to keep pace with developments in workers' compensation, which has led to an increasingly important role for the private insurance industry.

Workers' compensation insurance protects employees and their families against the consequences of occupational accidents and diseases. The make-up of any particular workers'

compensation system primarily depends on the economic, social and political parameters in place. However, there are many features common to almost all systems: workers' compensation insurance is compulsory, its benefits are paid regardless of fault and it is subject to strict legal regulations and supervisory controls. Even if there is no international standard definition of occupational accidents and diseases, most systems incorporate the following criteria:

- Occupational accidents occur in connection with occupational activity during working hours. They are sudden and accidental occurrences and cause some sort of physical injury.

- Occupational diseases result from continuous harmful exposure to an occupational hazard. This exposure must, in terms of its duration and dosage, be conducive to triggering an occupational disease and the disease must be medically diagnosed.

International comparison

In many countries, the private insurance sector is involved in the cover of occupational accidents and diseases. Norway (1991) and Colombia (1994) have only recently opened up their systems to private insurers and several Eastern European countries are looking to do the same. By contrast, countries such as Portugal and



New risks

New risks are a challenge for workers' compensation systems, especially as regards the insurability of occupational diseases and the assessment of occupational disability.

According to the European study Eurogip 2002, most benefit claims involve the following occupational diseases:

- Musculoskeletal disorders or damaged joints
- Loss of hearing
- Asbestos-related diseases
- Skin diseases, in particular allergies

Stress also plays a significant role in these figures. The "Third European survey on Working Conditions 2000" revealed the following: in the case of occupational risks with health problems, back complaints are in first place, stress second.

Belgium can look back on a long tradition of private insurance participation in workers' compensation. The country with the longest experience of private insurance in this field is the USA. However, it is very difficult to draw meaningful comparisons, as very little is regulated at national level and the individual states have pretty much a free hand in developing their own models. These models usually reflect the very different traditions and principles of the states and range from very liberal to heavily regulated.

The challenges

The constantly changing parameters in workers' compensation insurance mean that systems need to be continuously reviewed and, if necessary, reformed:

- Tight state budgets have forced legislators to instigate reforms which shift the funding of work-related accidents and diseases to the private insurance sector.
- Pay-as-you-go systems, which tend to dominate state cover, are increasingly being questioned as a funding method.
- Greater flexibility in the jobs market, a changing work environment as a result of technological progress and new employment concepts such as telework are bringing new risks to this field.
- Growing regional and occupational mobility is making it more difficult to trace someone's professional history and thus also to identify the cause of occupational diseases.
- Medical advances have increased life expectancy. Chronic diseases, which include a good number of occupational diseases, increase with age and are then usually more acute.

Such trends show just how difficult it is for legislators to assess whether the systems used today are still adequate

Facts on the occupational disability risk

Essentially, all workers' compensation systems cover the disability risk. This is vitally important given the enormous personal, social and financial consequences involved.

According to the **World Health Organization**, musculoskeletal disorders are the main cause of temporary or permanent occupational disability in many industrial countries, causing economic losses of up to 5% of the GDP.

The **International Labour Organization (ILO)** estimates that of the 160 million annual cases of occupational disability, 10% end in permanent disability. If occupational accidents are included, this figure is even higher.

and whether it might not be better to consider greater participation by the private insurance industry. Examples of possible public system reforms in order to restrict insurance cover to a financially viable minimum can be found in many countries. These include, for instance, discussions on the removal of commuting accidents from statutory cover, a reduction in the amount/duration of benefit for loss of earnings, i.e. benefit calculation based on actual rather than abstract reductions in earning capacity.

Alternative solutions will need to be developed in close cooperation with the insurance industry if we are to ensure the long-term financing of these risks. One aspect of this process in particular is of fundamental significance. Although the problems are very often of a similar nature, there are significant differences in market-specific parameters, meaning that

The 2003 **Eurostat** report "Employment of disabled people in Europe" revealed that some 16% of the population in 25 European countries suffer from a "long-standing health problem or disability". Work-related reasons were given as the second most common cause.

According to **US statistics**, some 32% of benefit recipients between 1970 and 2000 were partially or totally disabled on a permanent basis; this group accounted for over 74% of the benefits paid.

potential solutions have to be selective and finely tuned to individual market circumstances. The classic separation into "typical private" and "typical state" system is therefore no longer contemporary or appropriate.

With this very much in mind, Munich Re established a Centre of Competence for Workers' Compensation in 1998 in order to formulate and structure its know-how in the field of workers' compensation insurance. We consider it our task to identify and analyse trends and to develop possible solutions. This is our contribution to risk-adequate, financially viable and sustainable insurance systems for all sides – employers, employees, risk carriers and the state.

Dr. Adriano Bastiani is head of the Centre of Competence for Workers' Compensation in the Corporate Underwriting/Global Clients Division. He is responsible for Munich Re clients worldwide, except for the USA.

Dr. Héctor Upegui-García is a primary insurance specialist in workers' compensation and social insurance. He is responsible for Munich Re clients worldwide, except for the USA, and is a specialist in reform markets.

Opinion

Know-how for profitable business

Developing intelligent and innovative products in the field of occupational disability is one of the main challenges insurers face today. Munich Re not only has the experience needed to achieve this task, it can also offer its clients the best-possible tools to optimise the market opportunities available.

Dr. Wolfgang Strassl

Whether we are talking about new types of disease, the changing nature of work or increasingly tight state budgets, the occupational disability risk has undergone radical change over the past few decades. What has remained constant, however, is the fundamental importance of occupational disability insurance, which can be considered a basic right of all working people. After all, if young or middle-aged breadwinners have to stop work due to illness, they and their families invariably face a major financial crisis.

From an insurance point of view, occupational disability insurance pursues one central goal: it helps those affected to cushion the blow of a loss of earnings resulting from disability or incapacity. Such protection is therefore a highly important component of our socio-political system. Although there is a broad diversity of parameters and regulations in individual countries, there does seem to be a clear common trend emerging almost everywhere. As in so many other areas, state support is being scaled back. This is creating painful gaps in cover, and insurers must find the appropriate business models to fill this gap.

The insurance industry already makes a significant contribution in this sphere, without which social insurance would barely be able to function, and its share in the overall system of old-age provision is growing all the time. In order to fulfil this socio-political role, insurers need to develop intelligent, innovative and risk-adequate products which can cover occupational disability and adapt to the constantly changing parameters involved.

Early identification of trends

As a global risk carrier, Munich Re has many years of experience and great expertise in the field of product design. The development currently taking place in Germany is something that other countries went through years ago, albeit in a slightly different form. Thanks to its presence in all important markets, Munich Re has been able to closely follow the processes that have taken place in other countries and is therefore familiar with the cycles and special features of this business. This know-how enables us to identify and analyse trends at an early stage and share this experience with our clients. Indeed, we consider the transfer of knowledge to be one of our key tasks, as it is the only way of guaranteeing a supply of adequate products tailored to individual market customs and practices.

Thanks to our presence in all important markets, we are familiar with the cycles and special features of this business.

Profitable participation in the market requires not only sound risk assessment but above all optimal business processes. This includes thorough risk evaluation and effective claims management. Evaluating whether and on which conditions a risk can be accepted is a particularly difficult task, constituting a major challenge to underwriters. Primary insurers can count on our support here as well. In order to facilitate the transfer of knowledge and know-how, which has always been of top priority at Munich Re, we have developed the internet-based under-



writing system MIRA (Munich Re Internet Risk Assessor). Just a few clicks of the mouse will provide all the information underwriters need in order to react quickly and cost-effectively to business opportunities and to keep pace with the rapidly changing nature of the risks.

As there is a distinct and recurring pattern to the cycles in different markets, our international experience can provide valuable impulses.

Exerting a positive influence on loss experience

The status quo and the pace of new trends can differ significantly from country to country. Consequently, there are markets where the private insurance sector has almost no experience of the occupational disability risk. Giving due consideration to the sometimes highly complex regulations in some countries during the product design process requires great know-how, especially with regard to the underwriting risks involved. Munich Re offers insurers its support to help them come to grips with these risks. As there is a distinct and recurring pattern to the cycles in different markets, our international experience can provide valuable impulses for optimising control of business and risks. The results of our statistical analyses permit conclusions to be drawn on risk-adequate underwriting or on the wording of insurance conditions, differentiated on the basis of risk groups. This will certainly have a positive influence on loss experience.

Intelligent products to cover occupational disability are an excellent growth market in developed countries in particular. The challenge the insurance industry faces is to come up with solutions which adapt insurance cover to the increasingly complex parameters involved. As the career paths of today's insureds are nowhere near as straightforward as they used to be, innovative products also have to take account of the increasing career volatility. Moreover, the target group has also changed significantly, with the self-employed, students and young people yet to embark on their careers increasingly interested in occupational disability cover.

The market for occupational disability insurance in the future will continue to be heavily influenced by strong dynamics in terms of demand, products and loss experience. Given the numerous imponderables involved in disability risks, Munich Re sees it both as a challenge and an obligation to support primary insurers in their risk assessment. Our objective is to help our clients to develop new markets and to support them in the assumption of new, frequently unknown risks along the entire value chain.

Dr. Wolfgang Strassl is a member of Munich Re's Board of Management. He is responsible for the Life and Health Division and Human Resources.



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