Box 16

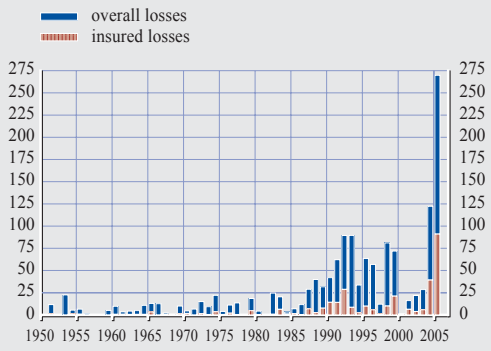
THE EFFECTS OF GLOBAL CLIMATE CHANGE ON THE EURO AREA INSURANCE SECTOR

Recent reports suggest that the earth's climate is becoming more volatile as a result of both human activity and natural variability. Indeed, the occurrence of extreme weather events such as drought or flooding has increased in recent years, as have heatwaves and windstorm activity.[1] As a result, financial losses and insured financial losses owing to global weather disasters have increased

1 See Intergovernmental Panel on Climate Change (2007), "Fourth Assessment Report – Climate Change 2007: The Physical Science Basis", and UK HM Treasury (2006), "Stern Review Report on the Economics of Climate Change", October.

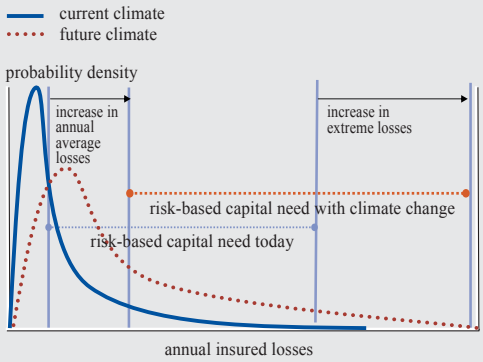
Chart B16.1 Overall and insured losses from global great weather disasters

(USD billions, 2006 values)



Source: Munich Reinsurance Company.
Note: "Great weather disasters" are defined by the UN and include events when interregional or international assistance is needed, thousands are killed, hundreds of thousands are made homeless, and substantial economic losses and considerable insured losses occur.

Chart B16.2 Climate change impact on the loss distribution for the insurance sector



Source: Association of British Insurers (2005), "Financial Risks of Climate Change", June.

significantly, especially over the past two decades (see Chart B16.1). Insurance underwriters and reinsurers offering protection for weather-related damage are increasingly faced with new challenges given the higher occurrence of extreme events. This Box reviews some of the potential risks and challenges that more volatile climate conditions pose for euro area insurers.

Weather-related losses have in the past caused insurers to go bankrupt, increased consumer prices for insurance, and led to withdrawal of insurance coverage.[2] Potentially greater uncertainty about the frequency, intensity and/or spatial distribution of weather-related losses will increase the vulnerability of insurers – in particular reinsurers, since severe and less frequent events are typically reinsured – and could complicate risk mitigation actions and increase the capital needed to cover extreme losses.

The insurance sector requires sufficient capital to bridge the gap between losses in an average year, which are all covered by premium income, and those in an "extreme" year, which are not. Climate change is expected to lead to a shift in the distribution of losses towards higher values, with a greater effect at the tail. Average annual losses (or expected losses) will increase by a smaller amount than the extreme losses, with the result that the amount of capital that insurers will be required to hold to deal with extremes will increase significantly (see Chart B16.2).

Non-life insurance, such as property and casualty insurance (which accounts for around 40% of total insurance premiums in the euro area) and in particular the related reinsurance segment, has been more vulnerable to weather-related events than the life insurance segment. In the longer term, it is however expected that climate change could also start to have an adverse effect on the life and health and asset management businesses because of the potential impact that climate change could have on, for example, mortality, the economy and financial asset prices. However, owing to structural changes in the industry, the distinction between different insurance sectors is becoming less clear as a result of consolidation and mergers. Greater

2 See Intergovernmental Panel on Climate Change (2001), "Third Assessment Report – Climate Change 2001: Impacts, Adaptation and Vulnerability".

diversification of insurers should prove beneficial when specific losses from one particular business line have to be absorbed.

A more volatile and changed climate has encouraged the creation of new insurance products such as financial protection for ski resorts against lack of snow, or for farmers against drought and flooding. While these insurance segments are exposing some insurers to more weather-related risks, they also provide new potential income sources and sometimes diversification possibilities as well.

Insurers typically reduce their financial vulnerability to extreme weather-related losses via risk transfer and risk reduction. Risk transfer usually takes place through reinsurance companies or directly through the capital markets. Insurers and in particular reinsurers can transfer part of the risk associated with natural disasters to the capital markets using instruments such as weather derivatives and catastrophe bonds.[3]

Exchange-traded weather derivatives are usually linked to widely followed measures such as temperature and rainfall, whereas bilateral deals traded over the counter are typically tailor-made for specific risks. Tradable indices are also starting to emerge. For example, UBS has recently launched a global warming index which is a tradable benchmark for global investments in the weather derivatives market.[4] Catastrophe bonds, by contrast, transfer a specified set of risks, such as natural disaster risks, from the insurer to the capital markets with a bond structure where the interest and/or the principal are forgone when a pre-defined catastrophic event occurs.[5] Whereas these insurance-linked securities have existed for a number of years, related CDO structures are relatively new. The use of risk transfer instruments by insurance companies increases the scope of risk spreading, but can also create new potential risks for financial stability. The sometimes complex structures of these instruments has underlined the need for sound risk management practices not only among institutional investors buying these instruments, but also among other investors, such as hedge funds, who have shown great interest in the extreme catastrophic risk market.

Whereas risk spreading is mainly an economic and distributional process, risk reduction focuses more on technology, environmental management, land-use planning, engineered disaster preparedness/recovery, and predictive modelling. Insurance companies' knowledge and rich historical data are useful for better understanding and identifying risks and for developing loss prevention in the form of, for example, land-use planning and fortifying property to withstand wind and floods. Insurance companies are also starting to include climate analysis in their loss models. For example, the reinsurer Swiss Re will incorporate results from a study which found a direct link between climate change and insurance losses in its proprietary windstorm rating tool.[6]

The euro area insurance sector, and in particular the reinsurance segment, is increasingly prepared to handle possible future high-impact, albeit low-probability, events, or several closely spaced events affecting parts of the sector and individual insurers. Trends toward diversifying business lines, together with improved tools to transfer and spread risk, should help maintain the robustness of the insurance sector.

3 See, for example, U. Hommel and M. Ritter, "New Approaches to Managing Catastrophic Insurance Risk", in M. Frenkel, U. Hommel and M. Rudolf (eds) (2005), *Risk Management – Challenge and Opportunity,* 2nd edition, Berlin: Springer Verlag.
4 See UBS (2007), "UBS Investment Bank Launches UBS Global Warming Index", press release, 24 April. UBS motivated the launch of this index by noting that global warming has created much more volatility in temperature and weather conditions, which has led to high growth and increased liquidity of weather derivatives.
5 For a more detailed description of catastrophe bonds, see Box 15 in ECB (2005), *Financial Stability Review,* June.
6 See Swiss Re (2006), "The Effects of Climate Change: Storm Damage in Europe on the Rise".