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CROP MICRO-INSURANCE

TACKLING POVERTY- ONE INSURANCE POLICY AT A TIME

MICRO-INSURANCE WORKING PARTY

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1. EXECUTIVE SUMMARY

- 1.1. Micro-insurance can be simplistically defined as insurance for the low-income population of developing economies. This is a relatively new area of interest in the global insurance market and active participants include local communities, non-profit organisations, multinational insurance and re-insurance companies, and governmental and intergovernmental bodies. Micro-insurance has the potential to play a crucial role in reducing poverty and in improving living standards for low income communities around the world. Given the size of the potential market, there are significant opportunities for growth in micro-insurance classes such as Life, Health, Crop, Livestock, Personal-Accident and others.
The actuarial profession has the potential to make a significant contribution to the development of micro-insurance, just as it has done for insurance in now developed countries. When attempting to solve micro-insurance problems, it is important that actuaries work closely with academics and other professionals.
- 1.2. This paper focuses on crop micro-insurance. High proportions of people in developing countries directly depend on agriculture and are therefore vulnerable to adverse agronomic events, such as droughts. Farmers face production and post-production risks, all of which have the potential to materially affect quality of life. In the absence of crop insurance, farmers manage agronomic uncertainty both by reducing the riskiness of the income process, for example by planting crops with low covariance in yields, and by dealing with the consequences of any residual risk, for example by pooling risk within extended families, ethnic groups, neighbourhood groups or professional networks. These risk management methods are often useful but suffer from various inefficiencies. Crop insurance, where available, can be a useful component of an agricultural risk management strategy.
- 1.3. Crop insurance can be offered on an indemnity basis, where claims are based on incurred crop loss, or on an indexed basis, where claims are a defined function of an index, chosen to be a good proxy for incurred crop loss. There is not yet a consensus amongst academics or practitioners as to the best form for crop micro-insurance but leading contenders include weather index insurance, area yield index insurance and group stop loss indemnity insurance. Claims payments from weather index insurance are a defined function of recorded weather at a contractual weather station. By contrast, area yield indexed insurance claims are a function of average local yields for a specific crop, estimated through crop cutting experiments in a sample of local farms, and group stop loss indemnity insurance claims are a function of the total crop loss incurred by a large group of farmers, who are joint policyholders.
- 1.4. Various parties are involved in providing crop micro-insurance. These include grassroots level organisations, insurance and reinsurance companies, distribution channels, third party administrators, governments, regulators, non-governmental organisations (NGOs) and international financial organisations. The actuarial profession can also have an important role to play in providing technical assistance for crop micro-insurance, particularly in areas such as product design, pricing and risk finance and management.
- 1.5. Designing a useful, affordable micro-insurance product is challenging. For example, when designing a weather index crop micro-insurance product various important and sometimes conflicting factors need to be considered. An agronomic basis needs to be developed for the insurance product. The product should be easily understandable by the target market, basis risk needs to be minimised and weather data for measuring indices needs to be collected. Different versions of the

product need to be considered depending on circumstances, e.g. standalone, packaged with a loan or savings product.

- 1.6. As for other insurance products the premium for crop micro-insurance comprises the expected payout, expense loading, profit margin and cost of capital. When pricing a portfolio of weather indexed crop micro-insurance policies a portfolio approach to estimating the expected payouts is likely to be more efficient than a standalone approach. Portfolio risk analysis can be carried out to determine the amount of risk capital required.
- 1.7. There are various mechanisms, which insurers could use to finance a crop micro-insurance product. These include self financing, mutuality, reinsuring, government funding, catastrophe bonds and pooling. All these methods have their pros and cons and a provider may decide to use a combination of these methods to finance different risk layers.
- 1.8. The structure of this paper is as follows. The next section describes crop micro-insurance in a global context. The third section discusses why low-income farmers might wish to purchase crop micro-insurance. The fourth section describes the various parties involved and their role in crop micro-insurance. This is followed by three technical sections dealing with product design, pricing and risk financing respectively. Section 8 then describes some case studies of crop micro-insurance in practice. The final section includes areas for further work. The authors would be very keen to hear from anyone who is interested in being involved in future work on micro-insurance.

2. GLOBAL CONTEXT OF CROP MICRO-INSURANCE

2.1. The extent of poverty

- 2.1.1. Reducing global poverty is one of the most important challenges, which we currently face. Almost half of humanity lives on less than USD\$2 a day¹. Around 80% of the world population live on less than USD\$10 a day². A range of strategies are required to try and reduce poverty. These strategies include providing basic financial services to low-income communities around the world to help them with their savings and protection needs. One area of protection for the rural low-income population is against weather risks.

2.2. Need for risk transfer

- 2.2.1. There is a need for efficient and innovative risk management instruments that will transfer a proportion of weather risk to insurance and other financial markets. This would allow farmers, agribusinesses and banks/MFIs who lend money to farmers to protect themselves from this risk. The United Nations Development Programme (UNDP) suggests³ that moving towards poverty reduction requires not just the generation of growing and sustainable income streams among the poor, but also protecting these incomes through effective risk management - a complementary, twin-track approach. Efficient methods of transferring agricultural risks are required.

2.3. Microfinance

- 2.3.1. Microfinance can be broadly defined as the provision of basic financial services for those on low incomes, who might otherwise be unable to access these services

¹ 47% of the world's population in 2005- Poverty Data, A supplement to World Development Indicators 2008, World Bank, Page 11.

² World Bank Development Indicators 2008.

³ Building Security for the Poor: Potential and Prospects for Microinsurance in India. UNDP 2007. Page 5.

through the mainstream retail banking sector. These financial services include savings, credit, money-transfer and insurance. The term 'Microcredit' is often used to describe arrangements by which unsecured or partially secured loans of relatively small amounts are provided to individuals and community groups for the purposes of generating income. Microcredit lending models are often group based, in which there is a group responsibility to borrow sensibly and to avoid defaulting on repayments. Microcredit schemes have typically reported very low default rates to date and some Microfinance Institutions (MFIs) have become very successful and well renowned such as the Grameen Bank in Bangladesh. MFIs provide essential financial services worldwide to millions of people with low income.⁴ In addition to focussing on financial products MFIs may also be involved in social development projects in collaboration with the low-income communities they work with.

2.4. *Micro-insurance*

- 2.4.1. Micro-insurance is insurance, which is specifically designed for the low-income population of developing economies. Micro-insurance can be defined as the protection of people on low incomes against specific perils in exchange for premium payments proportionate to the likelihood and cost of the risk involved.⁵ Micro-insurance transactions typically aim to be relatively cheap so as to reflect customers' ability and willingness to pay for the insurance. The target communities are often involved in the important phases of implementing the insurance product such as the product design and rationing of benefits.⁶
- 2.4.2. Micro-insurance is often directly linked to microcredit loans, with the insurance payout helping to repay the loan in the event of the borrower being unable to repay the loan because of the occurrence of the insured event. For example, the Jamii Bora Trust, a MFI in Kenya, identified that the main cause for their borrowers defaulting was the high expenses incurred by the defaulters in hospital fees due to illness. Consequently the Jamii Bora Trust introduced a hospitalisation insurance cover linked to the microcredit loans they gave out. Similarly, for many MFIs making agricultural microcredit loans to farmers on low-incomes, crop micro-insurance products which help repay the loan in the event of a poor harvest can be of benefit to both the lending MFIs and the borrowing farmers.
- 2.4.3. Micro-insurance currently covers around 135 million people, which is only 5%⁷ of the potential market. The potential market is estimated to be between 1.5 and 3 billion policies⁸ worldwide. Micro-insurance products cover risks in all areas of insurance from life, health and personal accident to crop, property and livestock.
- 2.4.4. Nearly half of the world's population - about 2.9 billion people - live in rural areas. An estimated 86 % of these people depend on agriculture as a source of livelihood. Agriculture generates an average of 29% of GDP for agriculture based economies, which include most countries in Sub-Saharan Africa. For agriculture based economies, agriculture provides employment to more than two-thirds of the

⁴ Mahul, Stutley. Government Support to Agricultural Insurance: Challenges and Options for Developing Countries. The World Bank. Page 52-53.

⁵ Churchill, Protecting the Poor: A Micro-insurance Compendium, 2006

⁶ Micro-insurance Academy (MIA)- <http://www.microinsuranceacademy.org/microinsurance>

⁷ Lloyd's 360° Risk Insight Insurance in developing countries: Exploring opportunities in micro-insurance, Page 11.

⁸ Lloyd's 360° Risk Insight Insurance in developing countries: Exploring opportunities in micro-insurance, Page 11.

population. Hence, in many countries around the world, agricultural development can contribute to spurring growth and reducing poverty.⁹

3. WHY CROP MICRO-INSURANCE?

- 3.1. In the event of suffering an agricultural loss, a rural low-income family may be deprived of the food and earnings required to provide them with adequate nutrition. Many low-income families in developing countries are nuclear families, who may lack some of the informal safety nets (e.g. assistance from other family members) available for joint families. Moreover subsistence farmers, who are very prevalent in developing countries, are very vulnerable to agricultural losses. The family may be forced to stop sending children to school and many children may be forced to switch over to child labour. If the family is already in debt the situation would deteriorate further, requiring them to sell valuable long term assets such as household possessions and livestock.
- 3.2. Having crop micro-insurance may enable better access to credit, both formal (banks and MFIs) and informal (e.g. Self Help Groups). The insurance may also provide an initial cushion over a period of time, while the family adopts other survival strategies. For any crop micro-insurance product there is an important need to educate customers about the product and to raise awareness on the need for insurance. Crop micro-insurance products can be made more accessible by using technologies such as smart cards, biometric cards and kiosks.
- 3.3. *Risks faced by farmers*
 - 3.3.1. Agricultural producers and agribusinesses face a range of different risks. Risks can be classified as Production and Post Production Risks.
 - 3.3.2. **Production Risk** means the risk of worse than expected volumes or quality of the agricultural commodity produced. For production risk, weather is one of the most important factors. Weather affects most aspects of the agricultural supply chain and is very important in economies where agriculture is primarily reliant on rainfall. Adverse weather events may have a significant effect on farmers' incomes. Some of the factors, which may cause crop yields to be lower than expected, include the following:-
 - Lower than expected rainfall and rainfall at the wrong time.
 - Significant temporal and spatial variation in rainfall.
 - Unreliable irrigation (e.g. inefficient canal and tube-well irrigation) and the adverse effect of weather conditions on irrigation.
 - Other weather factors e.g. temperature and humidity.
 - Pests and poor soil management techniques.
 - 3.3.3. The interaction between these various factors may also have a significant effect on reducing the crop yield. For example, a drought may worsen ground water irrigation and also give rise to certain crop-pest epidemics.
 - 3.3.4. **Post-Production Risk** means the risk to the farmer of receiving a lower price for his crop than expected. Price risks may be influenced by:-
 - Demand & supply factors from domestic and international markets.

⁹ Mahul, Stutley. Government Support to Agricultural Insurance: Challenges and Options for Developing Countries. The World Bank. Page 18.

- Government intervention (e.g. through Minimum Support Prices).
 - Changes in import-export policies.
 - Local infrastructure facilities and integration of markets. Poor rural connectivity due to lack of infrastructure (e.g. poor roads) may make it difficult for farmers to sell their produce directly to consumers in the market.
 - Information asymmetry reduces farmers' bargaining power.
- 3.3.5. Some structural features in developing countries, which have impeded farmers from finding fair prices for their products includes the following:-
- Limited negotiating power of small-scale farmers and greater bargaining power of crop purchasers and powerful 'middlemen'.
 - Operation of local monopolies (e.g. of large scale farmers) which artificially distort prices.
- 3.3.6. The costs of transporting the produce to consumers are often very challenging for small scale farmers. Another post-production risk is the risk of the produce perishing or being damaged by pests in granaries and other storage facilities. Also, political tensions and acts of war, vandalism etc. may sometimes cause damage to harvests.
- 3.4. *Identifying risks faced by farmers*
- 3.4.1. One of the most important stages of developing a crop micro-insurance product is to identify the most important risks which need to be mitigated. These important risks should not be substantially and cost-effectively addressed by other risk management mechanisms.
- 3.4.2. Feedback from farmers and stakeholder participation in identifying and quantifying risks is very important in ensuring that the insurance genuinely meets their needs.
- 3.4.3. Catastrophic risks for crop insurance are typically low frequency, high severity loss events, which are correlated across space. Examples include droughts, hurricanes, floods, snowstorms etc. In general, these spatially correlated catastrophic risks are a major constraint for delivering financial services to rural low income people in developing economies.
- 3.4.4. It is important to recognise that crop micro-insurance will not be able to address all the risks faced by farmers, but that it can be used to complement the existing risk management mechanisms.
- 3.4.5. Agricultural systems modelling (ASM) techniques provide insights into the interaction between the environment and crop and livestock systems. For example the relationship between crop yield and rainfall, soil moisture, crop management and crop physiology can be analysed more accurately using ASM.
- 3.4.6. ASM can also help in improving the correlation between insurance payouts and losses experienced by farmers and so reduce the Basis Risk¹⁰ in indexed crop insurance. ASM can also be used to understand how indexed insurance fits in with the other risk management options. Models can be used to understand what type of insurance product may be most suitable for attaching to agricultural loans.
- 3.5. *Extreme weather events*
- 3.5.1. Extreme weather events can have an extremely detrimental effect on agriculture, especially in developing economies where agricultural output is very strongly

¹⁰ See section 4.6 for definition of Basis Risk.

dependent on weather conditions. These extreme weather events include drought, unsuitable or excessive rainfall, flooding, extremes of temperature, hail, storms etc.

- 3.5.2. Natural disasters affect economic development at various levels. Hence it is in the interest of individual households, MFIs, governments and international donors and organisations to develop effective risk management methods and mechanisms for transferring the risk of natural disasters to other markets. New approaches to risk management could encourage increased investment in agriculture and reduce the impact of extreme weather events on the various stakeholders involved.
- 3.6. *Effect of an extreme weather event on a developing economy*
 - 3.6.1. Since agriculture is an important part of the economy for many developing countries¹¹, extreme weather events can have a significant impact on the economic growth and social conditions of these countries. In years of bad weather, there may be a consequent reduction in economic growth and a subsequent increase in crop insurance payouts. For example, in the 2002-2003 growing season in India, there was a 49 % fall in rainfall levels in July 2002, which is the most important month for the monsoon-season crop production. In the same month, crop production fell by 19% (the largest fall in 30 years) and the GDP growth decreased by over 1%.¹²
- 3.7. *Effect of an extreme weather event on low-income populations*
 - 3.7.1. For the rural low-income population of developing economies extreme weather events can have a particularly strong effect on farmers both directly and indirectly. For example, an extreme weather event can directly affect agricultural output leading to loss of earnings for the farmer. The actual impact will depend on the strategies used to mitigate the risk of weather shocks.
 - 3.7.2. Faced with the risk of an adverse weather event happening farmers often decide not to invest in innovative methods even though in principle these would enable the farmer to increase his income and assets¹³. Also, farmers access to credit and finance for agricultural work may be restricted because lenders will charge extremely high interest rates because of the higher risk of default due to weather shocks.
 - 3.7.3. Farmers from developing economies have often struggled to repay loans, especially when they have been adversely affected by weather events. These have led to extremely tragic consequences with “pressures to repay loans” frequently leading to farmers committing suicide. Farmer suicides should be a cause for concern worldwide, given the scale of the problem. For example in India, according to one estimate, nearly 200,000 farmers have committed suicide since 1997¹⁴.
 - 3.7.4. When an adverse weather event happens farmers are often forced to sell their long term assets such as household possessions and livestock or have to stop the education of their children and migrate. Cash inflow from alternative sources of employment may also fall. For example, daily wage rates may fall due to the sudden increase in the supply of labour due to the forced unemployment of farmers.
 - 3.7.5. The long term effects of an extreme weather event may last for years in the form of diminished farming capacity and weakened livelihoods. A Poverty Trap¹⁵ is the situation where a household falls below the poverty line and is unable to generate

¹¹ Mahul, Stutley. Government Support to Agricultural Insurance: Challenges and Options for Developing Countries. The World Bank. Page 18.

¹² Hess, Innovative Financial Services for Rural India, Page 4.

¹³ Hess, Managing Agricultural Production Risk. The World Bank. Page 6.

¹⁴ P.Sainath, The Largest Wave of Suicides in History, Counterpunch.

¹⁵ Hellmuth et al. Index insurance, development and disaster management. Page 5.

sufficient income to return to its previous economic status. Crop micro-insurance can help in compensating people for weather related losses so that they are not forced to sell their long term assets and help them avoid falling into the poverty trap.

3.8. *Ways of managing extreme weather risks in the absence of insurance*

3.8.1. In the absence of insurance, strategies used by the rural low-income population to manage their risks *before* an extreme weather event has happened are called **ex-ante strategies**. These include the following:-

- Using less risky technologies of lower yielding but robust crops. However, the lower average long-term yields from these crops, makes this a risky strategy from an overall livelihood perspective.
- Diversifying both farming and other activities to reduce exposure to weather risks. These may include seasonal migration to other geographical areas, even though they may still be exposed to the extreme weather events in these other areas.
- Saving goods and buffer stocks (farm output, objects for trading) during 'good' months.
- Holding small savings accounts.
- Diversifying crops, intercropping and crop sharing with other farmers.
- Varying cropping practices e.g. planting in different fields and staggering planting over time. This strategy may not have much impact if the different fields are exposed to similar risks from the same weather events.
- Managing risks at a community level by building irrigation projects and conservation tillage to protect the soil and the moisture content.

3.8.2. In the absence of insurance, strategies used by the rural low income population *after* an extreme weather event are called **ex-post strategies**. These include the following:-

- Migrating to other regions to seek a different livelihood.
- Borrowing money from banks, MFIs and the informal market (e.g. moneylenders, relatives).
- Selling assets such as household goods and livestock.
- Cutting all expenditures of the household e.g. school fees, food. Removing children from school and cutting down on other expenses. These steps often have very serious long term effects on families and communities by adversely affecting the continuation of education.

3.8.3. These ex-ante and ex-post strategies may turn out to be cheaper than taking out insurance, at least in the short term. This is especially the case if the insurance premium is very high and not subsidised by the government. Moreover, if the cost of insurance is very high, the farmer may find it difficult to take out agricultural loans (with insurance bundled in with the loan) and consequently there will be less investment in farming.

3.8.4. In choosing these strategies the farmers may be able to reduce their exposure to idiosyncratic risks and may be able to manage uninsurable risks. For example, by improving sustainable farming methods, a farmer may be able to improve agricultural output over time.

- 3.8.5. Some of these strategies are traditional methods, which involves the entire community and often helps in building strong social ties. From a sociological aspect some of these strategies are an important part of the farmers' cultural heritage and so may be preferable to taking out insurance cover.
- 3.8.6. These mechanisms may function effectively for small losses, even if these losses occur relatively frequently. However, these mechanisms often fail when faced with infrequent but very severe events. These risks can affect entire regions at the same time and cause the failure of most informal risk sharing arrangements. In the absence of insurance, the other risk management mechanisms may fail for a number of reasons. For example:-
- In the absence of crop insurance, farmers in developing economies who rely mainly on rainfall for their farming, often find it very difficult to access loans for investing in agriculture. When loans are available the interest rates are often very high. This is because banks perceive the weather risks to be extremely high.
 - Diversifying across different jobs may not help if the weather event has affected various livelihoods. For example, a drought may adversely affect both farming and non-agricultural occupations.
 - Reciprocity or some kind of self insurance among relatives and neighbours may not work if neighbouring households have been affected by the same weather event.
 - Distressed sales of livestock and household goods may only be possible at low prices if other households are selling their livestock and goods at the same time because of the weather event. Moreover, the health of the livestock may be affected by the weather event too, further lowering the prices.
- 3.8.7. Crop micro-insurance is not a replacement to using these ways of managing weather risks but is meant to complement and work alongside these existing methods. It can also be used to fill in the gaps which exist in these risk coping mechanisms.
- 3.9. *Two categories of crop micro-insurance*
- 3.9.1. Depending on how claims are paid there are 2 main categories of crop micro-insurance - indemnity basis and indexed version.
- 3.9.2. Indemnity Basis- A valid claim is paid when an actual agricultural loss is incurred. The agricultural loss may be during the production or post-production stage and may have been caused because of adverse weather, pest, flooding or any other reasons. The insurance payout would indemnify for the actual loss incurred, at least to some extent. This type of crop insurance has traditionally been used and continues to exist in many markets. It may compensate losses suffered by farmers more accurately but has several disadvantages. These disadvantages often make this type of crop insurance unsustainable in micro-insurance markets. Historically the high cost of the risk premium and costs incurred in collecting premiums, claims settlement expenses and other administrative expenses have increased market premiums and often made crop micro-insurance very expensive. This has led to relatively low take-up rates. Some of the problems with crop micro-insurance on an indemnity basis, include the following:-
- Moral hazard can be higher for farmers, dependant on rainfall, once they have taken out loans. If the farmers can claim for losses irrespective of the weather conditions, they may have a disincentive to optimise their crop production.

- Anti-selection- Farmers, who expect to incur a loss, may be more inclined to buy the insurance.
 - High expenses- developing product, delivering and monitoring product and verifying validity of claims. The verification process can also lead to considerable delay in the settlement of claims.
 - Correlated risks with potentially large catastrophic risks.
 - Low take-up due to various barriers including customers being smallholder, low-income farmers who cannot afford the premium and low awareness about insurance.
- 3.9.3. Indexed Basis_ A claim is paid depending on how a specified, measured event compares to specified thresholds or triggers, as described in the product design. For example, for one product \$X may be payable for every centimetre deficit in rainfall less than Y centimetres, where Y is the trigger point and subject to a maximum of \$Z being payable. So, the insurance payout depends only on the specified, measured weather event and the index used to specify the claim payment. The insurance payout does not depend on the actual agricultural loss incurred.
- 3.9.4. In addition to rainfall, indices could be developed for offering indexed crop insurance contingent on floods, soil moisture, crop yields etc. Some of these other measurements may be a better proxy to crop yield than rainfall. For example, soil moisture may have a stronger correlation with crop yield than rainfall does.
- 3.9.5. Indexed insurance products could be used for flood micro-insurance products too. Such flood insurance products are being used in Vietnam in the Mekong Delta. The risks and challenges of an indexed flood insurance product are similar to those for any indexed crop insurance product. Some additional considerations include the use of flood mapping techniques and the highly localised variation in flooding.
- 3.10. *Insurer's exposure to risks under crop micro-insurance*
- 3.10.1. For both the indemnity and the indexed versions insurers' exposure to risks depends on various factors, which include the level of cover and maximum policy payout, the correlation of different risks insured by geography and over time, the extent to which reinsurance is used etc.
- 3.10.2. Business volumes may be lower than expected resulting in lower than expected aggregate profit. The insurer is particularly exposed to this risk if the premium charged is perceived to be very high and/or if the indices used (in the case of the indexed version) are not a good proxy to the losses incurred by the customers. There is a risk of higher than expected new business strain if the insurer sells many more policies than expected.
- 3.10.3. Business mix may be different from what the insurer expects e.g. more policies with small premiums sold. This may make it difficult for the insurer to recoup all expenses and maintain the required profit contribution, especially if the expense loadings are premium related and larger policies cross subsidise smaller policies.
- 3.10.4. Claims experience may be worse than expected e.g. poorer rainfall than expected. Moral hazard may be a particularly major risk for the indemnity version of insurance. Farmers may have a disincentive to optimise their agricultural output if they think they will be indemnified in the event of any losses incurred. Anti-selection may worsen the claims experience for both indemnity and indexed insurance. For example, as a season progresses farmers may have a more informed view of what the rainfall experience of the season would be like and may consequently decide to

take out insurance. Crop micro-insurance policies usually have a time limit specified in the policy wording, after which further policies cannot be taken out. Depending on the design of the product there is a trade-off between having either small claims paid reasonably frequently and large claims paid if extreme, rare events take place. Many existing weather indexed products fall into the second category.

- 3.10.5. Concentration of insured risks is a major risk for the insurer. If writing a geographically concentrated portfolio of risks, the insurer is exposed to the risk of suffering large losses from a single event e.g. poor rainfall throughout a particular region.
- 3.10.6. Adequate reinsurance may not be available or the cost of reinsurance may be very high. Insurers may find it difficult to charge cheaper premiums if the cost of reinsurance is very high.
- 3.10.7. Expenses may be higher than expected. For example, the expenses of setting up weather stations (for indexed insurance) and monitoring rainfall etc may be higher than the insurer expected. The cost of training the staff of local microfinance institutions (MFIs) may be higher than expected.
- 3.10.8. Regulations may change and insurers may face political pressure. For example, the maximum premium charged for crop micro-insurance may be capped by changes in regulations. Similarly there is a risk from changes in taxation and in the freedom an insurer has in refusing to underwrite some risks.
- 3.10.9. Hence, for an insurer writing crop micro-insurance, there may be considerable diversification benefits if diversifying across different developing economies.
- 3.10.10. Other risks include the risk of mismanagement or fraud by the local agents of the insurer, currency risks, risk of war and political upheaval. Competition risks include the risk of being priced out of the market by government insurance companies, which may be able to charge highly subsidised premiums.

3.11. *Basis risk*

- 3.11.1. Claim payments from indexed crop micro-insurance products depend only on the specified index and the relevant weather event happening. Since claim payments do not depend on the actual profits or losses incurred by the farmers, claim payouts cannot be artificially manipulated, provided the weather event is accurately measured. Also, farmers will have an incentive to maximise their agricultural output, since the claim payout will still be payable if the farmers have a profitable crop yield and the specified weather event has taken place. Hence, the indexed version of crop micro-insurance significantly reduces the moral hazard and anti-selection involved, both of which have traditionally been a big problem for implementing the indemnity version of crop micro-insurance.
- 3.11.2. However, the fact that claims are linked to an index and not to the actual loss incurred, results in a basis risk. This basis risk is one of the drawbacks of indexed crop insurance. The basis risk could potentially be reduced by having more sophisticated products and/or by having many products, each tailor-made for a specific crop. However more complicated and multiple products may be difficult to understand and the take-up rate may be low. Hence there is an important trade-off between reducing basis risk and increasing the complexity and number of individual products offered.
- 3.11.3. Basis risk is the risk of choosing a wrong base for the settlement of the claim, resulting in a low correlation between the losses incurred and claims paid out. So,

this may result in times when the farmer incurs a loss but the insurance does not sufficiently compensate her for the loss. There may also be times when the farmer does not incur a loss but an insurance claim is still paid, since this is linked to the weather event.

3.11.4. Basis risk may have 3 different components depending on the product design. These are:-

- Spatial component - Most weather indexed insurance policies make claim payments based on the rainfall or temperature recorded at a local weather station. Rainfall differs across different locations. So the rainfall as measured at a weather station may not be a good indication of rainfall experienced by the insured farmer. Hence the claim paid to a farmer may be poorly correlated to the actual crop yield experienced by the farmer. This is a major challenge to plans for scaling-up operations. Certain risks (e.g. inadequate rainfall, flooding) may be more susceptible to spatial basis risk than other risks (e.g. droughts).
- Temporal component - During different stages of farming the amount of rainfall has different effects on the crop yield. So even if the rainfall has been "sufficient" overall the farmer may suffer a loss if the timing of the rainfall has not been suitable.
- Crop-specific component - Basis risk may exist due to the low correlation between insurance claims paid and crop yields due to crop specific agronomic features. These agronomic features include a variation in planting times, duration of growing season and sensitivity to rainfall, average temperature etc. This component of basis risk is a problem when the product design of the insurance does not sufficiently allow for crop-specific features.

3.11.5. The various stakeholders involved- farmers, insurance companies, MFIs- have different ways of mitigating basis risk. These methods include the following:-

- Self insurance or risk pooling (e.g. in a group of farmers) for protection when individual farmers incur losses but claims are not paid out because the trigger event has not happened.
- Offering supplemental insurance products or improving the existing product design.
- Blending index insurance with rural savings schemes. For example, farmers could be encouraged to save regularly, with a part of their savings being used to pay the premium for an insurance product. The balance of their accumulated savings can be used for compensation when the insurance payout itself does not adequately compensate farmers for their losses.
- Cover for Extreme Events only, although this may still retain substantial basis risk.
- Installation of more weather stations, improved Remote Sensing (e.g. Satellite imagery) techniques and a better understanding of the regional variations in weather.

3.12. *Benefits of using indexed crop micro-insurance*

3.12.1. The availability of insurance may enable rural low-income populations to increase their investment in agricultural activities, which may increase their income and improve their financial circumstances both in the short and long term. The indexed version of crop micro-insurance has various advantages and disadvantages relative to the indemnity version.

- 3.12.2. Indexed crop insurance can substantially reduce many of the costs associated with crop micro-insurance on an indemnity basis¹⁶. Claims settlement is significantly cheaper if the claim depends on an easily verifiable index. The nature of the product substantially reduces anti-selection risk and moral hazard. Like indemnity insurance, the insurance can be linked to agricultural loans, which reduces premium collection expenses.
- 3.12.3. Some advantages of using indexed insurance for ex-ante risk management include:-
- Delays in reporting and settlement of claims should be relatively negligible after the occurrence of the specified weather event, especially as the claim verification process should be relatively speedy.
 - Farmers can use their increased access to affordable loans for improving their other risk management strategies e.g. invest in irrigation projects.
 - Claims are linked to an objective and independent source of information for calibrating an event.
 - Historic data on these events (e.g. historical levels of rainfall) often exists or this data could be collected with reasonable accuracy on an ongoing basis. This allows insurers to simulate the probability distributions of claim frequencies and severities.
 - Because the insured event (e.g. a certain level of rainfall) may be relatively easily verifiable, reinsurance may be easier to obtain for indexed products. Reinsurers could include governments, international organisations and/or reinsurance companies. The reinsurance could be used to transfer most of the catastrophic risk.
 - Expenses in verifying claims and other transaction costs are greatly reduced if payments are linked to weather events. However, there may be additional expenses for helping to set up weather stations and maintaining systems for measuring the weather event.
- 3.12.4. Disadvantages of indexed compared to indemnity crop micro-insurance include:-
- Basis risk may be significant depending on the correlation between the actual loss incurred by the farmer and the rainfall recorded at the weather station, the index used and the product design etc. Also if the agricultural losses have occurred for other reasons (e.g. pests, flooding), which are not measured by the index then there may be a large disparity between losses and payouts.
 - Setting up and maintaining weather stations and other infrastructure required for measuring rainfall may be expensive and challenging.
 - Constructing suitable indices and a suitable product design may be challenging and subject to more basis risk. Also product design may need regular reviewing.
 - Indexed products may be more difficult to understand and explain especially if the product design is made more complex to deal with basis risk.
- 3.12.5. Benefits of indexed crop insurance to farmers include:-
- Protecting rural livelihoods and consequently reducing poverty.
 - Protecting the productive capacity of households.

¹⁶ US Aid, Index Insurance for Weather Risk in Lower-Income Countries.

- No repayments being required and/or benefits being received in the event of adverse weather conditions.
 - Improving low income households' access to credit and microfinance. The insurance may be better collateral than the farmers' household goods.
 - Smoothing income over time.
 - Being able to invest in improving their farming methods without being as exposed to weather risks as they would be without insurance.
- 3.12.6. Benefits of indexed crop insurance to lenders of loans to farmers include:-
- Making lending more secure and reducing weather related default rates to some extent and reducing collateral requirements.
 - Being able to increase amount lent.
 - Making loan terms more affordable may lead to higher take-up rates.
- 3.12.7. Benefits of indexed crop insurance to (re)insurance companies include:-
- Offering diversification benefits.
 - Increasing potential for writing new business.
- 3.12.8. Benefits of indexed crop insurance to Governments include:-
- Reducing volatility in agricultural income.
 - Reducing emergency risk management outlays to some extent.
 - Making efficient and equitable access to finance for low-income households dependent on agriculture.
 - Allowing government funds to be used more effectively for disaster relief and other development projects.
 - Promoting growth of rural markets.
- 3.12.9. Conditions for successful crop micro-insurance
- 3.12.10. Two essential conditions for insurance, which are a challenge for indexed crop micro-insurance are:-
- The insured must have an insurable interest such that the product is not simply a wager.
 - The product should compensate the insured for the insured risk at a cost effective price.
- 3.12.11. The first condition may be a problem if the presence of the insurance encourages people to take on disproportionately high risks and/or reduce their incentives to practice their optimum farming techniques and/or their other risk management methods. However this risk can be reduced to some extent with good product design and interaction with the customers. Features such as limits to the maximum payout help in reducing the risk of customers taking out very high loans and other financial commitments due to the availability of the insurance.
- 3.12.12. The second condition can be mitigated by the methods used for reducing basis risks. In general, if the index used is a very good proxy to actual losses incurred this condition for insurability should be satisfied. Hence, one of the main challenges for indexed crop micro-insurance is to improve the correlation between the index and the losses incurred.

3.12.13. The ideal conditions required for insurance presents both opportunities and challenges for indexed crop micro-insurance. For example:-

- Large number of homogenous risks should be insured for the Law of Large Numbers to apply- this condition can be satisfied by insuring a large number of similar farming plots. Effective pooling of risks would reduce the variance of the entire portfolio of policies.
- Moral Hazard should be minimised- Moral Hazard could be significantly reduced if claims are linked to weather events instead of the losses suffered by the farmer, as the farmer will not be able to submit fraudulent claims, if the weather event itself can be easily measured and verified.
- Ultimate Liability of loss should be known- The insurer's ultimate liability can be specified in the policy conditions in terms of the rate paid (e.g. for insuring against inadequate rainfall, £X may be payable for every 1 unit deficit in rainfall below the threshold of Y units) and a maximum policy payout.
- Risks should not be concentrated- This is a particularly important risk for Crop insurance as claims paid will often be strongly correlated across space. To protect solvency, the insurer may use suitable forms of reinsurance and also write a portfolio of policies, diversified over a large geographical area to reduce their correlations across space.
- Premium should be calculable and should be economically affordable for the target market- Suitable probability distributions and methods should be used to calculate the claim frequency and severity. This may be particularly challenging in the case of low frequency, high severity claims. Also, there should be specific focus on ensuring that the premium is affordable as well as covering insurers' costs and profit criteria, if the product is to be sustainable on an ongoing basis.

3.13. *Sustainability of crop micro-insurance*

3.13.1. For a crop micro-insurance product to be successful it needs to be sustainable. By 'sustainable' we are referring to a product, which, in the medium to long term, will continue to be attractive to farmers and which insurers will be able to continue marketing while meeting their profit criteria. For the product to be sustainable, (without government subsidies) the benefits (both financial and non-financial) of the product need to exceed the unsubsidised cost of the product. The insurance must be affordable and considered to be good value for money by customers. The existence of other risk management tools (e.g. disaster relief, informal risk management strategies etc) and their perceived effectiveness will also influence the demand for these products. Also the extent of weather risks compared to other risks (e.g. market, political, war risks) is important in assessing the sustained demand for these products.

3.13.2. Some of the important features for a sustainable crop micro-insurance product are:-

- The product should be affordable for the target customers and should be perceived as being good value for money.
- The product should be deliverable to remote areas, so that transaction costs incurred by customers (e.g. transportation costs) are minimised and so that the take-up of the product is high.
- The product should be simple and easy to understand.
- Other benefits and incentives could be provided to increase take-up of product e.g. providing free advice on farming techniques.

- Product must aim to minimise anti-selection and moral hazard.
- Collaborations should be set up with other organisations (e.g. local Non Governmental Organisations (NGOs) and Self Help Groups), who are already present in the market, especially for understanding the customer's needs and in the distribution of the product.

3.14. *Demand for indexed crop insurance*

- 3.14.1. Demand for indexed insurance products is very important before projects can be scaled-up. Demand assessments should use customer feedback and these assessments should be carried out both at the start of a project and on an ongoing basis to ensure that the product continues to meet the needs of customers.
- 3.14.2. The demand for crop micro-insurance will depend on the following factors:-
 - Past experience of insurance by the target customers and whether they considered the insurance to be good value for money or not.
 - Awareness, of concepts of insurance, which is affected by levels of literacy, use of other financial products etc.
 - Accessibility to the first point of contact for the product. This may be the local sales channel of the insurance company, a MFI or a NGO, involved in the economic and social development of the local community. The existing relationship and with this first point of contact and the existing level of trust are very important factors for the take-up of the insurance product.
 - Attitudes towards other risk management strategies ex-ante & ex-post e.g. migration, buffer stocks, social security nets, Government disaster relief.
 - Social and Cultural factors e.g. more demand for crop insurance as this becomes the social norm.
 - Psychological factors e.g. increased take-up after years in which the rainfall has been bad and years in which insurance has paid out claims.
 - Disposable income of customers and opportunity cost of buying insurance, perceived value for money of insurance.
- 3.14.3. There are a number of reasons why farmers might not purchase a crop micro-insurance product. These include:-
 - The premiums maybe unaffordable.
 - They may be relatively less risk-averse.
 - There may be a lack of information and low awareness of product.
 - There may be a lack of trust in insurance companies and the financial services sector in general.
 - The bureaucratic process may be overly onerous and there may be high transaction costs involved in buying insurance.
 - The farmers may have no past experience of crop micro-insurance claims being paid out.
- 3.14.4. Index insurance may NOT be suitable for some types of risks. Some examples of these risks are:-
 - Risks which cannot be easily measured and verified and quantified on the indices used.

- Very frequent risks. Depending on the severity of claims the premium could become prohibitively expensive if the risks were very frequent. Other risk management strategies would be preferable in this case e.g. better irrigation if the geographical area is extremely arid and very drought prone.
- Unique idiosyncratic risk. The index would not be a good proxy to uncorrelated, independent risks, which may vary from customer to customer due to individual circumstances only.
- Risks which can be influenced by human behaviour. The customer should not be able to influence the indices being used.

3.15. *Lessons from economic theory: the design of desirable indexed products*

- 3.15.1. As already discussed, a good crop insurance product should have low loading and low basis risk. However, in practice some loading and some basis risk is inevitable. Economic theory can help us to understand the effect of loading and basis risk on rational demand, and therefore to help the design of desirable products. The following discussion is based on Clarke (2010).¹⁷
- 3.15.2. First, economic theory has useful things to say about the how rational demand changes with the degree of risk aversion. Rational demand for unsubsidised indexed cover is hump shaped in the degree of risk aversion. In particular, neither risk neutral nor infinitely risk averse decision makers would rationally purchase any indexed cover, the former because the commercial premium is higher than the expected claim income and the latter because purchase worsens the worst possible outcome. This is substantially different to indemnity insurance, since the most risk averse would purchase full indemnity insurance, but zero indexed cover.
- 3.15.3. Second, it is an open question as to whether indexed cover should indeed be called indexed insurance, or whether it should be called a derivative. The accountancy profession has ruled that for the purposes of International Financial Reporting Standards, weather derivatives are derivatives, not any kind of insurance, regardless of whether they are sold to individuals or large organisations. Economic theory supports this ruling, since the basis risk in weather derivatives means that they are not appropriate products for the most risk averse (Clarke, 2010). This differs from the prevailing practice which is to use the term index insurance to refer to a derivative sold to an individual for the purposes of hedging, regardless of the degree of basis risk.
- 3.15.4. Third, it is possible to derive upper bounds for rational purchase of hedging instruments using the restriction of decreasing absolute risk aversion. Loosely speaking, the logic of these upper bounds are that if an individual cares enough about the risk to want to purchase a hedge, they must care enough about the downside basis risk and the loading to limit the size of the hedge. In particular, weather derivatives with claims payable in one year out of three and loading of 100% or more seem to be fundamentally attractive products, which no rational individual would purchase. A good commercially priced weather derivative would therefore target catastrophic risk, with claims payable perhaps in one year out of ten. Such catastrophic products may be difficult to sell to individuals, but unlike high claim frequency weather derivatives, they are fundamentally sound.

4. THE PARTIES INVOLVED IN CROP MICRO-INSURANCE

¹⁷ Clarke, D (2010): A Theory of Rational Hedging, available at <http://www.stats.ox.ac.uk/~clarke/>

- 4.1. In this section we look at the organisations which are involved in providing micro-insurance and in particular crop micro-insurance. To a very large extent the list is the same as the list of parties who are involved in providing traditional insurance. However, the context of crop micro-insurance means that in addition to these traditional organisations, governments and international financial institutions and non-governmental organisations (NGOs) also have a significant role to play.
- 4.2. *Insurance companies*
 - 4.2.1. To provide crop micro-insurance there is clearly a need for an insurance company of some form. These can, as in developed countries, take many different forms. At one extreme there are insurance operations which are parts of large international insurance groups, either 100% owned by an international company or a joint venture between an international financial group and a local insurer, while at the other extreme there can be small local mutual insurance companies. One could debate ad nauseam which structure is better but which is better will depend on the specific situation. Being a small local operation may help the insurance company to overcome reticence among the locals to purchase insurance cover while being part of a large group offers an opportunity for greater diversity of risk.
 - 4.2.2. A number of European insurance groups have set up micro-insurance operations in developing countries sometimes as a joint venture with a local company. These companies include Allianz, Mapfre and Zurich Insurance. At the same time developing countries are themselves home to large commercial insurance companies such as Bradesco in Brazil and ICICI in India.
 - 4.2.3. There are a number of specific challenges for large insurance companies who want to enter into this market. It should be clear to management at all levels of the company that the micro-insurance product should contribute positively to the company's financial bottom line as well as to the company's corporate social responsibility rating. If it does not do the former then there is a high risk that management will not treat the product seriously and resources will be devoted to other more profitable line of business making the failure of the micro-insurance product a near certainty. The key requirements for profitable micro-insurance include generating sufficient scale and achieving high administrative efficiency. Management need to be focussed on these goals.
- 4.3. *Reinsurance companies*
 - 4.3.1. Many large global reinsurance companies have invested in micro-insurance and are involved in a number of pilot schemes. For example, Munich Re carries out research and sponsors conferences on this topic. Munich Re itself is involved in a pilot scheme in Indonesia along with Indonesian insurance company Asuransi Wahana Tata and the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) which offers low income households in the capital Jakarta the opportunity to insure against the direct economic losses and social risks caused by severe flooding. Swiss Re has been working with Oxfam America, Columbia University and Nyala, an Ethiopian insurance company, on a crop insurance pilot scheme.
 - 4.3.2. Reinsurers such as Munich Re and Swiss Re provide not just capital and sponsorship to local insurers; they also provide technical expertise and a risk transfer mechanism which can diversify the risks from one country or a region within one country against the same or different risks in other places. They can also provide a conduit between donors who wish to support micro-insurance and local insurance operations.

4.4. *Distributors and other service providers*

- 4.4.1. As with any insurance product, efficient and effective distribution channels are vital. Given the low margins available in micro-insurance, the pressure to keep per policy distribution costs down to a minimum is even greater. In some countries, insurance companies have teamed up with local utility companies (water, electricity and mobile phone operators) who already have a relationship with the micro-insurance target market. Insurance companies also use locally based agents and small kiosks in shops as outlets for their products. Creditor and crop insurance products are often sold when the client takes out a loan so as to keep to a minimum the additional distribution costs.
- 4.4.2. In order to keep costs down insurance companies can also look to outsourcing back office functions to specialist companies. As in developed countries this may not necessarily be a successful strategy

4.5. *Governments*

- 4.5.1. Developing country governments are potentially key to the success of micro-insurance by helping the insurance industry to develop in general and to encourage or even force the provision of insurance for people of low-income. The actual involvement of government will depend on how interventionist it is with respect to the provision of social insurance. Some governments would see it as their role to provide social safety nets while others prefer, or have no choice due to a lack of capacity but, to leave it to the market to provide such safety nets.
- 4.5.2. Governments can use various means to make insurance more attractive to its population, assuming that the government can reach the sectors of the country's population with the lowest income, many of who may be working in the informal sector. They can subsidise the premiums or subsidise some of the costs incurred by insurers providing micro-insurance. They can help to educate the population about the benefits of insurance. They can invest in product research and development, training and information gathering for crop insurance and livestock insurance. They can make insurance compulsory. They can ensure that insurance legislation and regulation is appropriate for the micro-insurance market, although they have to be careful to avoid the situation where "benefits meant exclusively for the poor often end up being poor benefits."¹⁸
- 4.5.3. Governments can also work with reinsurers and international organisations to ensure that, for example, pilot schemes are set up in places of real need. Governments can also provide public sector reinsurance programs for agricultural micro-insurance.
- 4.5.4. Governments and the private sector can cooperate at different levels in providing micro-insurance at various levels, from state control to a free market. The level of public-private partnership will affect the types of product provided and the impact on government finances.

4.6. *Regulators*

- 4.6.1. Insurance regulators, like governments have a key role to play in improving access of low-income people to financial products, not just insurance but banking services and credit. There is a tension between micro-insurance providers who might, in

¹⁸ Sen, A.K. 1995. "The political economy of targeting." in van de Walle and Nead (eds.). 1995. Public Spending and the Poor: Theory and Evidence. Johns Hopkins University Press, Baltimore, MD

order to keep compliance costs low, prefer to offer their products within a more limited regulatory regime than applies to traditional insurance.

- 4.6.2. In June 2007 the International Association of Insurance Supervisors published an issues paper “Issues in Regulation and supervision of micro-insurance”. In section 5 of this paper the IAIS acknowledged that “It is therefore important to develop principles, standards and guidelines which assist in identifying the entities that need to be regulated and providing the rationale to the supervisor to justify any differentiation between the insurers regulated by the insurance laws, the ones regulated by other laws or the entirely unregulated ones”.
- 4.6.3. As an example of the approach taken by a country to apply different regulations to micro-insurance, in January 2010 the Philippine Insurance Commission issued new regulations regarding micro-insurance¹⁹ which until then had been provided by a mixture of institutions not all of which were licensed insurance companies. From now on all providers of micro-insurance have to be licensed by the Insurance Commission but different regulations will apply to micro-insurance operations in the areas, for example, of agent training and - solvency requirements. The Insurance Commission has not yet issued the solvency requirements for micro-insurance providers.
- 4.6.4. In its “Issues in ... micro-insurance” paper the IAIS set out the following ideas of how supervisors could make micro-insurance sustainable and feasible in their territories:
- developing a micro-insurance policy and promoting its implementation;
 - facilitating the availability of key information/ statistical data on micro-insurance business;
 - promoting learning processes and dialogue among relevant stakeholders;
 - enacting clear laws and regulations in accordance with internationally accepted standards that encourage insurance coverage for low-income households and its compliance while limiting regulatory arbitrage,
 - contributing to the policy dialogue with government so that social insurance schemes are working in conjunction with micro-insurance;
 - developing clear policies to enhance access to financial services which can be used as a basis for discussion with legislators, and also between government departments and supervisors;
 - limiting moral hazard and fraud by promoting awareness, and putting in place controls and incentive systems; and
 - promoting consumer education and raising awareness to instil an insurance culture among low-income households.
- 4.6.5. Whether all of these considerations need to be taken into account by a regulator who is assessing crop insurance will be up to the regulator to decide. If crop insurance is heavily subsidised by government or overseas donors then there is perhaps no reason to reduce the level of regulation for this type of business compared to other similar lines of business sold to rich segments of the market.
- 4.6.6. It is not just insurance regulators who can affect the development of the micro-insurance market. Legislation and regulation regarding taxation, corporate

¹⁹ See: http://www.insurance.gov.ph/_@dmin/upload/reports/Joint%20IC-CDA-SEC.pdf

governance, financial inclusion and credit will also help or hinder the development of the micro-insurance market.

4.7. *International financial institutions*

- 4.7.1. The World Bank and the UN have been actively involved in promoting and sponsoring crop micro-insurance.
- 4.7.2. According to the World Bank²⁰, it has provided technical assistance for the development of innovative agricultural insurance programs in both low- and middle-income countries, often tying these programs into agricultural finance support efforts and complementary efforts in agricultural development. As of 2009, more than 15 index-based agricultural insurance programs had been implemented or enhanced with World Bank assistance in low- and middle-income countries. For example, the World Bank has assisted the government of India in improving the National Agricultural insurance Scheme (NAIS), which offers coverage against crop yield losses, using an area-yield index in the indemnity payment schedule. One of the problems with the original design of the NAIS was that the premiums were not actuarially based. Through the Financial Sector Reform and Strengthening (FIRST) Initiative, which is managed by the World Bank, a Canadian actuarial consultancy firm was used to derive actuarially based premium rates for the NAIS. While farmers still pay a flat rate, the State and Federal governments pay a subsidy so that the insurance company which covers the NAIS scheme, the Agriculture Insurance Company of India, receives a premium calculated using actuarial principles.
- 4.7.3. The International Finance Corporation, a member of the World Bank Group, also takes an interest in micro-insurance. It has set up the Global Index Insurance Facility (GIIF) to expand access to index-based insurance for natural disasters and weather risks in developing countries particularly to farmers and people in agrarian communities. The European Commission committed €24.5 million as the first donor.²¹
- 4.7.4. The UN, through its agency the International Labour Organisation (ILO), has also been funding a number of micro-insurance projects. The ILO is the home of the Micro-insurance Innovation Facility which was funded by the Bill and Melinda Gates Foundation. The Facility provides grants to support organisations developing innovations in the micro-insurance sector. While the grants can support insurance against any type of risk priority is given to products where demand exceeds supply, such as agriculture, health, life and property.

4.8. *International development agencies*

- 4.8.1. Most developed countries have their own development agency which is responsible for the governments overseas aid budget. In the UK, the Department for International Development (DfID) plays this role. In Germany the equivalent to DfID is GTZ. The UK government published a white paper, 'Building our Common Future' in 2009, which dealt with the government's proposed response to issues affected developing countries such as the global recession, climate change, and fragile states. The white paper included a commitment to work with the private sector and international financial institutions to pilot approaches to affordable micro level

²⁰ World Bank (2010) 'Government support to Agricultural Insurance' World Bank, Washington D.C. p. 79

²¹ <http://www.ifc.org/ifcext/gfm.nsf/Content/Insurance-GIIF>

insurance services for low income people in three countries and help develop climate insurance markets that offer affordable products.²²

4.9. *Non-governmental organisations*

- 4.9.1. A wide variety of non-governmental organisations (NGOs) also get involved in micro-insurance in one way or another. Many of these will be microfinance providers and supporters who have branched out into the micro-insurance sector.
- 4.9.2. For example, Planet Finance, which started as a microfinance related NGO, have set up a micro-insurance project to help develop knowledge for MFIs and micro-entrepreneurs and to sell a credit life insurance product covering death and disability. They are starting in Egypt and aim to increase coverage from 50,000 people in 2007 to 7 million in 2011.
- 4.9.3. The role of Planet Finance in this project was overall project coordination; assisting insurance and reinsurance companies to promote credit life insurance; assisting reinsurance companies to develop and adapt death & disability insurances, introducing reinsurance companies to microfinance institutions in several countries; developing a death & disability insurance product adapted to the needs of microfinance institutions and training microfinance institutions.
- 4.9.4. The Micro-insurance Network (<http://www.microinsurancenetwork.org>) and the Micro-insurance Centre (<http://www.microinsurancecentre.org>) are organisations that provide a host of useful material for those who want to find out more about micro-insurance.
- 4.9.5. The Consultative Group to Assist the Poor (CGAP) have a micro-insurance working party under the auspices of the microfinance gateway provides some useful links relating to micro-insurance²³.
- 4.9.6. The Aga Khan Agency for Microfinance (AKAM), has been working on insurance products for low income people since mid-2005. Grants from the Bill & Melinda Gates Foundation for research and the start of operations were provided to AKAM as part of the Gates Foundation's wider efforts to improve access to financial services for low income people. With this funding AKAM was able to open the First Micro-insurance Agency Pakistan (FMiA-P) in 2007 and the First Micro-insurance Agency Tanzania (FMiA-T) in late 2008.
- 4.9.7. The Bill and Melinda Gates foundation has been active in supporting microfinance and micro-insurance initiatives such as the AKAM and the UN's Micro-insurance Innovation Facility mentioned earlier. The Gates Foundation has also helped, to the tune of \$24.2 million, Opportunity International's subsidiary the Micro Insurance Agency (now called MicroEnsure) expand its insurance offering for low income people with the aim of reaching 21 million low income people by 2012.
- 4.9.8. MicroEnsure is an insurance intermediary aiming through extensive market research and insurance expertise to ensure that products are designed that address the real financial risk management needs of low income people. MicroEnsure have been pivotal in providing weather index insurance in Malawi, Tanzania, Rwanda, India, The Philippines as well as other micro insurance products in many other third world countries.

4.10. *Actuaries*

²² DfID 2009 'Building our common future' DfID London, p 64.

²³ See: <http://www.microfinancegateway.org/p/site/m/template.rc/1.11.48248/>

- 4.10.1. To date there has been relatively little publicly known about the work of actuaries in the area of micro-insurance. Partly this will have been due to most actuaries working in developed countries where micro-insurance is not a product offering. However, the Actuaries without Borders section of the International Actuarial Association has as one of its areas of focus micro-insurance/finance and microfinance and the IAA itself has a micro-insurance working group.

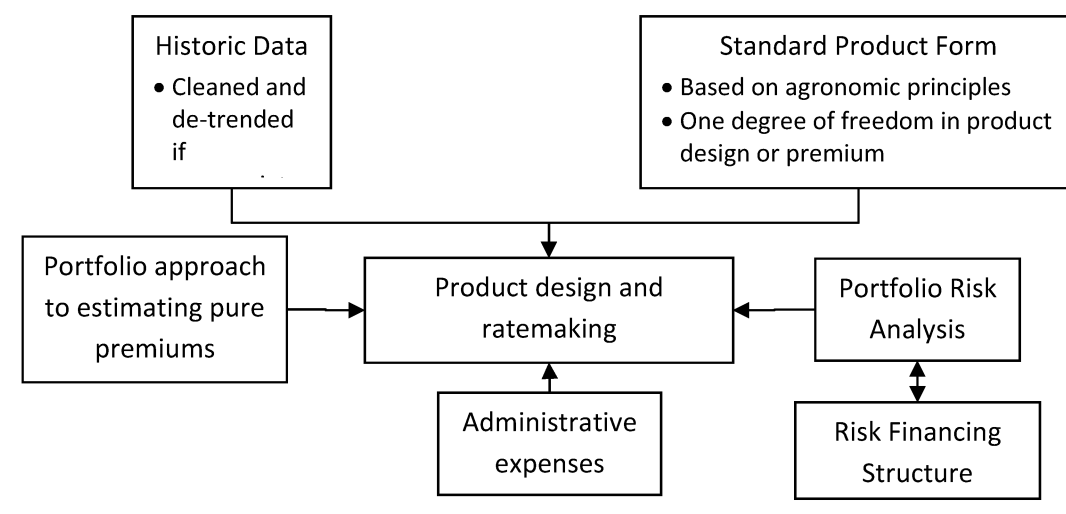
5. PRODUCT DESIGN

- 5.1. Weather related risks for small holder farmers in developing countries have been covered using weather index insurance products since 2003 when the World Bank initiated a pilot with BASIX in India²⁴. Index crop micro-insurance products have covered a number of different weather related risks including drought, flood, excess rain and typhoons. The aim of weather index insurance product design is to identify an index which closely matches the underlying risk farmers would like protection from. Desired properties for a suitable index being measured are:
- Observable and easily measured
 - Objective
 - Transparent
 - Independently verifiable
 - Able to be reported in a timely manner
 - Stable and sustainable over time²⁵ (Hess et al 2005)
- 5.2. *Product design and ratemaking*
- 5.2.1. Whilst the pricing of products is left to the following section, it may be said at this stage that the procedure for design and ratemaking are linked. To simplify somewhat, one can think of an index insurance product as comprising a *shape* of coverage, a *level* of coverage and a premium, or premium rate. This Section is primarily focused on the shape of index insurance products, whereas Section 6 will focus on statistical procedures either for setting the level of coverage to match a target premium, or setting the premium for a given coverage level. Figure 5.1 offers an overview of the topics covered in this and the next section.

²⁴ Manuamorn, O (2007): Scaling Up Micro-insurance: The Case of Weather Insurance for Smallholders in India
http://www.climate-insurance.org/upload/pdf/Manuamorn2007_weather_insurance_india.pdf

²⁵ Hess U, Skees J, Stoppa A, Barnett B, Nash J (2005): World Bank Report No. 32727-GLB: Managing Agricultural Production Risk: Innovations in Developing Countries
http://siteresources.worldbank.org/INTARD/Resources/Managing_Ag_Risk_FINAL.pdf

Figure 5.1: Components of ratemaking



5.3. The product design process

5.3.1. The weather index insurance product design process takes into account a number of important and sometimes conflicting factors.

5.3.2. Developing a scientific basis for the product

5.3.2.1. A good weather index insurance product should have a scientific basis linking the index to the underlying risk that farmers face. Some weather index insurance products have aimed to insure a specific crop, whereas others are more generic perhaps covering specific months and so potentially applicable to several crops. Product design typically involves initial discussions with local farmers and agronomists to understand the main risks and farming practices specific to the crop being insured. Information on the crop growing season and sowing dates can be matched with an insurance product that covers the growing season only (less than a year term).

5.3.2.2. For deficit rainfall products, crop growth models can be used to assess the water requirements of specific crops in specific locations during different phases of the crop growth. As well as estimating crop water requirements in each growth phase, it is also possible to estimate the levels of rainfall below which the crop becomes stressed due to deficit rainfall. These can be used to set rainfall triggers, when the rainfall is below these triggers payouts can be made.

5.3.2.3. Potato blight typically occurs when a series of meteorological conditions (known as a “Smith Period”) occur during a certain phase of the potato plants growth. Weather index insurance products have been developed in India to provide payouts when these meteorological conditions occur, regardless of whether the plants themselves have actually suffered potato blight.

5.3.2.4. When weather index insurance products have been developed it is good practice to test how well historic payouts from these products correlate to historic crop loss data. A good correlation provides an additional level of comfort that the product would have paid out in times of significant crop loss. It is difficult to get good quality crop loss data at a regional level in most third world countries.

5.3.2.5. It is probably best to design products (and possibly set premiums) based on agronomic and commercial fundamentals, with one free parameter for ratemaking.

This parameter could be the commercial premium, the level of a deductible or the payment rate per mm of rainfall, say. Historic weather data should only be used in setting this single free parameter.

- 5.3.2.6. Under no circumstances should historic weather data be used in determining the *shape* of insurance products; this data will also be used for ratemaking and there is the potential for data mining. One example of data mining would be the following: There are 30 years data for a one month period of insurance coverage. The average rainfall is 100mm in that month and the insurer wants to develop a trigger below which they start making payouts. A crop model says payouts are made below 65mm. The actual data has the lowest 10 points with 9 points at 65 and 1 point at 60. The product designer finds it is possible to significantly cheapen the product based on historic data by moving the trigger from 65 mm to 64 mm, excluding the 9 points from payouts.

5.3.3. *Easily understandable products*

- 5.3.3.1. Product development should take into account the target market. Some of the most scientifically accurate weather index insurance products have failed to achieve sufficient scale and take up rates as they are too difficult to explain to local partners and customers. Concepts for how the products work need to be clear and easily explainable.
- 5.3.3.2. Interaction with farmers is a very useful method for designing the product and in the regular monitoring of the performance of the product, especially for cases where projects are trying to scale up. Feedback from farmers is particularly useful for understanding issues like how many crops should be covered by a single policy, what different risks should be covered, should the policy pay out small amounts frequently or pay out larger amounts for extreme weather events only etc. Feedback sessions include interviews, surveys and games played to understand the risks faced by farmers and how the insurance could help in managing some of these risks. It is a challenge of product development to get the right balance between products that are easily understandable and will sell well, with those that are scientifically accurate, but more difficult to explain.

5.3.4. *Minimizing basis risk*

- 5.3.4.1. As discussed above, basis risk is the risk that the weather index insurance product fails to payout when the farmer has suffered a loss on the underlying risk. (It is also the risk that the product pays out when the farmer has suffered no loss – although this typically receives fewer complaints!)
- 5.3.4.2. Many weather indexes are based on weather readings taken from weather stations. Not all farmers' fields are immediately next to weather stations, so the question arises as to how far from the weather station a farmer can purchase weather index insurance with an index based on the weather station. For rainfall indices 20km has been taken as a standard distance for many contracts in Africa. Although in some places 20km is far smaller than necessary, and in others the boundary is dangerously large. Techniques have not been established to determine the maximum distance from a rain gauge at which one can design a responsible contract²⁶. In India, where there is the longest history of rainfall index insurance products, 20km is seen as too high in many regions. The basis risk in this instance

²⁶ Dinku T., Giannini A., Hansen J., Holthaus E; Ines A., Kaheil Y., Karnauskas K., Lyon B; Madajewicz M., McLaurin M., Mullally C., Norton M., Osgood D., Peterson N., Robertson A., Shirley K., Small C., and Vicarelli M (2009)

is that the rainfall at the rain gauge is significantly different from that experienced on the farmer's field.

- 5.3.4.3. The aim of weather index insurance product design is to minimize basis risk. By linking the product as closely to the underlying risk as possible basis risk can be minimized, but never totally removed.

5.3.5. *Weather data source for indices measurements*

- 5.3.5.1. The weather parameters used for weather index insurance are typically gathered from ground based weather stations. As discussed in section 3 this restricts the sales of weather index insurance to farmers who live nearby weather stations. There have been insurance pilots launched that have used satellite data to provide the weather parameters for weather index insurance. The main benefit for using satellite data is that there is no restriction to market the insurance near weather stations; and in many developing countries this is a significant benefit as there are currently few weather stations. There are a number of issues with using satellite data, and many satellite based approaches do not have a resolution high enough to accurately assess the weather conditions in a farmer's field.
- 5.3.5.2. There are many possible approaches to using satellite data, three examples used in practice are:
- The typhoon index described in section X is based on satellite data
 - IFCO Tokio has launched a satellite drought protection product in India in 2009²⁷
 - Kenyan livestock insurance 2010²⁸
- 5.3.5.3. Other ideas have included measuring the "greenness" of vegetation in known farming regions. This has been used in Canada and the US with some success. There are potentially issues with this approach in smaller fields in the developing countries, where nearby forests can influence index readings²⁹. Satellites can also be used to photograph farmers' fields at sufficient resolution to capture visible crop damage.
- 5.3.5.4. Some testing has been carried out on satellite rainfall estimates compared to ground based weather stations. There are no conclusive studies yet published, but many satellite weather indices are not well correlated to ground based rain gauge indices in the tail of the distributions – when insurance claims will be paid.
- 5.3.5.5. Satellite data has been seen as a potential solution to the lack of weather stations in the developing countries. However, there are potential issues with many of the possible approaches, which may make developing products with low basis risk difficult. Even if current approaches are not yet good enough for this task, it is quite likely in the near future more accurate approaches will be developed.
- 5.3.6. *Products sold stand alone or packaged*
- 5.3.6.1. Weather index insurance products can be sold:
- As a standalone product;

²⁷ IFFCO Tokio 2010 Press Release "IFFCO TOKIO strengthens its commitment to Chhattisgarh"

http://www.iffcotokio.co.in/press_releases/2010/10-03-10.html

²⁸ BBC 2010 - Will Ross "Satellite images help insure Kenya cattle". <http://news.bbc.co.uk/1/hi/8475548.stm>

²⁹ Dinku T., Giannini A., Hansen J., Holthaus E; Ines A., Kaheil Y., Karnauskas K., Lyon B; Madajewicz M., McLaurin M., Mullally C., Norton M., Osgood D., Peterson N., Robertson A., Shirley K., Small C., and Vicarelli M (2009)

DESIGNING INDEX-BASED WEATHER INSURANCE FOR FARMERS IN ADIHA ETHIOPIA
<http://portal.iri.columbia.edu/portal/server.pt?open=512&objID=962&mode=2&documentID=908>

- Tied to a loan where the sum insured is a the loan amount; or
 - Tied to a savings product.
- 5.3.6.2. Trials of selling weather index insurance as a standalone product have met with limited success.
- 5.3.6.3. Linking weather index insurance with a loan has met with success in piloting conducted in several different countries. For farmers in developing countries getting access to credit can be difficult. Banks are reluctant to lend to farmers due to default risk. Defaults on agricultural loans can be high in times of adverse weather. In pilots, weather index insurance has alleviated these fears and promoted lending to farmers. Basis risk is reduced at a portfolio level on a large book of locally diversified business. Even if some individual farmers default due to basis risk, as a group and over the long term the weather index insurance can reduce defaults. Banks that are more willing to lend to the agricultural sector can provide much needed capital investment to food producing sectors in the developing world.
- 5.3.6.4. Savings products in some developing countries require the saver to put savings aside for a number of years without access. One idea yet to be tested is to tie in weather index insurance with such savings products. In the event of specific weather stress event such as a drought, the savings product could provide access to the savings immediately; and / or provide a higher rate of interest. This could be provided very cheaply and may alleviate some of the concerns farmers may have about tying up their money for a number of years.

6. PRICING

- 6.1. Pricing for weather index insurance is similar to that for traditional lines of insurance business; a typical premium formula would consist of an estimate of the expected payout from the product as well as loads for expenses and risk. However, there are some unusual aspects of weather index insurance that we will also cover in this section.
- 6.2. First, when selling a product which indemnifies policyholders against an incurred loss, there is a natural product shape in the form of full or partial marginal insurance for losses above a deductible. With weather index insurance, there is no such natural product shape. As noted in the previous section, insurers should be careful in using historic data both for product design and pricing, as there is the potential for data mining, leading to a systematic underpricing of products. In this section, we outline how products should be designed and priced based on agronomic and commercial fundamentals, but with one free ratemaking parameter. For example, the product could be designed to be based on agronomic fundamentals with the premium acting as the free ratemaking parameter. Alternatively the premium could be set based on commercial fundamentals, with the shape of the product based on agronomic fundamentals and the level of coverage as the ratemaking parameter.
- 6.3. Second, weather patterns and underlying agronomic fundamentals are typically spatially correlated. In such a circumstance, an efficient estimate of the expected payout from each product should be based not only on the weather history at the nearest weather station, but also at other nearby weather stations. By using the spatial structure of agronomic and weather conditions, an insurer could protect the ratemaking process from statistically insignificant features of historic data.
- 6.4. Thirdly, the existing practice for rating weather index insurance products is based on the approach used in weather derivatives markets, in which products are

designed and priced on a standalone basis. Risk loading is also on an individual basis, calculated using the corresponding weather history. While this might be acceptable for small pilot portfolios, it is likely to be inefficient for larger portfolios. In particular, under a standalone methodology it may be impossible to offer the same product at adjacent weather stations for similar premiums, even if the difference in weather histories is not statistically significant; under a standalone approach there is no mechanism by which weather histories can be compared or historic claims mass be spread over more than one product. As portfolios mature, and insurers offer a large number of weather index insurance policies, a portfolio approach to rating may be more appropriate. This would likely lead to similar products being offered at similar prices in nearby, agronomically homogenous districts.

6.5. *Basic premium formula*

- 6.5.1. The basic premium formula a reinsurer might charge for 100% coverage of risk for short term business is:

$$\text{Premium} = (\text{Expected Payout} + \text{Cost of Capital} + \text{Expenses}) * \text{Discount Factor}$$

Expected Payout: Estimating the expected payout will be the main focus of this section and so we defer the bulk of the discussion until we have discussed the other items in the premium formula. However, we may say that the calculation should yield an estimate that is both unbiased and efficient, that is to say the estimate should neither be too high nor too low on average and it should be unlikely that the estimate is significantly wrong. The simplest possible estimate for the expected payout from a product is to calculate the payout that would have been paid in each historic year for whichever weather data is available, and then average these historic payouts. This type of calculation, referred to as Historic Burn Analysis, yields an estimate that is simple and unbiased (barring trends or non-random missing data) but is likely to be inefficient.

Cost of Capital: The cost of capital reflects the return an insurer requires on any capital it holds with respect to the risk being taken. Under a risk based regime such as Solvency 2 this may look like:

$$\text{Cost of capital} = \text{Proxy for capital required} * \text{Required return on Capital}$$

Where,

$$\text{Proxy for Capital required} = (99.5^{\text{th}} \text{ percentile} - \text{Expected Payout}) * \text{Diversification benefit}$$

The required return on capital is the extra return that shareholders require to compensate for the capital being held in low yield low risk assets and the liabilities containing significant risk. The diversification benefit would typically be set so that the total cost of capital across the portfolio is approximately equal to the portfolio-wide cost of capital, allowing for reserves and any reinsurance purchase. The diversification benefit for weather index insurance is potentially very attractive with little correlation to any other risks international reinsurers may underwrite.

The 99.5th percentile represents an estimate for the high level of payout that might occur with a 0.5% probability.

Expenses: The contribution to expenses is an allowance for all administrative costs of the product, including design, pricing, marketing, collecting premiums and settling claims. The total contribution to expenses for an insurer should equal or exceed the total expected expenses of the insurer.

Discount Factor: The Discount Factor allows for the fact that there is a period between premiums being paid and claims being settled, during which the premium income may be invested in interest bearing assets. In agricultural insurance, premiums are typically due before sowing whereas claims are settled after harvest.

6.6. *Cleaning data*

- 6.6.1. Some developing countries have weather stations with long recorded histories, and many of these weather series have gaps. Depending on the specific context, an assumption that gaps are missing at random might be entirely reasonable. If gaps are not missing at random one might try to construct estimates of missing weather data from other sources or make an ad hoc adjustment to rates, for example by the addition of an 'ambiguity load'. The latter approach is common in weather derivative markets regardless of whether missing data is perceived to be missing at random, presumably to protect against adverse selection.

6.7. *Historic Burn Analysis and de-trending*

- 6.7.1. Armed with a product and a historic weather series one should be able to calculate the claim payments that would have been made in past years for each product in the portfolio. The average claim payment for an individual product, divided by the sum insured, is typically referred to as the Historic Burn Rate.
- 6.7.2. Historic payments should be analysed for statistically significant trends. If an unusually high number of series display trends and these trends have a plausible explanation then de-trending of raw weather data or historic payments may be necessary.

6.8. *Using the spatial structure of weather to increase efficiency*

- 6.8.1. The portfolio approach to ratemaking outlined in this section is based on Bühlmann's Credibility Theory.³⁰ This is one of the simplest portfolio approaches to pricing and can be easily implemented in Excel. There are, of course, more advanced statistical methods that could be applied and may be more efficient than this methodology.
- 6.8.2. Standalone approaches to ratemaking will take the Historic Burn Rate as the estimate for the pure premium rate. However, such a standalone approach is likely to be inefficient for reasons described above. One might instead begin with an uninformative symmetric prior belief over the claim payment distribution for all products. Suppose that all products are fixed and the challenge is to determine premiums. Then Bühlmann's Credibility Theory would suggest the following steps.
- 6.8.3. Firstly, partition products into risk collectives. This classification should be based on sound agronomic, spatial or practical reasons. No two products in the same risk collective should be based on the same weather station data. One possible rule would be that all products designed for the same crop in the same political or agronomic region form a risk collective.
- 6.8.4. Secondly, rate all products in a risk collective together. Let us index products by i and years with loss cost histories by j . Denote:
 - N = the number of products in the risk collective to be considered
 - n_i = the number of years of history for product i
 - LC_{ij} = the historic loss cost (payment / sum insured) for product i and observation j

³⁰ See for example <http://www.casact.org/admissions/syllabus/ch8.pdf>

- $\bar{n} = \frac{1}{N} \sum_{i=1}^N n_i =$ the average number of years of loss cost history within the risk collective
- $\overline{LC}_i = \frac{1}{n_i} \sum_{j=1}^{n_i} LC_{ij} =$ the average historic loss cost for product i
- $\overline{LC} = \frac{1}{N} \sum_{i=1}^N \overline{LC}_i =$ the average of average historic loss costs within the risk collective

For illustration, assume that uniform take up is expected across all products in the risk collective. Then, Bühlmann's Credibility estimate of the pure premium for product i is $Z \times \overline{LC}_i + (1 - Z) \times \overline{LC}$ where Bühlmann's Credibility Factor Z is given by:

$$Z = \frac{n_i}{n_i + \frac{\mathbb{E}[s^2(\theta)]}{\text{VAR}[m(\theta)]}}$$

Where:

$$\mathbb{E}[s^2(\theta)] = \sum_{i=1}^N \sum_{j=1}^{n_i} \frac{[(LC)_{ij} - \overline{LC}_{ij}]^2}{N(n_i - 1)}$$

$$\text{VAR}[m(\theta)] = \max \left(\frac{1}{N-1} \sum_{i=1}^N [(\overline{LC}_i) - \overline{LC}]^2 - \frac{\mathbb{E}[s^2(\theta)]}{\bar{n}}, 0 \right)$$

- 6.8.5. Bühlmann interpreted Z as the credibility of each individual data series, as it satisfies intuitive properties. It increases if:
- There is more data for the product itself.
 - The variation of historic losses for the product itself decreases.
 - Data from other risks in the collective is statistically less relevant. (This is based on the relationship between the within-product and the between-product volatility.)
- 6.9. *Designing products with target premiums or premium rates*
- 6.9.1. The procedure in the previous section assumes that the *free parameter* is the premium rate. The free parameter could instead be a product design parameter, to be set with a target premium in mind.³¹

7. RISK FINANCING

- 7.1. Like all insurers, providers of crop micro-insurance need to have a plan for the inherent risk that comes with underwriting policies. However, correlation of claims can make this problem especially difficult for aspiring micro-insurance upstarts. Most early micro-credit organizations started locally, building a small customer base and steadily expanding. But for crop micro-insurance, this strategy is a lot more

³¹ For more details of the Credibility Theory approach to product design see forthcoming work by Mahul and Clarke.

difficult. As agricultural risks are highly spatially correlated, an insured shock will spur a large number of claims from the affected area. Unless the insurer has extremely diverse coverage or extremely deep reserves, they may have trouble meeting claims in a rough season.

- 7.2. For instance, consider a launching a rainfall insurance product in a small country such as Rwanda. Even if the insurance company was to expand throughout the whole country, if a drought were to hit it would likely affect the entire insured population. Therefore, the insurance company would have to have enough capital on hand every year to deal with large amounts of payouts.
- 7.3. Ideally, insurers would hold such a diverse portfolio that the chance of having exorbitant claims in any given year is minimal, but suddenly attracting many customers in new markets is not generally feasible. Therefore, many crop micro-insurance providers seek to pass on the risk to other parties.
- 7.4. There are a number of mechanisms that micro-insurance providers could use to bear the risk of a crop micro-insurance venture. The following paragraphs describe some of these approaches.
 - 7.4.1. **Self-Financing** - if an insurance company is sufficiently diversified with ample cash reserves, it can bear the risk itself. As long as the company can afford to bear this risk, this is best option, as any form of risk transfer will come at a cost. However, due to the fact that crop insurance claims are highly correlated, this can be a big problem in practice and most crop micro-insurance schemes transfer their risk in some way.
 - 7.4.2. **Mutuals** – In much of the developing world, risk mitigation is provided through informal risk sharing agreements. Therefore, a natural first step toward establishing formal insurance may be to set up a mutual insurance company. In this situation, the policy holders are the sole owners of the company, and therefore share all gains and losses together.
 - 7.4.3. While this may seem like a natural arrangement, applying it to crop micro-insurance has its pitfalls. The problem of correlation of claims that plagues self-financing may be an even bigger issue for a mutual, as they may find it harder to diversify. Assuming that claims are highly correlated, the mutual will need to have large capital reserves to cover payouts, and it will likely be difficult to raise this capital. Unless the mutual covers a wide enough area that its risk is diversified, it is unlikely to succeed on its own. One option would be for the mutual to purchase reinsurance. Another idea would be for mutuals to share risk among themselves through a Reciprocal Quota Share arrangement. In this setup, mutuals in different geographical locations (who should have uncorrelated risks) could share the risk of catastrophic events.
 - 7.4.4. **Cell Captive** - Another option for self-financing would be to set up a cell captive subsidiary to deal with index insurance. In this situation, an insurer could work with affiliated 'cells', which would design micro-insurance products and share in both the profit and risk. This can be an attractive option for both sides, as a diversified insurance company may not have the local knowledge to develop new products, but the local organization may not have the capital, expertise, and regulatory permission to sell insurance on their own.
 - 7.4.5. A cell captive will have different repercussions based on the regulatory environment of the company in which they are operating. In many countries, the cells can be set up as 'ring fenced' individual entities, so if one cell went bankrupt the finances of the parent company or other cells would not be affected. This would be desirable for

the parent, since it would allow it to give autonomy to the cell without exposing itself to too much risk.

- 7.4.6. Hollard, a South Africa based insurance company, has taken this approach in developing a weather index product. They have agreed to underwrite insurance products designed by the micro-insurance provider MicroEnsure, and their cell captive subsidiary will bear much of the risk. This arrangement has allowed MicroEnsure to provide products at more attractive prices than if they transferred the risk to international reinsurers. Note however that South African laws do not allow cells to be ring fenced, so Hollard is still exposed to the risk of its cells.
- 7.4.7. **Re-insurance** – Due to the problems with self-financing, many sellers of crop micro-insurance turn to international reinsurers to bear most of the risk of their ventures. Large reinsurers such as French Re, Swiss Re, and Munich Re have highly diversified portfolios, so can afford the risk of localized crop insurance. The drawback of reinsurance is the price, with reinsurers typically asking for premiums far larger than the actuarially fair value, which squeezes the profits for local insurers and drives up rates for the end customer.
- 7.4.8. In order to make reinsurance more affordable and more sustainable in the long term, good sources of historical data are required. With the availability of reliable, accurate and indicative data, the large loadings in reinsurance premiums may be justifiably reduced and a greater choice of reinsurance may become available with more affordable terms.
- 7.4.9. **Government** - If providing protection to farmers from the significant downside risk inherent in agriculture is a government priority, the central or local government may offer explicit or implicit subsidies to insurance companies that serve target populations. Such subsidies could be ex-ante, in the form of upfront premium subsidies or ex-post, in the form of partial indemnification for aggregate claims. If government were to fully subsidise the insurance, this would typically be referred to as social insurance, fully funded by the taxpayer. More typically the subsidy is partial, and has the potential to spur or to crowd out private insurance markets. However, if not all voters stand to benefit from the scheme it may prove unpopular, as government guarantees must ultimately be backed up with taxpayers' money. Also, a government guarantee can result in a lack of financial discipline in coverage and premium rates.
- 7.4.10. For instance, the National Agricultural Insurance Scheme (NAIS) is an area-yield index insurance scheme provided by the government available throughout India. It has been successful in achieving wide coverage (over 19 million farmers were covered in 2008)³², partly attributable to the large subsidies from state and central government. The Indian government currently offers substantial ex-post subsidies to the NAIS. From 1999 to 2006, the NAIS collected premiums that amounted to just over 30% of the claims that were paid out, resulting an ex-post subsidy from government of around 607,000 Crore (or around 133.5 billion USD at current exchange rates)³³. Subsidies are higher for small/marginal farmers and farmers growing food crops or oilseeds, and lower for other farmers.
- 7.4.11. An alternative model for government involvement in micro-insurance is that of the Mongolian Livestock Mortality Indexed Insurance programme. In the program insurance companies retain a working layer of risk. Different insurers pool together to pay a reinsurance premium to the government of Mongolia for reinsuring extreme

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<http://www.indiaagriscat.com/Agriculture/2/NationalAgriculturalInsuranceSchemeNAIS/450076/466446/data.aspx>

³³ <http://www.indiastat.com/table/agriculture/2/nationalagriculturalinsuranceschemenaais/450076/29808/data.aspx>

risk layers. The reinsurance premium charged by the government is lower than what may have been available from commercial reinsurers due to a lower ambiguity loading i.e. lower loading to allow for uncertainties of extreme losses. Once the government's reinsurance layer is burnt through, a line of contingent credit is available from the World Bank. The Mongolian Livestock Mortality Indexed Insurance programme is a good example of where private and public partnerships are necessary for financing a micro-insurance product.

- 7.4.12. One final, market-friendly option may be for the government to simply subsidize premiums on policies provided by the private market to target citizens. For instance, governments could target subsidies to cover the administrative cost of the policy, while policyholders were liable for paying the pure premium.
- 7.4.13. **CAT Bonds** – Catastrophe bonds allow the risk of micro-insurance to be covered in small amounts by international investors. In theory, these bonds should provide good value as part of a diversified portfolio, as crop risk in the developing world is unlikely to be correlated with other risks undertaken by an investor (such as developed world stocks and bonds).
- 7.4.14. FONDEN, the Mexican natural disaster relief fund, is an example of a government buying a macro-index insurance product and is the first CAT bond issued in Latin America. The fund provides cover for the risk of earthquakes, as measured on the Richter scale. Part of the bond (\$160 million) is placed on the capital markets as Cat Bonds and the remainder is reinsured.
- 7.4.15. **Pooling** – Community organised risk pooling can be used to reduce basis risk and insure idiosyncratic risks and also reduce the cost of insurance. Geographical risk spreading is feasible where complementary weather patterns are observed in different geographical regions. For example, in Africa a certain country may tend to have a dry season when a neighbouring country experiences a wet season. For example, Hess and Syroka³⁴ calculated premium savings of about 23% if Malawi and Tanzania were covered in a single insurance portfolio.
- 7.4.16. The Caribbean Catastrophe Risk Insurance Facility is the world's first multinational index insurance scheme with 16 member countries although not really a micro-insurance scheme. By pooling together their country specific risks, the reserves and reinsurance required by the pool reduces considerably as opposed to their risk capital requirements if each country had insured their catastrophe risks separately. CCRIF purchases reinsurance for the combined pool for events such as large, multi-island hurricanes.

8. CASE STUDIES

8.1. *Deficit Rainfall Insurance - Malawi*

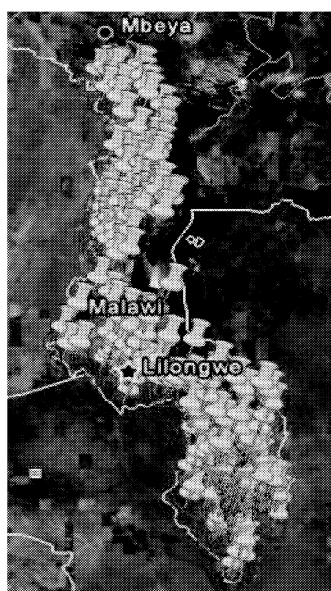
8.1.1. *Background*

- 8.1.1.1. In 2005 the World Bank and insurance broker MicroEnsure launched a weather index insurance pilot for deficit rain risk in Malawi. The International Research Institute for Climate and Society (IRI) at Columbia University provided scientific

³⁴ Hess, U. and Syroka, J. (2005). Weather-based Insurance in Southern Africa: The Case of Malawi, Agriculture and Rural Development Discussion Paper 13, The World Bank, Washington, DC. Paper available on the internet at: http://www-wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/2006/08/23/000310607_20060823171231/Rendered/PDF/370510MW0Weath1d0insurance01PUBLIC1.pdf

expertise to develop the initial product. The insurance is linked to a bank loan for each farmer, allowing access to funding for high quality seeds and fertilizer. A collection of nine insurance companies underwrote the risk in the first year. After the product was shown to be successful, the risk has been subsequently underwritten in the international insurance market.

- 8.1.1.2. The first year of the pilot included groundnut farmers. The farmers purchased index insurance covering deficit rainfall, which was included with a loan agreement for improved farming inputs. The 2005 pilot year included 892 farmers located near four different weather stations on which the deficit rainfall was based. In the 2006 season the coverage was expanded to include maize in conjunction with the purchase of groundnut coverage. The groundnut pilot was discontinued after the second year. In practice farmers found other markets to sell their produce than the agreed markets and defaulted on their loans.
- 8.1.1.3. After the first two years the program moved to the tobacco sector because it has a reliable built-in mechanism for loan repayment. The Opportunity International Bank of Malawi (OIBM) purchased the index insurance policy, which covered tobacco farmers located near two weather stations. Though the policy was designed to insure the bank's portfolio of loans to tobacco farmers, the contract was based on individual insurance policies so that the companies could easily associate payouts from particular stations to farmer groups and crops. The cost of the insurance was shared with the farmers.
- 8.1.1.4. During the 2008 and the 2009 cropping seasons the pilot program was expanded to include additional tobacco clients and organizations with both meso- and micro-level products. Two additional banks agreed to participate in financing the bundled insurance and loan product. During the 2008 cropping season, the pilot covered 2500 farmers and the total transaction value was in excess of \$2 million. Future scale-up plans for weather index insurance are being considered, particularly within formal and well-coordinated supply chains. Malawi has a well sourced supply of weather stations – many of them recently installed as shown in the map below.



8.1.2. *Deficit rainfall weather index product*

- 8.1.2.1. The initial product design divided the crop growing season into three periods. If the rainfall was below a certain trigger level in each of these three periods a payout would be made. The lower the rainfall the higher the payout, up to a maximum of

100% of the sum insured. Agro-meteorological data was used in the FAO Water Requirement Satisfaction Index (WRSI) to calculate the rainfall triggers below which payments would be made. The coverage period of the insurance was matched to the growing period of the crop. A dynamic start date for the insurance contract was also included so that the insurance coverage starts when there is sufficient rainfall for germination in the month farmers typically sow. Discussions were held with farmers in the pilot to understand better their practices and to ensure these were closely in line with the contract design.

8.1.2.2. After the first two years the contract was modified by MicroEnsure to allow for lessons learned. It was found that by having just three phases over a typical 90 day contract that the product had some issues of basis risk. It is possible that there is a no rainfall until the last few days of a 30 day phase. This would lead to potentially drought like conditions at the start of the phase without a payout. The improvement taken was to split the contract into nine ten day (ten days is a dekad in agronomic terminology) phases. Each phase having a trigger below which deficit rainfall would be calculated. The deficit rainfall in each of the nine phases was given a different weighting according to crop water requirements during these phases. By applying these weights to the deficit rainfall in each phase and overall weighted deficit rainfall level was developed. This overall weighted deficit rainfall is then subject to a trigger on which payouts are made.

8.1.2.3. Example: The phase deficit trigger is 25mm; column (3) has example rainfall data mm

Weighting (1)	Contract Dekad (2)	Rainfall (3)	Dekad Deficit rainfall (4) (max(0, 25 – (3)))
0.3	1	71.5	0
0.3	2	0	25
0.7	3	98.8	0
0.7	4	14	11
0.7	5	238	0
1.05	6	218.3	0
1.05	7	234.2	0
1.05	8	19	6
0.8	9	5.5	19.5

The overall weighted deficit rainfall (OWDR) is calculated by the sum product of columns (1) and (4).

In this example this is 37.1. A trigger for the OWDR can then be calculated as part of the product design process so a payout may be generated if the OWDR is above 50 for example.

8.1.3. *Conclusions*

8.1.3.1. The pilot in Malawi has highlighted some of the key issues with weather index insurance.

- An early decision to tie the weather index insurance to a loan meant that farmers were willing to accept the cost of the insurance to have access to bank loans.

The banks understood their exposure to higher defaults due to droughts has been reduced.

- The importance of the agricultural supply chain was highlighted with the failure to ensure loan repayment from the groundnut farmers and the successes when moving to tobacco farmers, where the markets are fixed.
- The weather index insurance products themselves can be refined and improved as local experience is gained.
- When a successful pilot has been established – action to scale the project up can be taken.

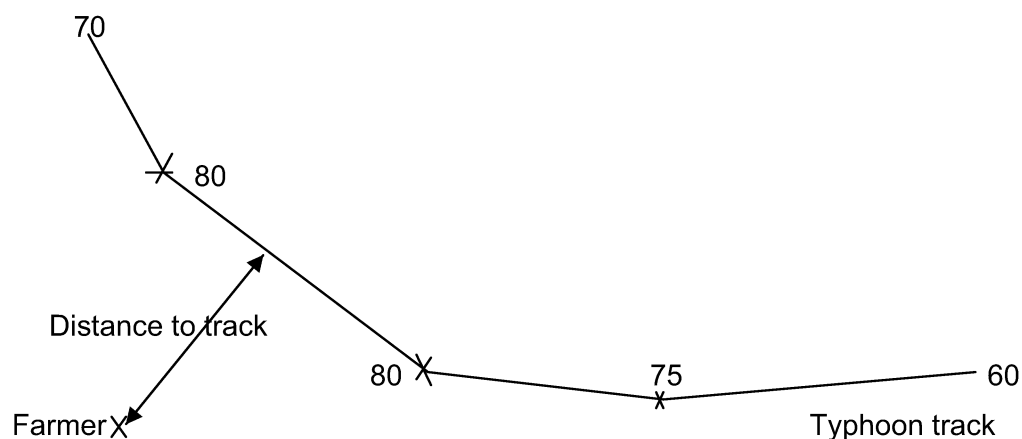
8.2. *Typhoon Weather Index Insurance – the Philippines*

8.2.1. *Background*

- 8.2.1.1. The Philippines is heavily reliant on agriculture and it is estimated the average farm size is 2 hectares. This suggests a large number of small holder farmers and a large potential market for weather index insurance. Questionnaires and focus groups held by an insurance broker in 2007 and 2008 on the Philippines island of Panay confirmed that typhoon risk is the biggest perceived risk amongst the small holder farmers questioned.
- 8.2.1.2. Typhoon weather index insurance was piloted in 2009 by MicroEnsure to cover 446 smallholder rice farmers in the Philippines from high wind speeds. The pilot involved partnering with rural banks and MFIs which act as delivery channels for the product. The product is tied to a loan from the rural bank / MFI to provide financing for farm inputs. The weather index insurance removes a significant default risk across the banks / MFIs loan portfolio. The weather index insurance is insured by the Malayan Insurance Company, marketed with loans offered by rural banks / MFIs and reinsured by Paris Re.
- 8.2.1.3. In the Philippines a government multi-peril product is available to farmers. Farmers in the pilot had experienced the government multi-peril product and claimed to be dissatisfied with the level of previous payouts and the length of delay in making such payouts. If a claims assessor takes two months before visiting a field – the farmer is obliged to leave the field in a damaged state for this period.

8.2.2. Typhoon weather index insurance product design

- The GPS latitude and longitude for each farmer or farmer group is recorded (typically the farmer's field is within 2km of any GPS reading used for the farmers contract)
- The index for claim payments is based on "Typhoon tracks" which give the location (latitude and longitude) and wind speed of typhoons in real time as the typhoon occurs. These "Typhoon tracks" are made freely available by the Japanese Meteorological Authority (JMA)
- Insured farmers with a GPS point within a certain distance of the typhoon track which has a certain wind speed will receive a payout
- Payouts will be based on distance of the farmer's GPS point from the typhoon track and the wind speed of the typhoon at that point. i.e. Payout = $w*d*s$; where w = wind speed factor, d = distance factor, s = sum insured. In the example below, the distance d is measured using the GPS points of the farmer's field and the typhoon track. The numbers at each track point are the wind speed of the typhoon at those points.



8.2.3. Product development

- 8.2.3.1. The key determinants of payout sizes are the distance from the farmer to a typhoon track and the wind speed of the typhoon at that point. Payout = Distance Factor * Wind speed Factor * Sum insured

The wind speed factors used were:

	Maximum Sustained	Payout
Tropical Cyclone Type	Minute Wind Speed (mph)	% Sum Assured
Tropical Depression	< 59	0%
Tropical Storm	59 to 73	15%
Category 1	74 to 95	40%
Category 2	96 to 110	60%
Category 3	111 to 130	80%
Category 4	131 to 155	100%
Category 5	> 156	100%

Distance factor:

- 100% of the payout for tracks within 100km radius
- $(\text{Max}(140 - \text{Distance}(\text{km}), 0) / (140 - 100))\%$ for tracks up to 140km radius
- 0% for tracks over 140km

- 8.2.3.2. This product design was tested against crop loss data over the whole Philippines. Payouts at an aggregate level across the Philippines were found to correlate well with recorded crop losses. The product was also tested against the questionnaires put to farmers. The farmers on the island of Panay where the product was piloted were asked to detail the years in which they recalled suffering losses due to typhoons. Again the years significant payouts would have been made correlated well with the years Panay farmers recorded crop losses.

- 8.2.3.3. The product had an unknown level of basis risk before launching the pilot, so it was combined with a government multi-peril product which was subsidized by the insurance broker.

8.2.4. *Project results*

8.2.4.1. There were no typhoons in the pilot area of sufficient wind speed to trigger payouts of the weather index insurance during the piloting periods. However, a number of claims in the region were recorded under the multi-peril scheme in the region of 10%-30% of sum insured. The government scheme recorded these as due to typhoon; even in cases where the nearest typhoon was over 3500km away; also rainfall during these claim periods were low. The view from the local insurance broker was that these claims paid were not serious damage to the farmer's field warranting payouts.

8.2.5. *Product improvements*

8.2.5.1. The product is planned to be improved in two significant ways:

- The distance parameter is currently based on two distances which are fixed for all typhoons. In the real time typhoon track data, the radius of 50 knot and 30 knot wind speeds are given. These radii could be used as the distance parameters
- Intense rainfall can also cause significant damage during typhoons and is intended to be added to the index. In particular, a typhoon with low wind speed and high rainfall would not be picked up well by the current product. There are very few rain gauges in the Philippines, making this step more difficult. The options being explored are:
 - o Funding rain gauges across the regions of The Philippines where this product will be sold
 - o Using some form of satellite rainfall estimation technique. Satellite rainfall estimators are not particularly accurate for high rainfall events, so this approach is considered less likely to be successful

8.2.6. *Conclusions*

8.2.6.1. The pilot has shown it is possible to develop weather index insurance to cover typhoon risk. Further improvements to the product are being developed for future use.

8.2.6.2. The piloting period did highlight one of the problems with multi-peril products in that claims were potentially wrongly paid. With weather index insurance payments are based on objective indices.

8.2.6.3. One of the main problems with weather index insurance is that these indices do not accurately represent the damage in a farmer's field – i.e. basis risk. However, for a loan portfolio across a reasonably sized area the losses to the bank due to defaults as a result of typhoon damage are reduced. This has meant banks are more willing to lend to farmers if such insurance is in place. This can provide much needed capital investment into Philippines agriculture.

8.2.6.4. This pilot is also an example of using weather parameters from satellite which means the distribution is not tied to nearby weather stations.

8.3. *SEWA and Gujarat*

8.3.1. Starting in 2006, a research team led by Shawn Cole (Harvard Business School) teamed up with the Self-Employed Women's Association (SEWA a non-profit group in Gujarat) to pilot rainfall index insurance products for their members. SEWA members generally have very low income, and have small plots of marginal land if any at all. SEWA was interested in rainfall index insurance as many SEWA

members complained that droughts and floods were some of the biggest risks to their livelihoods.

8.3.2. The project was set up as a randomized program evaluation, where both a treatment group and control group were given detailed household surveys, but only the treatment group received insurance marketing. Additionally, within the treatment group households received randomly assigned marketing strategies. The project seeks to answer three main research questions:

- Does rainfall insurance actually help with consumption smoothing, or does it simply replace informal risk sharing mechanisms?
- Does provision of rainfall insurance change the input decisions for farmers? For instance, does it allow them to increase cultivation on higher-risk higher-yield crops?
- What marketing interventions are effective in spurring demand for insurance?

8.3.3. The project has so far yielded somewhat limited results due to the fact that even with door-to-door marketing, take-up of insurance was low. Around 25% of households purchase insurance, but almost all of those who do insure far below what they stand to lose if a drought would hit. The first three years of the study produced no payouts, so the research team was unable to study the effects of insurance payout on farmers' livelihoods. Also, they have observed no change in farmers' behaviour in response to simply having insurance.

8.3.4. The randomized marketing interventions have given some insight as to how best sell insurance to low income farmers.³⁵ For instance, showing potential buyers a video about the benefits of insurance produced greater sales. However, the one marketing treatment that had a large effect was discounting the insurance policies, which spurred much higher insurance purchasing. However, it is not entirely clear how to interpret this result. It could mean that the policies need to come down in price in order to spur demand, or maybe people just like getting discounts. In 2009, many of the policies paid out, so this project should soon be able to answer the central question of whether insurance actually helps families cope in the event of a drought.³⁶

8.3.5. Overall, the low take-up of insurance in spite of the huge consequences of drought suggests that the current rainfall insurance options available in the private market in Gujarat are not meeting the needs of customers. In order to succeed, the products will have to improve or the prices will need to come down.

³⁵ Cole, Shawn Allen, Giné, Xavier, Tobacman, Jeremy Bruce, Topalova, Petia B., Townsend, Robert M. and Vickery, James I., Barriers to Household Risk Management: Evidence from India (October 14, 2009). Harvard Business School Finance Working Paper No. 09-116; FRB of New York Staff Report No. 373. Available at SSRN: <http://ssrn.com/abstract=1374076>

³⁶ Cole, S. Stein, D. Tobacman, J. (2010) Work in Progress

9. AREAS FOR FURTHER WORK

- 9.1 One of the main issues with weather index insurance is use of available rainfall data. As discussed, rain gauges are very limited in developing economies. Using satellite data has been discussed above; a full investigation of available sources clearly summarizing conclusions would be a very valuable piece of work for weather index insurance. An alternative approach is to install rainfall gauges in areas where weather index pilots are being carried out – the economic viability of installing rain gauges for weather index insurance could be explored in further work.
- 9.2 Weather index insurance requires real time data to provide an index on which claims are paid. It also requires historic data to enable pricing of weather index insurance contracts by the risk carriers. Investigating how pricing can be carried out with limited historic data or data from a different source is potentially valuable.
- 9.3. One of the parameters associated with weather index insurance based on rain gauges is that policies are typically sold within 20km of the rain gauge. This limit has been reduced in India. Understanding the key determinants of this factor that allow a reasonable number of policies to be sold whilst minimizing basis risk is a valuable area for further work.
- 9.4. The weather index insurance products sold to date have been pure protection products with an agreed sum assured (typically set at cost of farm inputs), or tied directly to a loan (with the loan as the sum insured). The development of savings products tied to weather indices has yet to be explored in detail. For example in some parts of India, savings are possible for a set term, say five years. The saver has no access to the savings in those five years. A weather index savings policy could aim to provide access to policyholders' savings during times of drought; such a policy may remove one of the potential hindrances for bank savings.
- 9.5. Additionally, the rate of return of the savings could also change based on the weather. Continuing with the drought example above, this type of account would give an interest rate boost if drought conditions (as determined by an index) occurred. Of course, this would come at a cost of a lower rate in times of 'good' rainfall, but the benefit of having extra money during a drought may be attractive to customers. This product would be identical to having a normal savings account and simultaneously purchasing insurance, but there may be benefits to offering them as a bundle.³⁷ If consumers are unfamiliar with insurance but comfortable with savings, they may be more likely to take part in a savings scheme with some elements of insurance than a stand-alone insurance product.

10. CONCLUSION

- 10.1. Weather risk is a major issue faced by millions of low income farmers throughout the world. Weather index insurance provides a way for farmers to manage this risk that is potentially beneficial to the farmers while remaining a viable product for the counterparty (an insurance company, government, etc.) While it holds great promise, weather index insurance schemes have a mixed track record of success, and the products are constantly improving in an attempt to overcome previous

³⁷ This idea is explored in Stein, D. and Tobacman, J (2010) Work in progress

challenges. One of the great promises of weather index insurance was that it theoretically could be provided as a stand-alone product in the marketplace, bringing benefits to both customers and insurers. However, early trials cast doubt on this model, as customers failed to respond to the products.

- 10.2.** Despite these challenges, weather index insurance continues to proliferate around the world, as interested parties search for the best ways to mitigate weather risk. While selling stand-alone products at market rates has been difficult, other models such as tying insurance to loans or selling insurance to organizations has been more successful. Given the vast amount of demand for mitigation of weather risk, weather index insurance is sure to play an important role in the market. As these products are constantly evolving, this field is ripe for innovation and experimentation.

ERM for Emerging Risks in General Insurance

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25th July 2010

Abstract

This paper is focussed on ERM for emerging risks in general insurance in our world of “unknown unknowns” and the emergence of unexpected risks over time. It illustrates how Chief Risk Officers can focus, with an ERM framework on “risk and opportunity management”, balancing risks against opportunities, whilst being resilient against “unknown unknowns” and their emergence over time as “known unknowns” and “known knowns”. The findings were based on real case studies and review the “lessons learned” and the “early warning indicators” that could (and perhaps should) have been used in order to detect the emerging risks in a timely manner and influenced the CRO function to have taken appropriate remedial action.

The presentation of this paper is scheduled for the GIRO conference and exhibition 2010.

Availability

To discuss further, please contact George Orros at uhcg@cwgsy.net

Keywords

Enterprise Risk Management; Strategic Risks; General Insurance; Governance; Risk Appetite

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1. Introduction

The paper is focussed on ERM and strategic business management for general insurance companies in our world of “unknown unknowns” and the emergence of unexpected risks over time. Consideration has been given to how the CRO (Chief Risk Officer) can focus, with an ERM (enterprise risk management) framework on “risk and opportunity management”, balancing risks against opportunities, whilst being resilient against “unknown unknowns” and their emergence over time as “known unknowns” and “known knowns”.

The findings were based on case studies of “unknown unknowns” and their emergence over time as “known unknowns” and “known knowns”. Consideration was given the “lessons learned” and the “early warning indicators” that could (and perhaps should) have been used in order to detect the emerging risks in a timely manner and could have influenced the CRO function to have taken appropriate remedial action. For each case study, a time line” was prepared to record the emerging events (and management reactions) over time.

The research questions addressed include:

- (i) Which ‘key risk indicators’ and ‘early warning indicators’ would you have used, why would you have used these and how would they have informed your decisions?
- (ii) How quickly would you have spotted the emergence of the unexpected event and what would you have done about it?
- (iii) What evidence would you have needed to convince the CEO to take the appropriate remedial action before it was too late?

Case Studies

CS1 AIG (American International Group)

CS2 LTCM (Long Term Capital Management)

CS3 Union Carbide

2. Conclusions

The principal conclusions on ERM for emerging risks on general insurance are summarised below.

2.1 Conclusions on the ERM framework model

- a) 6-stage iterative process model with feedback loops
- b) Corporate governance essential → lead from top
- c) Internal systems and controls essential
- d) Internal and external sources of risk
- e) Upside & downside → risk & opportunity management

2.2 Conclusions on ERM process model that might have helped

- a) Effective corporate governance, systems & controls
- b) Management awareness of business model & value chains
- c) Corporate culture assessment → regulatory review
- d) Scenario planning → stress testing extreme conditions
- e) Opportunity management of upside potential

2.3 Conclusions on timelines for unexpected events

- a) The future is largely unpredictable
- b) The future unfolds rapidly for adverse risk incidents
- c) The historical perspective is often post-rationalised
- d) Timelines are rarely within the management's control
- e) Timely service recovery requires agile management team

2.4 Conclusions on emerging risk from unexpected events

- a) The future is not what is used to be
- b) Black swans and fallacy of inductive logic
- c) The trap of false enthusiasm
- d) Emerging risks pro-activity versus re-activity
- e) Emerging risks with the benefit of hindsight

2.5 Conclusions on the lessons learned

- a) Lessons from internal risk incident reviews
- b) Lessons from historical reviews and post-mortems
- c) Lessons from management role play exercises
- d) Lessons from scenario planning → team decisions
- e) Lessons from survival training → team decisions

2.6 Conclusions on early warning indicators that might have helped

- a) Every early warning indicator should be actionable
- b) Real-time early warning indicator dashboards
- c) Solvency II 'Use Test' → in the driving seat
- d) Indicator dashboard as a tool for management action
- e) Less can be more ...

2.7 Conclusions on the corporate governance that might have helped

- a) Early warning indicators for the governing body
- b) Pictures and storyboards → the 'elevator' test
- c) Solvency II 'Use Test' → can not be delegated
- d) Not just a 'box ticking' exercise
- e) No excuses for not understanding the business model

3. Summary of Findings

This section provides the summary of findings in respect of the case studies.

CS 1 AIG (American International Group)

1. **The AIG story begins just short of 100 years ago in Asia. The history of AIG is impressive and was built to succeed.** AIG started life in Shanghai by a keen business man by the name of C.V. Star. Star had no knowledge of insurance; he did however have a keen eye for business opportunities. He grew AIG into a multinational insurer/broker, spanning multiple countries.
2. **AIG had experienced decent growth but that all changed when Hank Greenberg took the wheel.** He turned AIG into one of the largest companies in the world. Was this all good? Greenberg instilled a culture in AIG to succeed at any cost and he coined the rule of “15”, which was 15% growth in revenue, 15% growth in profit and 15% return on equity. The executive and all employees were encouraged to do what needed to be done to accomplish these figures. Greenberg in the process of growing AIG produced numerous millionaires. Those who succeeded were rewarded very well; this provided even more incentive to succeed!
3. **Greenberg, surrounded himself by a board that could help him.** He selected the board personally, not to provide governance for the company but to connect the company to other organisations that could help AIG to grow. Majority of the AIG board members were known by Greenberg personally prior to becoming a board member. The board was unable / unwilling to perform the duties that a board should take of assessing and questioning the CEO and senior management until it was too late.
4. **The AIG culture led to the first issue in the early 2000.** Two AIG executives were convicted when they colluded with Marsh & McLennan Companies in insurance price fixing. This was the first victim of AIG’s culture. But definitely not the last.
5. **In 2005 Eliot Spitzer New York State Attorney General accused Greenberg of adjusted accounting figures.** Greenberg adjusted the accounting figures slightly to achieve his rule of 15 to satisfy the analysts that AIG was still performing. He managed to do this via manipulating re-insurance contracts through closely held re-insurance companies.
6. **In September 2008, AIG was facing bankruptcy!** Since 2005, AIG had become the poster child for corporate governance, however this was unfortunately too late. Their UK division had started selling large amounts of CDSs to various counterparties. CDSs allowed AIG to collect the "insurance" premium as long as the insured company did not default. Normally this was a great way of collecting money without having to set aside capital to cover the risk as these contracts were derivatives and companies rarely defaulted in good times. In 2008, AIG had an estimate CDS exposure of \$441bn. AIG had treated CDSs as insurance in the sense they assumed that all companies are independent, which in reality is not true. There is a correlation of failure among companies. When the credit crisis unfolded and AIG was under threat of their credit rating being downgraded. It became apparent that they would not be able to cover the margins that would need to be paid to the CDS counterparties. The US government had to step in and bailout AIG to the tune of \$85 bn. This was only the first payment made by the US government.

CS 2 LTCM (Long Term Capital Management)

1. **Strategic thinking on business model could have prevented the disaster.** LTCM provides a reminder of the notion that there is no such thing as a risk-free arbitrage. Because the arbitrage positions they were exploiting were small, the fund had to be leveraged many times in order to produce meaningful investment returns. The problem with liquidity is that it is never there when it is really needed.
2. **Rigorous strategic analysis and understanding of the business model should precede development of technical business model systems and a resilient ERM implementation.**

LTCM was essentially a hedge fund founded in 1993 by John Meriwether. Its Board of Directors included Myron Scholes and Robert C. Merton, who shared the 1997 Nobel Memorial Prize in Economic Sciences. LTCM used complex mathematical models to inform relative value or convergence arbitrage trades e.g. exploiting small price differences between related securities such as U.S., Japanese and European government bonds. Trading strategies made returns in excess of 40% in 1995 and 1996. However LTCM's trading strategy relied upon aggressive leverage to boost absolute performance; e.g. trying to earn a 1.0% p.a. return on assets, leveraged 25:1, to yield a 25% p.a. return.

3. **Corporate culture and ethics need to be scrutinised to ensure that they deliver sufficient transparency and disclosure to stakeholders.** In LTCM's case this includes ensuring that the providers of credit were able to assess whether LTCM's aggressive arbitrage strategy was aligned with their own risk appetite. It also included the client investors who paid higher than average fees and were locked in to an initial 3-year relationship with LTCM. Transparency might have solicited intelligence to improve the robustness of the trading strategy and a different response at September 2nd 1998. By this point LTCM had just \$400 million in capital. With assets still over \$100 billion, this meant a leverage ratio over 250:1. LTCM's partners lost their own investment (\$1.9 billion), UBS lost \$700 million and other investors lost \$1.8 billion.
4. **LTCM failed because both its trading models and its risk management models failed to anticipate the extreme scenario and cycle of losses following Russia's default on its government debt.** This announcement led to a global review of credit and sovereign risks. Panicked investors sold Japanese and European bonds to buy U.S. treasury bonds. The profits that were supposed to occur as the value of these bonds converged became huge losses as the value of the bonds diverged. LTCM lost \$550 million on 21 August 1998 and by the end of August, the fund had lost \$1.85 billion in capital. With assets at \$1.26 billion leverage had increased to 55:1.
5. **Reliance on VaR based models should have been continually subject to scrutiny.** In the event the models did not foresee or provide for the extreme volatility and violence of the cycle of losses. Stress-testing also needs to be calibrated to the complexity and risk profile of the arbitrage. In this case it was inadequate e.g. the level of volatility of \$44 million anticipated was exceeded with LTCM experiencing \$100 million and above. LTCM's VaR at 10-days was \$320 million - actual losses in August 1998 were over \$1,000 million.

CS 3 Union Carbide

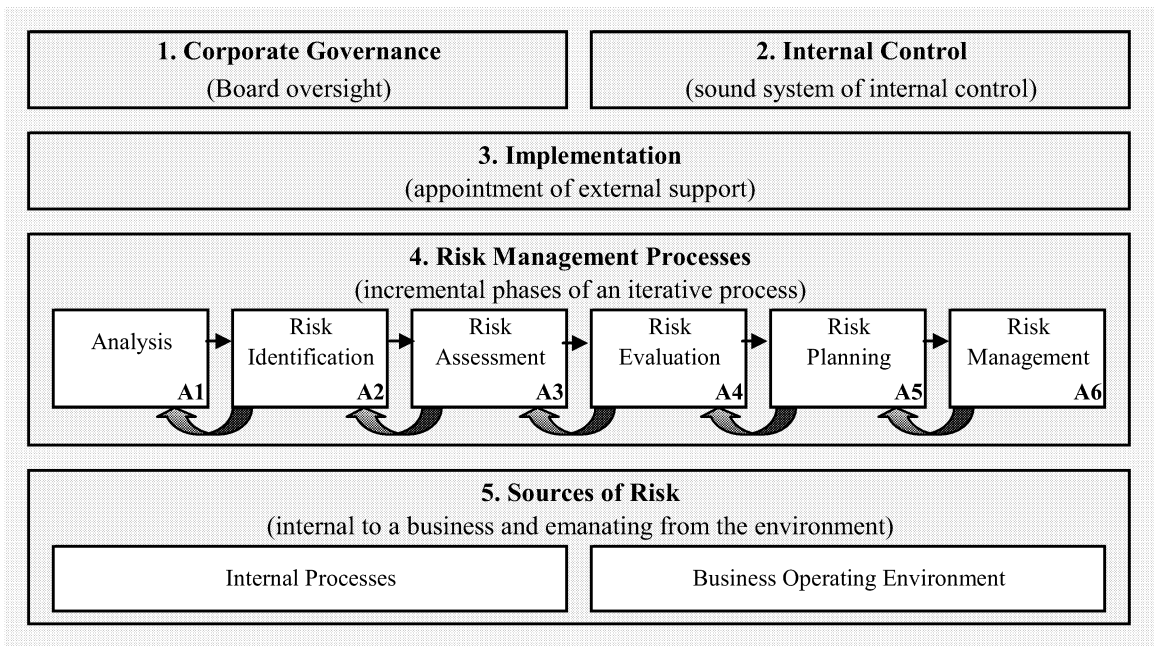
1. **The severity of this accident makes it the worst recorded within the chemical industry.** At midnight a relief valve on a storage tank containing highly toxic methyl isocyanate (MIC) lifted releasing a toxic plume of MIC gas which drifted onto nearby housing exposing 520,000 residents. A total of 521,000 residents were now exposed to the gas. Estimates vary on the death toll. The official immediate death toll was 2,259 and the government of Madhya Pradesh has confirmed a total of 3,787 deaths related to the gas release. Other government agencies estimate 15,000 deaths. Others estimate 8,000 to 10,000 died within 72 hours and 25,000 have since died from gas-related diseases. 40,000 more were permanently disabled, maimed, or rendered subject to numerous grave illnesses,
2. **Strategic thinking on the business model might have halted backward integration and inappropriate use of the plant.** If UCIL had analysed the proposed changes in its business model it might have decided not to proceed with backward integration – certainly without a robust ERM implementation – and have avoided the unacceptable level of risk exposure from attempting to maintain whilst decommissioning processes and safety equipment.
3. **Strategic thinking about the business model should identify the broadest view of the firm's value chain and apply the ERM framework across the value chain.** UCIL should have applied their entire value chain and have identified the risks attached to poor safety equipment

and standards; prioritising the provision and maintenance of specific plant (Flare system, Vent Gas System, operative Refrigeration with coolant) and identify areas where there was insufficient knowledge within the organization to manage any processes e.g. the risk and management of runaway reactions in a gas storage tank.

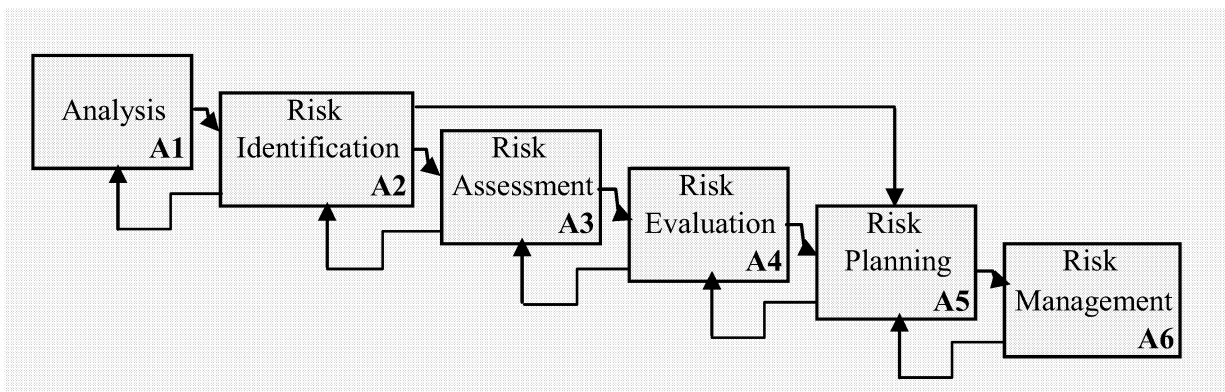
4. **Corporate culture needs to encourage and promote adherence to risk management.** UCIL, some suggest, is an example of double standards for multinational corporations operating in developing countries. This engendered a corporate culture within the subsidiary which led to degraded safety procedures and equipment.
5. **Corporate culture and ethics need to be scrutinized and addressed to ensure that they ensure sufficient transparency and disclosure to stakeholders.** The Bhopal facility was operating with safety equipment and procedures far inferior to its US sister plant. The local government wanted to retain UCIL as a large employer and, so, were reticent to impose safety and pollution controls despite their awareness of the poor standards at the plant. UCIL changed the plant's activities from a relatively lower-risk assembly of the final pesticide product to a more hazard and complex backward integration process involving processing of raw materials, production of intermediate compounds and assembly of the final Sevin pesticide. Full consultation on the evolving business model would have enabled the local authority to consider the implications for its (and its residents) risk appetite. The UCIL plant was operating outside of its zoning requirements for light industry in a residential area when the incident occurred.
6. **Effective internal controls and risk incident reporting should have alerted the management hierarchy to breaches in safety equipment and standards at the plant in critical equipment** e.g. VGS and the potential runaway reaction in the storage tank. Failings in technical measures at the plant included:
 - i) The flare system was a critical (UCIL did not recognise this) element of the plant's protection system had been out of commission for 3 months
 - ii) Hazards from runaway reactions in a chemical reactor are understood but an occurrence within a storage tank had received little research
 - iii) The ingress of water caused an exothermic reaction with the process fluid. The exact point of ingress is uncertain though poor modification/maintenance practices may have contributed.
 - iv) Decommissioning of the refrigeration system (a plant modification) contributed to the accident as without this system the temperature within the tank was higher than the design temperature of 0°C.
7. **The absence of risk planning and management can serve to increase the severity and impact of a major incident.** UCIL did not lead consultation with the local authority and public services to plan, scenario test and implement a plan to manage a major incident. When at around 1.00 AM, December 3, a safety valve gave way sending a plume of MIC gas into the early morning air, an estimated 3,800 people died immediately, many in the poor slum colony near the UCIL plant. No sirens were used to warn residents and the public services, including the hospitals, had no information on what the gas was or what its effects were.

4. ERM Framework Model

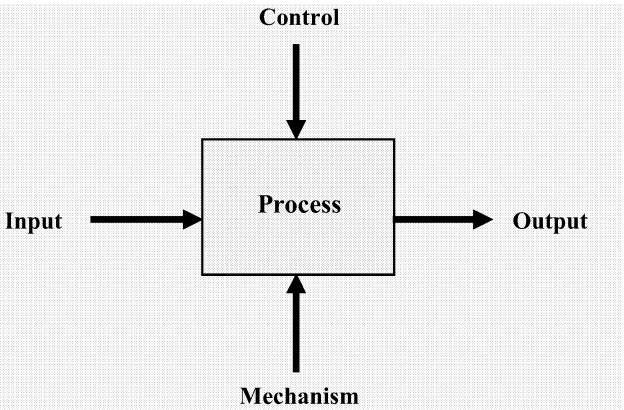
The ERM framework model which has five elements, as illustrated below.

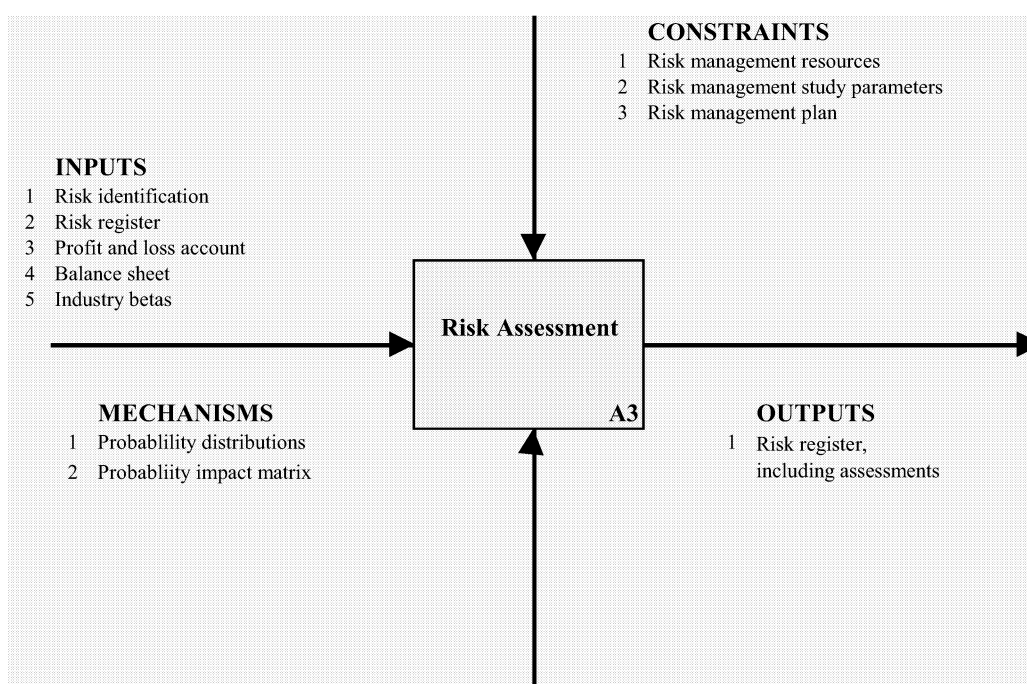
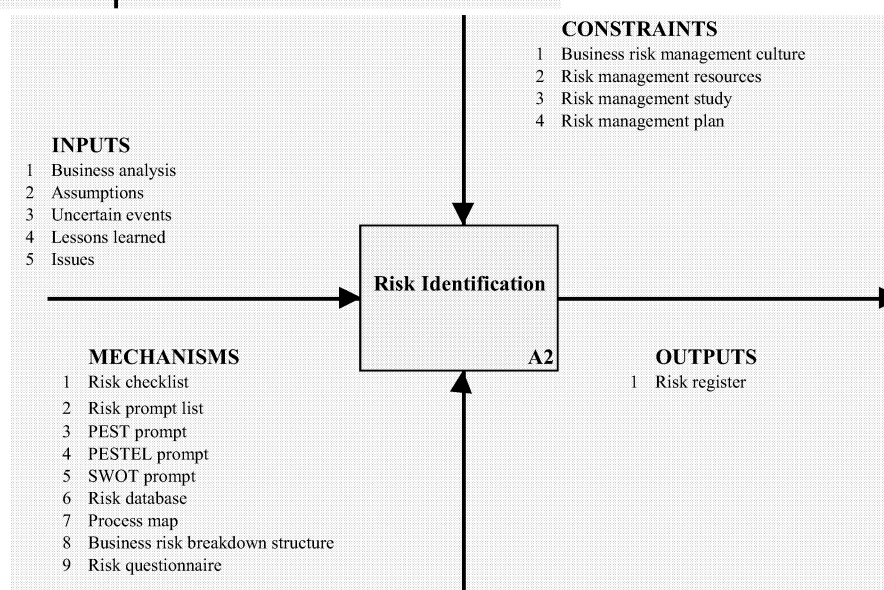
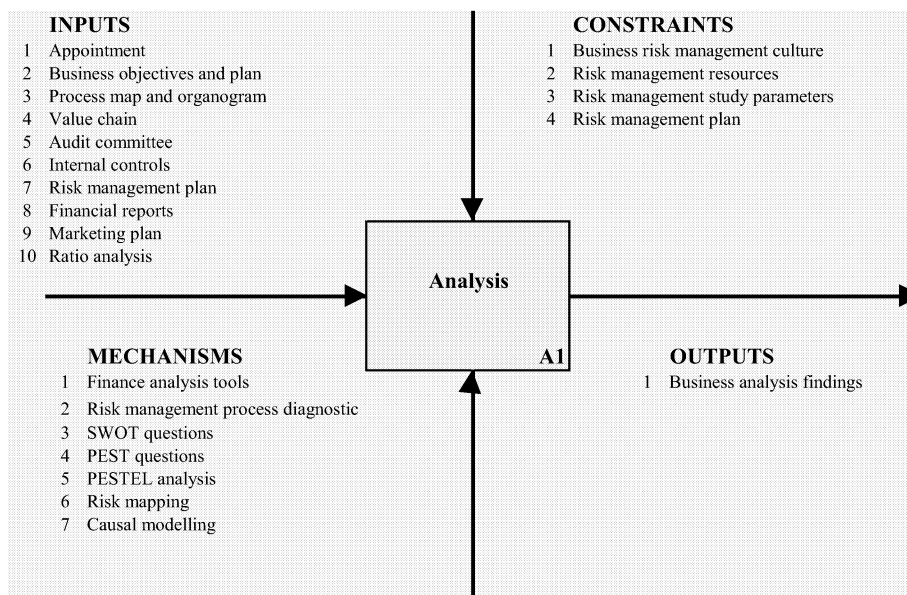


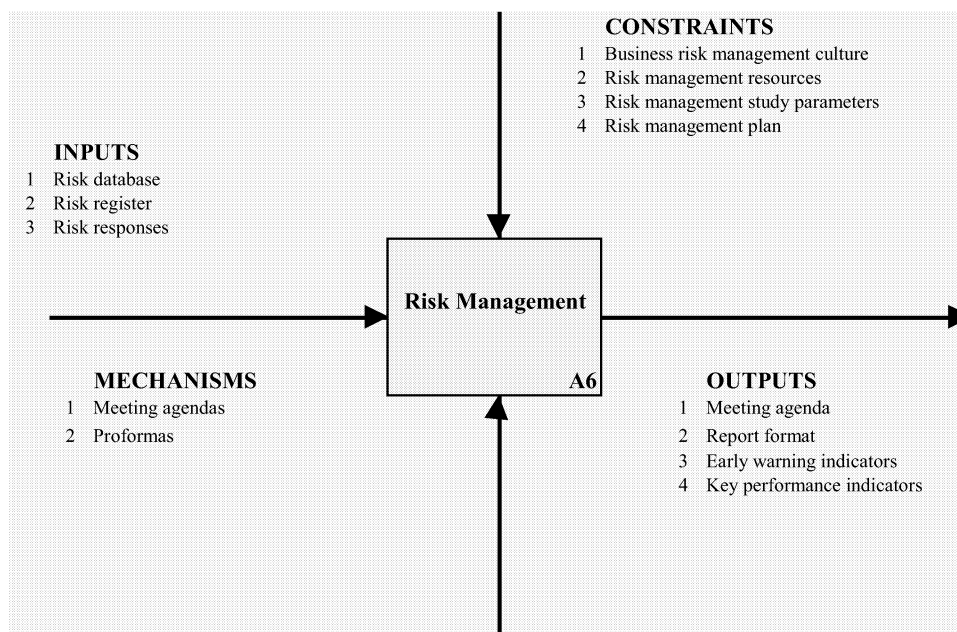
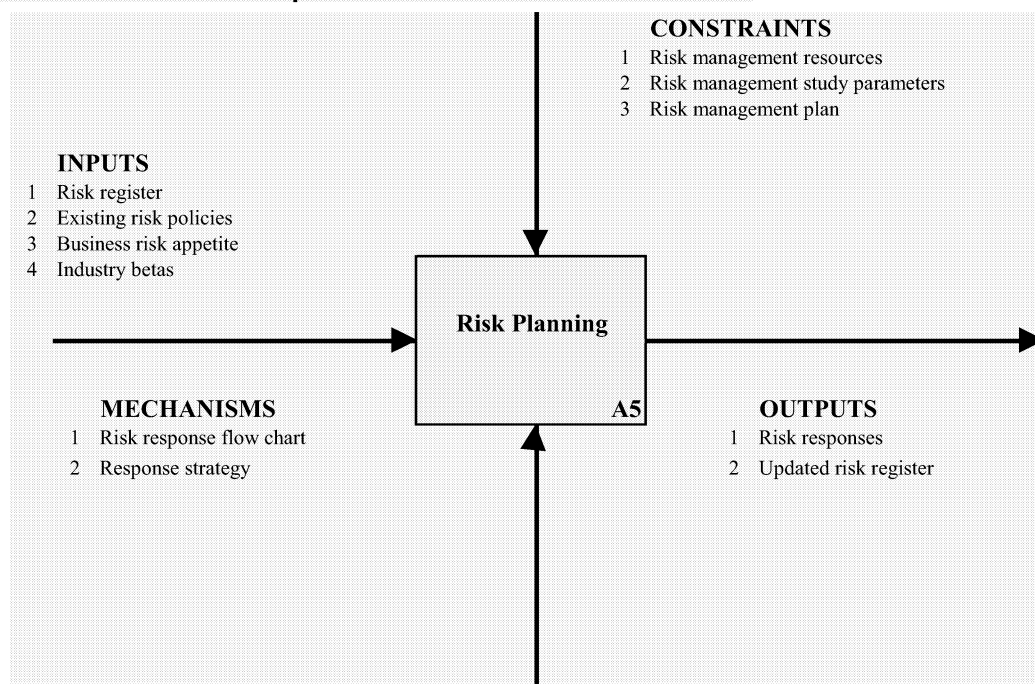
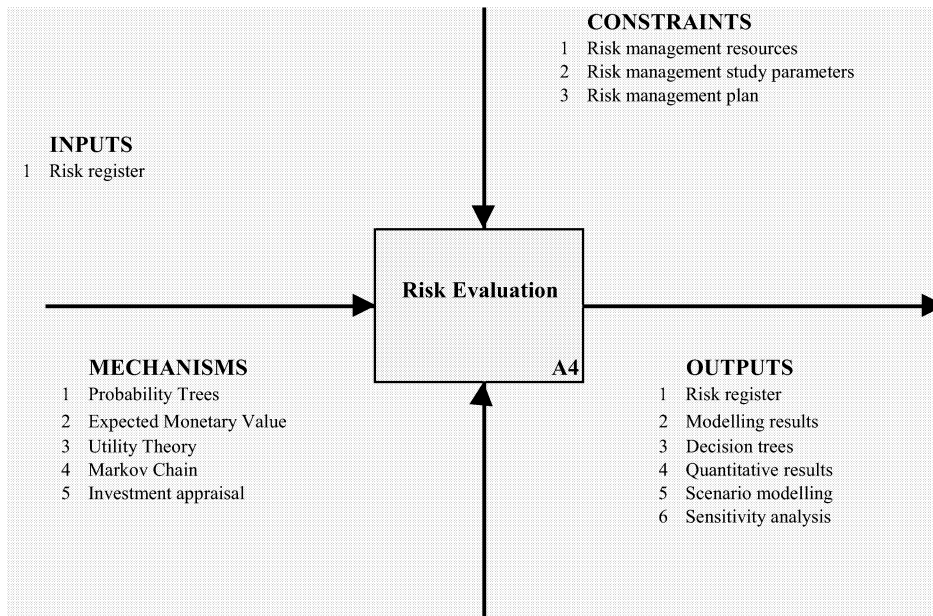
The risk management process is a 6-stage iterative process, with feedback control loops at each stage. These are necessary to develop a robust and resilient ERM framework that can be embedded within the organisation and serve to facilitate real-time risk response strategies.



Each of the six risk management processes has inputs, outputs, control and mechanisms. The modes of data connectivity can be charted using the IDEFO (Integration Definition for Function Modelling) process mapping technique.







5. Early Warning Indicators and Lessons Learned

CS 1 AIG (American International Group)

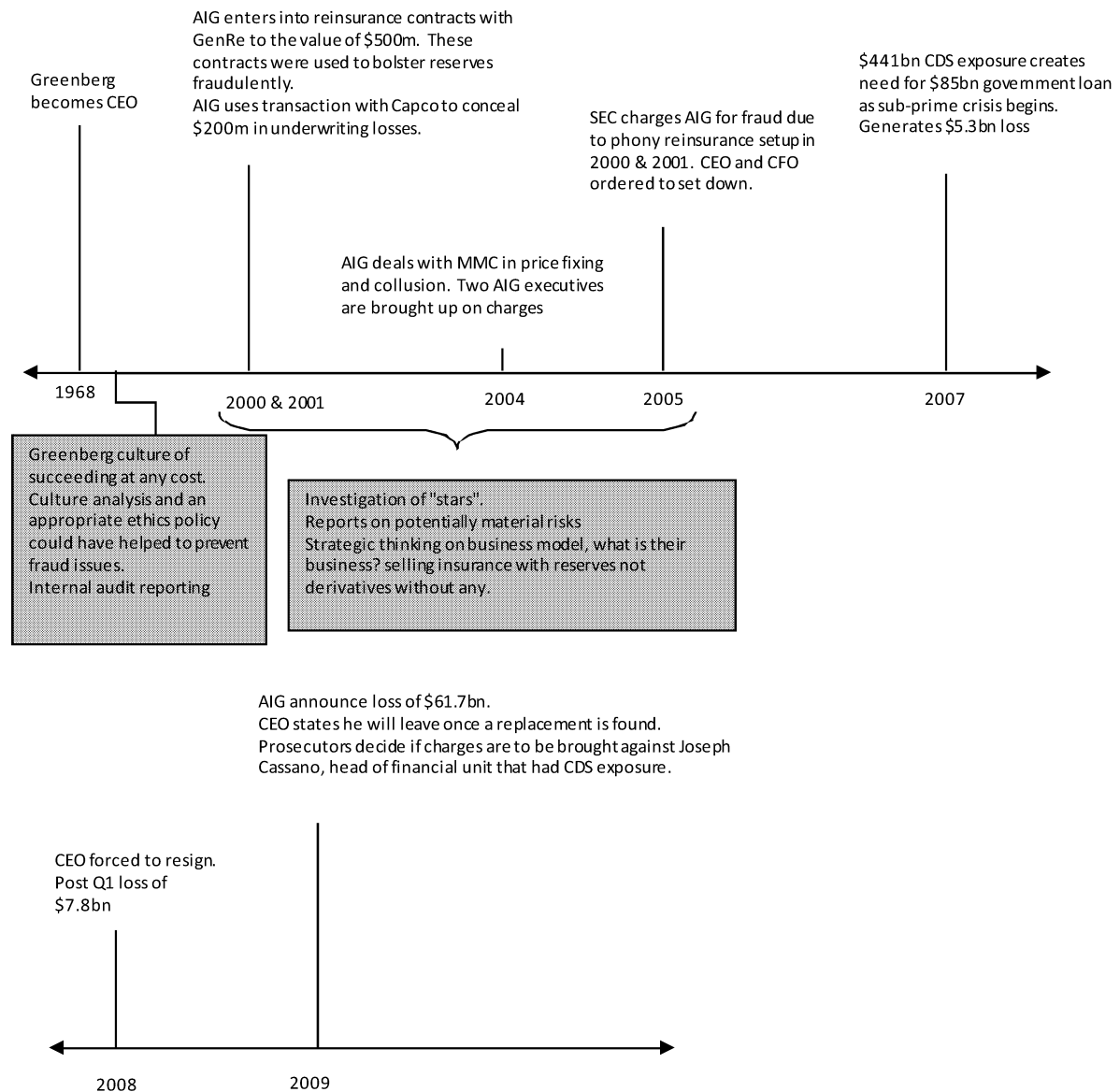
Early warning indicators that could have been useful:

1. Corporate culture analysis, monitoring and tracking
2. Corporate ERM governance policy and its implementation
3. Corporate ethics policy and its implementation
4. CRO reports on ERM implementation and issues
5. Strategic thinking on business model (value chain, process)
6. Investigation of 'stars' (e.g. business units, individuals)
7. Whistle blowing reports, analysis tracking
8. Internal audit reporting, training and culture
9. Risk incident reporting, training and culture
10. Management controls reports on all potentially material risks
11. Business model systems and internal controls

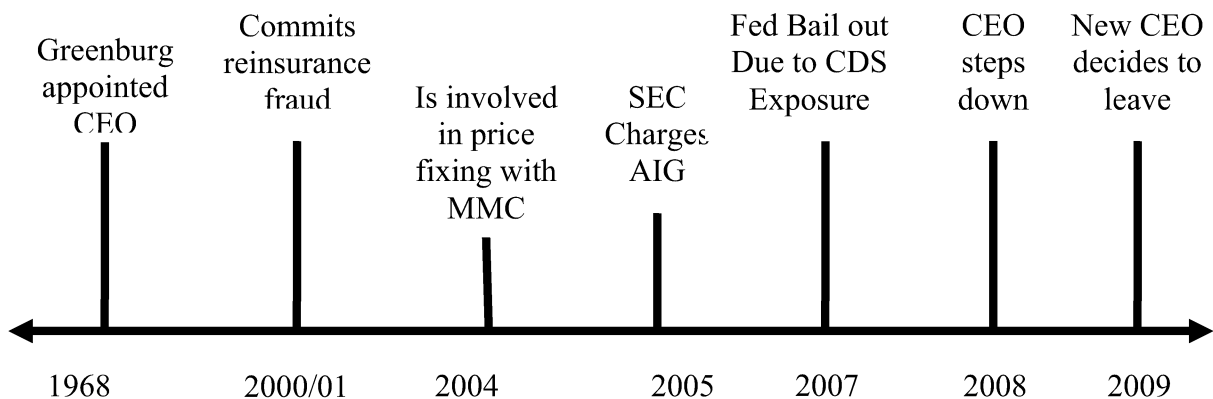
Lessons learned:

1. A controlled corporate culture could have prevented employees going too far. The culture at AIG was heavily focused on succeeding at any cost. Adjusting accounting figures and dealing illegally with insurance companies could have been avoided if the company employed an effective corporate ethics policy.
2. A single business unit can bring down a whole organisation. A chain is only as strong as its weakest link.
3. Always consider all risks regardless of how unlikely they are to occur. Remember the Black swan effect.
4. Effective management controls could have prevented the disaster.
5. Effective risk monitoring could have identified over exposure to certain risks.
6. With the benefit of hindsight, the organization had lost sight of its core business model, which was that of an insurance firm and not an investment bank.

CS 1 AIG (American International Group) Timeline



CS1 AIG - Summary Timeline



CS 2 LTCM (Long Term Capital Management)

Early warning indicators that could have been useful:

1. Corporate culture analysis, monitoring and tracking
2. Corporate ERM governance policy and its implementation
3. Corporate ethics policy and its implementation
4. Strategic thinking on business model (value chain, process)
5. Reputational loss exposure watch list (stakeholders, risks)
6. Investigation of 'stars' (e.g. business units, individuals)
7. Whistle blowing reports, analysis tracking
8. Internal audit reporting, training and culture
9. Risk incident reporting, training and culture
10. Management controls reports on all potentially material risks
11. Business model systems and internal controls

Lessons learned:

1. An organisation is only as strong as its weakest link.
2. Strategic thinking on business model could have prevented the disaster.
3. **VaR** has proved to be unreliable as a measure of risk over long time periods or under abnormal market conditions. The danger posed by exceptional market shocks can be captured only by means of supplemental methodologies.
4. The catastrophic losses were caused by systemic risks that LTCM had not foreseen in its business model. The failure of the hedge fund LTCM provides a classic example of model risk in the financial services industry.
5. LTCM provides a reminder of the notion that there is no such thing as a risk-free arbitrage. Because the arbitrage positions they were exploiting were small, the fund had to be leveraged many times in order to produce meaningful investment returns. The problem with liquidity is that it is never there when it is really needed.
6. As LTCM's capital base grew, they felt pressed to invest that capital and had run out of good bond-arbitrage bets and led it to undertake more aggressive trading strategies.
7. LTCM failed because both its trading models and its risk management models failed to anticipate the cycle of losses during an extreme crisis when volatilities rose dramatically, correlations between markets and instruments became closer to 1, and liquidity dried up.
8. Risk control at LTCM relied on a VaR model. However, LTCM's risk modelling was inappropriate and let it down.
9. The theories of Merton and Scholes took a public beating. In its annual reports, Merrill Lynch observed that mathematical risk models "may provide a greater sense of security than warranted; therefore, reliance on these models should be limited."
10. Effective management controls could have prevented the disaster.

CS 2 LTCM (Long Term Capital Management) Timeline

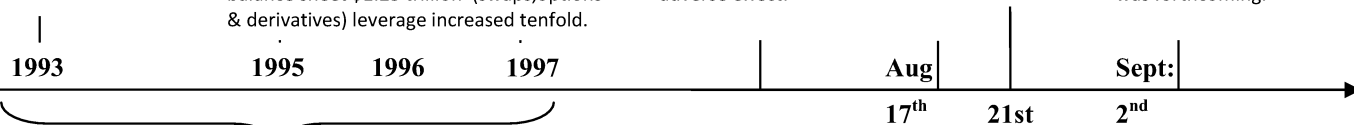
LTCM was essentially a hedge fund founded in 1993 by John Meriwether. Its Board of Directors included Myron Scholes and Robert C. Merton, who shared the 1997 Nobel Memorial Prize in Economic Sciences.

Complex mathematical models informed relative value or convergence arbitrage trades e.g. exploiting small price differences between related securities e.g. U.S., Japanese and European government bonds. Investors paid high fees; with a 3 year lock in. Trading strategies made returns in excess of 40% in 1995 and 1996. Capital grew from \$1 to over \$7 billion (1997); fees reached \$1.5 billion. Balance sheet Total Funds was \$125 billion (largely borrowed). Equity was \$5 billion. The leverage ratio was 25:1. Allowing for Off balance sheet \$1.25 trillion (swaps, options & derivatives) leverage increased tenfold.

The mortgage-back securities market fell - returns from the fund were -6.42% and -10.14% respectively, reducing LTCM's capital by \$461 million and increasing leverage to 31. The exit of Salomon Brothers from the arbitrage business in July 1998 also had an adverse effect.

Russia defaulted on its government debt. Investors sold Japanese & European bonds to buy U.S. treasury bonds. LTCM lost \$550 million on 21st August and by the end of August the fund had lost \$1.85 billion in capital. leverage was 55:1.

Meriwether advised investors that the fund had lost \$2.5 billion or 52% of its value over 1998; \$2.1 billion in August; its capital base was just \$2.3 billion. The fund required new investment of around \$1.5 billion. No new investment was forthcoming.



LTCM's trading strategy relied upon aggressive leverage to boost absolute performance; e.g. trying to earn a 1.0% p.a. return on assets, leveraged 25:1, to yield a 25% p.a. return.

Rigorous strategic analysis and understanding of the business model should precede development of technical business model systems and an appropriately calibrated ERM framework to address the nature of the arbitrage activity.

Corporate culture and ethics need to be rigorously queried with reference to the complexity and risk profile of the trading strategy. The strategy needs to be matched with sufficient transparency and disclosure to its stakeholders. Transparency might have solicited intelligence to improve the robustness of the trading strategy and a different response at September 2nd 1998.

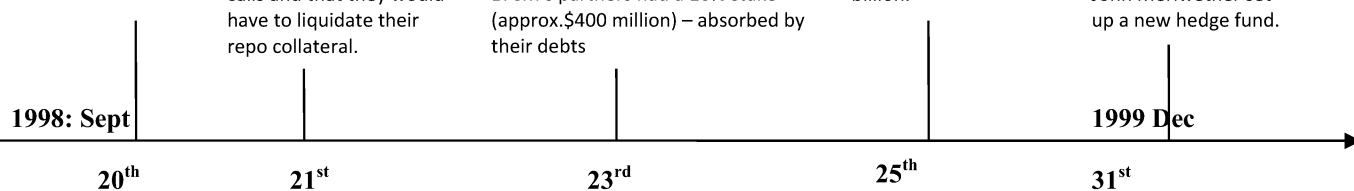
External inspection of LTCM's balance sheet shows assets of \$125 billion, capital base \$4 billion; 30:1 leverage. \$1 trillion off balance sheet business e.g. interest rate swaps increases leverage tenfold.

LTCM lost \$550 million largely due to equity market volatility. Bear Sterns, LTCM's lead broker, needed capital for a large margin call from a losing LTCM T-bond futures position. Counter parties were concerned whether LTCM could meet future margin calls and that they would have to liquidate their repo collateral.

Goldman Sachs, AIG, and Berkshire Hathaway offered to buy out LTCM's management for \$250 million, injecting \$3.75 billion and operating LTCM within Goldman's trading division. This deal failed. The FRBNY set up a bailout of \$3.625 billion by the major creditors to avoid a wider collapse in the financial markets. The 14 banks got a 90% share in the fund; a supervisory board was set up; LTCM's partners had a 10% stake (approx. \$400 million) – absorbed by their debts

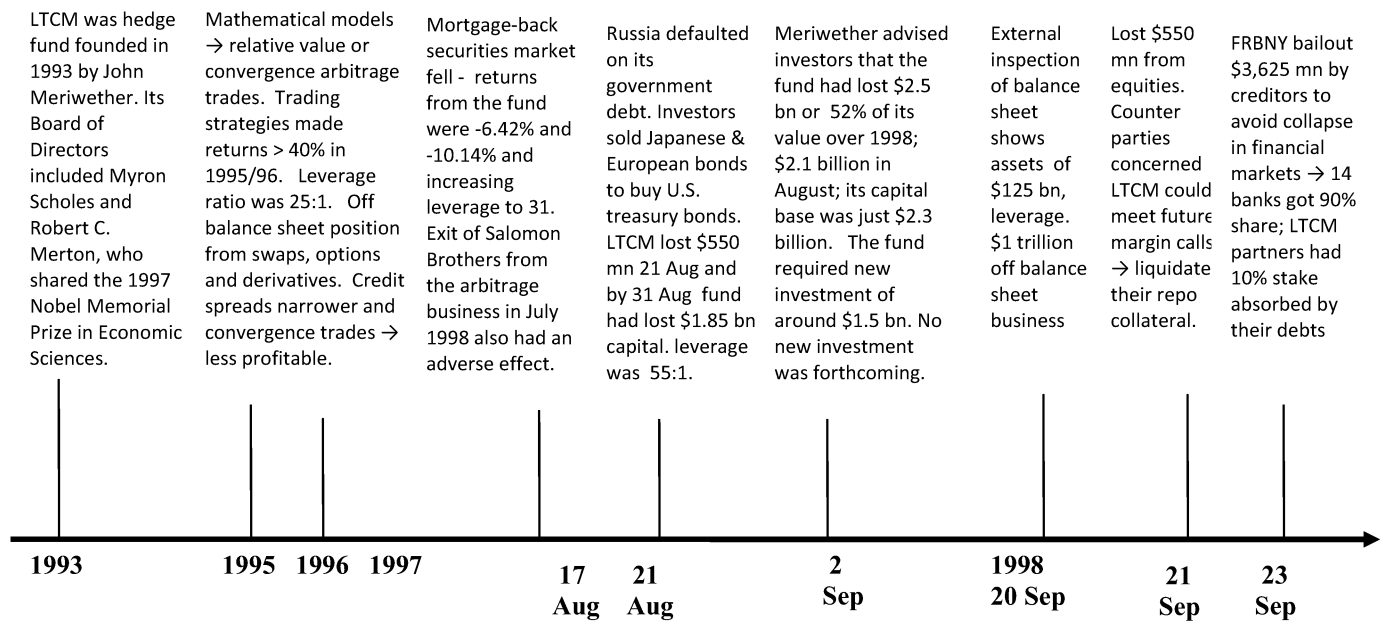
LTCM had just \$400 million in capital. With assets still over \$100 billion, this meant a leverage ratio over 250:1. LTCM's partners lost their own investment (\$1.9 billion), UBS lost \$700 million and other investors lost \$1.8 billion.

LTCM was controlled by a 14 member consortium. The fund recovered by around 13% alongside the market. The portfolio was gradually unwound returning a small profit by the end of 1999 to the bail out consortium members. John Meriwether set up a new hedge fund.



Reliance on VaR based models should have been continually subject to scrutiny. In the event the models did not foresee or provide for the extreme volatility and violence of the cycle of losses. Stress-testing also needs to be calibrated to the complexity and risk profile of the arbitrage. In this case it was inadequate e.g. the level of volatility of \$44 million anticipated was exceeded with LTCM experiencing \$100 million and above. LTCM's VaR at 10-days was \$320 million - actual losses in August 1998 were over \$1,000 million.

CS 2 LTCM Summary Timeline



CS 3 Union Carbide

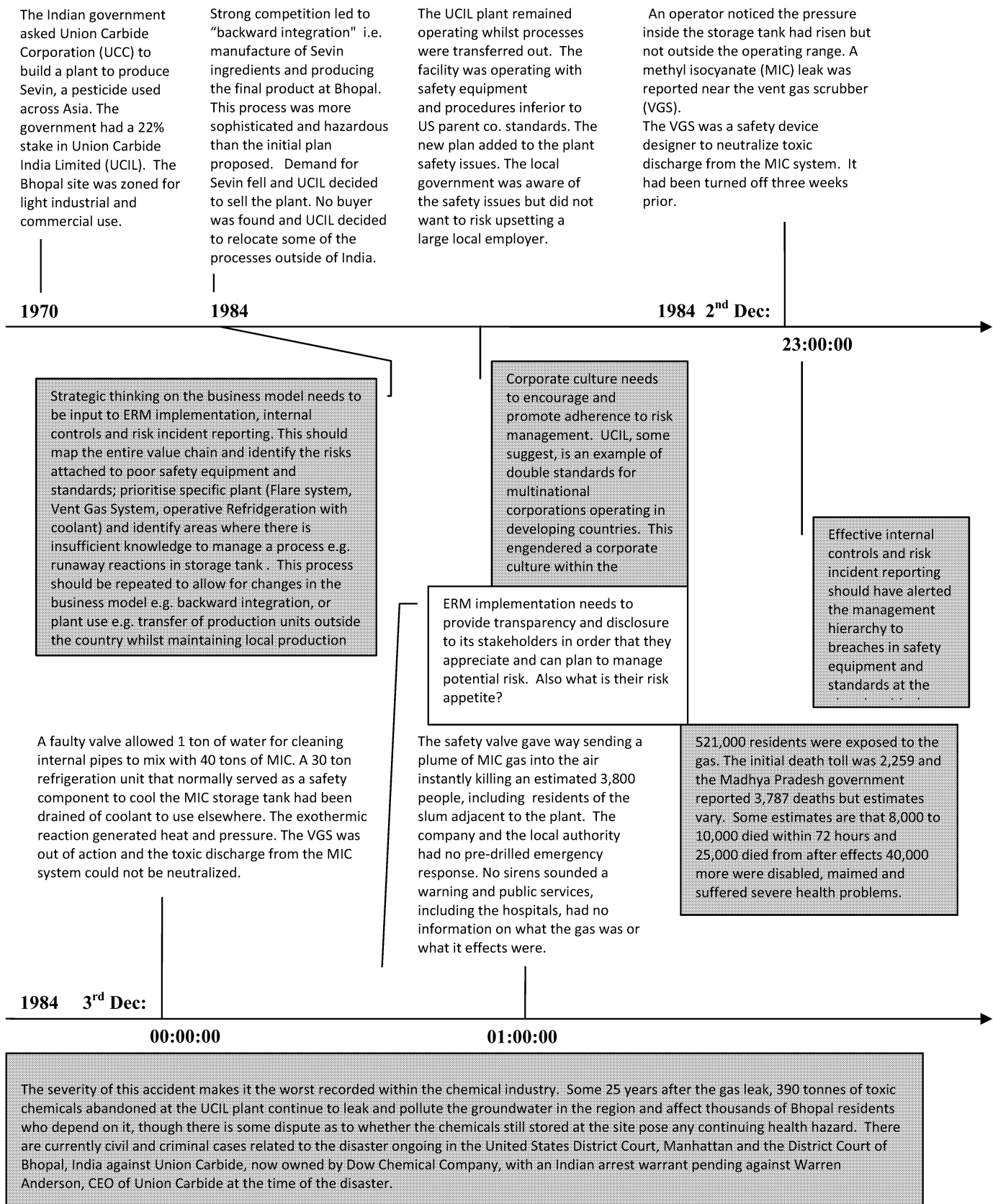
Early warning indicators that could have been useful:

1. Corporate culture analysis, monitoring and tracking
2. Corporate ERM governance policy and its implementation
3. Corporate ethics policy and its implementation
4. Strategic thinking on business model (value chain, process)
5. Reputational loss exposure watch list (stakeholders, risks)
6. Investigation of 'stars' (e.g. business units, individuals)
7. Whistle blowing reports, analysis tracking
8. Internal audit reporting, training and culture
9. Risk incident reporting, training and culture
10. Management controls reports on all potentially material risks
11. Business model systems and internal controls

Lessons learned:

1. An organisation is only as strong as its weakest link.
2. Reputational damage travels swiftly and is difficult to salvage.
3. Strategic thinking on business model could have prevented the disaster.
4. Corporate ethics policy based on best practice could have prevented the disaster.
5. The court proceedings revealed that management's cost cutting measures had effectively disabled safety procedures essential to prevent or alert employees of such disasters.
6. The severity and impact of the event were also made worse by the lack of safety standards and effective containment measures at the factory in Bhopal. The physical manifestations of these failures included unreliable monitoring equipment, inoperative safety equipment, unsuitable and inadequate gas suppression equipment and alarm systems which failed.
7. Although Dow Chemical has since taken over Union Carbide and denies responsibility for this disaster, the fact that it is much larger than what was once Union Carbide and its Union Carbide India Ltd. subsidiary, ongoing litigation continues to haunt the parent company.
8. Each operational business unit needs to recognise the likelihood and consequences of the risks that they face. A risk event at a small foreign subsidiary can bring down the entire enterprise - risk management at all levels should recognise that the potential for catastrophes always exists and that their impact can have both a large scale and a long-term impact.
9. We can never predict risks of this major consequence, but an enterprise should accept that the risk always remains of a catastrophic disaster. The foundation of a risk management strategy needs to be strong in its fundamentals, such as adherence to appropriate safety standards.
10. Effective management controls could have prevented the disaster.

CS 3 Union Carbide Timeline



	Early Warning Indicators	AIG	LTCM	Union Carbide
1	Corporate culture analysis, monitoring and tracking	1	1	1
2	Corporate ERM governance policy and implementation	2	2	2
3	Corporate ethics policy and its implementation	3	3	3
4	CRO reports on ERM implementation progress and issues	4		
5	Strategic thinking on business model (value chain, process)	5	5	5
6	Reputational loss exposure watchlist (stakeholders, risks)		6	6
7	Investigation of 'stars' (e.g. business units, individuals)	7	7	
8	Whistle blowing reports, analysis tracking	8	8	8
9	Internal audit reporting, training, compliance culture	9	9	9
10	Risk incident reporting, training and culture	10	10	10
11	Management controls on all material risks	11	11	11
12	Business model systems and internal controls	12	12	12

Appendix B

Case Studies - Lessons Learned

Early Warning Indicators		CS 1 AIG	CS 2 LTCM	CS 3 Union Carbide
1	Corporate culture analysis, monitoring and tracking	A controlled corporate culture could have prevented employees going too far. The culture at AIG was heavily focused on succeeding at any cost;	LTCM was founded by a highly-talented group of individuals including John Meriwether (expert relative value trader from Salomon bond traders) and Myron Scholes and Robert C. Merton, who shared the 1997 Nobel Memorial Prize in Economic Sciences. The business culture of entrepreneurial, high performance supported by highly complex mathematical modelling was too volatile to sustain the business without other external and independent criticism and scrutiny.	Some commentators have argued that the way in which UC established and operated the Bhopal plant suggests evidence of a double standard for multinational corporations operating in developing countries. This engendered a corporate culture within the subsidiary which led to degraded safety procedures and equipment.
2	Corporate ERM governance policy and implementation	An effective system of corporate governance would have provided more scrutiny and mandated for robust, sustainable improvement in business performance, ensured accurate accounting and promoted more ethical behaviour at all levels of the corporate hierarchy. ERM should inform all stages of the corporate governance cycle (policy, strategy, governance and operations).	LTCM's trading strategy relied upon aggressive leverage to boost their absolute performance; for example, trying to earn a 1.0% p.a. return on assets, leveraged 25:1, to yield a 25% p.a. return. Corporate ERM governance and policy needs to be calibrated and matched to the nature of the financial trading and also to be applied to ensure that the business model is robust and sustainable.	Corporate governance and ERM have a similar focuses on strategic direction, corporate integration and motivation from the top management. Not only was poor risk management to blame for the incident, but so too was ineffective corporate governance. Companies with poor corporate governance practices often have poor risk management skills, and vice versa.
3	Corporate ethics policy and its implementation	Adjusting accounting figures and dealing illegally with insurance companies could have been avoided if the company employed an effective corporate ethics policy and monitored ethical standards.	LTCM's trading strategy was not accompanied by sufficient transparency and disclosure to its stakeholders until a crisis point had been passed.	Corporate ethics policy based on best practice could have prevented the disaster - it would have ensured the chemical processes were appropriate for the licence granted and the location; it would have ensured that safety standards and equipment were considered over-arching priorities and would have led to strong engagement with all local community stakeholders inc. management of public health and safety.
4	CRO reports on ERM implementation progress and issues	ERM must be embedded within the 'Executive Suite' and the corporate governance cycle. There is also evidence that the ERM process stage of 'business analysis' was flawed in that AIG management did not understand the CDS business model and were therefore ill-equipped to identify, assess, evaluate and plan to manage the risks associated with the products.		

Early Warning Indicators		CS 1 AIG	CS 2 LTCM	CS 3 Union Carbide
5	Strategic thinking on business model (value chain, process)	The organization had lost sight of its core business model, which was that of an insurance firm and not an investment bank. The development of the financial products division's CDS activities and those within the RBMS market involved moving away from AIG's core business model into a product market which was closer to selling options than insurance.	Strategic thinking on business model could have prevented the disaster. LTCM provides a reminder of the notion that there is no such thing as a risk-free arbitrage. Because the arbitrage positions they were exploiting were small, the fund had to be leveraged many times in order to produce meaningful investment returns. The problem with liquidity is that it is never there when it is really needed.	There seems to have been little analysis of how the plant's business model was changing and the implications for production processes at the plant, including safety equipment and standards. UCIL switched from less hazardous production of the final pesticide product to backward integration involving more sophisticated and hazardous processes to generate the ingredients for the pesticide. Next a decision was made to decommission units of the plant whilst continuing production and plan to relocate production to other sites
6	Reputational loss exposure watchlist (stakeholders, risks)		Reputational damage travels swiftly and is difficult to salvage. It was already too late for any remedial action to engage investors before Meriwether wrote to request \$1.5 billion of new money to stay in operation. At this stage the fund had lost \$2.5 billion or 52% of its value during 1998; \$2.1 billion in August and its capital base was just \$2.3 billion. LTCM's reputation was irrevocably damaged.	Reputational damage travels swiftly and is difficult to salvage. The reputational damage from the subsidiary UCIL has cross-generational effects - possibly justifiably it tarnished the reputation of Union Carbide, the parent company, and in turn has left a legacy for Dow Chemicals.
7	Investigation of 'stars' (e.g. business units, individuals)	A single business unit can bring down a whole organisation. A chain is only as strong as it's weakest link. The reliance upon bid-rigging and CDS were at the same time capable of generating high-profits but were also high risk strategies where the cost of failure risked the core business operation.	LTCM's trading strategy relied upon aggressive leverage to boost their absolute performance; for example, trying to earn a 1.0% p.a. return on assets, leveraged 25:1, to yield a 25% p.a. return. LTCM's obtained over-generous lending credit and its strategy was not critically analysed by its lenders. Star performers are sometimes judged subject to the Tinkerbell Phenomenon (see Barings) when instead their high performance should be subject to more scrutiny and investigation to avoid fraud or hubris.	
8	Whistle blowing reports, analysis tracking	The dominant culture of 'generating growth and making the numbers' may have disincentivised and suppressed critical reports. Whistle-blowing should be channelled by the organisation as it can prompt effective scrutiny and investigation of its business conduct and performance.		UCIL did not appear to take action following reported incidents and there would appear to have been little encouragement for staff to proactively identify issues. The local government were also concerned that unfortunate news reports might expedite UCIL's closure of the local plant and cause unemployment.

Early Warning Indicators		CS 1 AIG	CS 2 LTCM	CS 3 Union Carbide
9	Internal audit reporting, training, compliance culture	The functions of internal audit and compliance were ironically described in this quote by Robert Graham, Senior VP, GenRe: "their [AIG's] organizational approach to compliance issues has always been pay the speeding ticket..." (recording, 7 March 2001). Studies and comment on AIG indicate that the CEO and Board of Directors created the dominant culture of aggressive growth which saw these areas as a constraint.		An organisation is only as strong as its weakest link. The evidence of failings in technical measures at the plant included critical equipment which had been out of commission for 3 months, poor modification and maintenance practices and the decommissioning of the refrigeration system which was a major contributor to the accident as without this system the temperature within the gas tank was higher than the design temperature of 0°C.
10	Risk incident reporting, training and culture	This activity relies upon an understanding of a product/service, a business process and its linkages to other processes. The outputs also need to be seen to be valued and utilised by management and the 'Executive Suite'.		A day prior to the gas leak an operator noticed the pressure inside the storage tank was higher than normal although not outside the working pressure of the tank. A methyl isocyanate (MIC) leak was reported near the vent gas scrubber (VGS). The Vent Gas Scrubber, a safety device designed to neutralize toxic discharge from the MIC system, had been turned off three weeks prior. No action was taken this is one of a series of equipment failures which led to the accident.
11	Management controls on all material risks	Always consider all risks regardless of how unlikely they are to occur. Effective management controls could have prevented the disaster. The downside of bid-rigging e.g. reputational damage, loss of major corporate clients, legal resources and costs, and the risks attached to the selling of CDS and RMBS activity marketing of CDSs e.g. 80% government ownership and the divestment of profitable non US operations such as the Asian, AIA unit.	LTCM failed because both its trading models and its risk management models failed to anticipate the cycle of losses during an extreme crisis when volatilities rose dramatically, correlations between markets and instruments became closer to 1, and liquidity dried up	Effective management controls could have prevented the disaster. Each operational business unit needs to recognise the likelihood and consequences of the risks that they face. A risk event at a small foreign subsidiary can bring down the entire enterprise - risk management at all levels should recognise that the potential for catastrophes always exists and that their impact can have both a large scale and a long-term impact.
12	Business model systems and internal controls	The financial products unit reported a very low "capital markets trading" value-at-risk (VaR) at December 2007 for the financial AIG stated that the VaR calculation reflects interest rate, equity, commodity and foreign exchange risks. But it excluded, "Credit-related factors, such as credit spreads or credit default, are not included in AIGFP's VaR calculation." (AIG 2007 Form 10-K, p. 124.) This suggests possible weaknesses concerning AIG's fundamental understanding of the CDS business and its risk modelling.	VaR was unreliable measure of risk over long time periods or under abnormal market conditions. Dangers from exceptional market shocks can be captured only by means of supplemental methodologies. CAT losses were caused by systemic risks that LTCM had not foreseen in its business model. Its failure is classic example of model risk in the financial services industry. LTCM failed because both its trading models and its RM models failed to anticipate the cycle of losses during an extreme crisis when volatilities rose dramatically, correlations between markets and instruments became closer to 1, and liquidity dried up.	We can never predict risks of this major consequence, but an enterprise should accept that the risk always remains of a catastrophic disaster. The foundation of a risk management strategy needs to be strong in its fundamentals, such as adherence to appropriate safety standards.

Appendix C

Case Studies – Literature Review

Case Studies

- C.1** AIG (American International Group)
- C.2** LTCM (Long Term Capital Management)
- C.3** Union Carbide

Appendix C.1

CS 1 AIG (American International Group)

<http://www.sec.gov/news/press/2006-19.htm>

AIG to Pay \$800 Million to Settle Securities Fraud Charges by SEC

Over \$1.6 Billion to be Paid to Resolve Federal and New York State Actions

Washington, D.C., Feb. 9, 2006 — The Securities and Exchange Commission announced today the filing and settlement of charges that American International Group, Inc. (AIG) committed securities fraud. The settlement is part of a global resolution of federal and state actions under which AIG will pay in excess of \$1.6 billion to resolve claims related to improper accounting, bid rigging and practices involving workers' compensation funds.

The Commission announced the settlement in coordination with the Office of the New York State Attorney General, the Superintendent of Insurance of the State of New York and the United States Department of Justice, which have also reached settlements with AIG. The settlement with the Commission provides that AIG will pay \$800 million, consisting of disgorgement of \$700 million and a penalty of \$100 million, and undertake corporate reforms designed to prevent similar misconduct from occurring. The penalty amount takes into account AIG's substantial cooperation during the Commission's investigation.

Linda Chatman Thomsen, Director of the Commission's Division of Enforcement, said, "This important settlement arose out of our industry wide investigation into the misuse of finite insurance and reinsurance. While this settlement concludes our investigation of AIG, our investigation continues with respect to others who may have participated in AIG's securities laws violations."

Mark K. Schonfeld, Director of the Commission's Northeast Regional Office said, "In this settlement, we have sought to balance AIG's historical misconduct – which was substantial – with its new approach to compliance and cooperation with regulators and law enforcement. The Commission's settlement will also deliver meaningful monetary relief to those harmed by AIG's prior conduct."

The Commission's complaint, filed today in federal court in Manhattan, alleges that AIG's reinsurance transactions with General Re Corporation (Gen Re) were designed to inflate falsely AIG's loss reserves by \$500 million in order to quell analyst criticism that AIG's reserves had been declining. The complaint also identifies a number of other transactions in which AIG materially misstated its financial results through sham transactions and entities created for the purpose of misleading the investing public.

Specifically, the Commission's complaint alleges that in December 2000 and March 2001, AIG entered into two sham reinsurance transactions with Gen Re that had no economic substance but were designed to allow AIG to improperly add a total of \$500 million in phony loss reserves to its balance sheet in the fourth quarter of 2000 and the first quarter of 2001. The transactions were initiated by AIG to quell analysts' criticism of AIG for a prior reduction of the reserves. In addition, the complaint alleges that in 2000, AIG engaged in a transaction with Capco Reinsurance Company, Ltd. (Capco) to conceal approximately \$200 million in underwriting losses in its general insurance business by improperly converting them to capital (or investment) losses to make those losses less embarrassing to AIG. The complaint further alleges that in 1991, AIG established Union Excess Reinsurance Company Ltd. (Union Excess), an offshore reinsurer, to which it ultimately ceded approximately 50 reinsurance contracts for its own benefit. Although AIG controlled Union Excess, it improperly failed to consolidate Union Excess's financial results with its own, and in fact took steps to conceal its control over Union Excess from its auditors and regulators. As a result of these actions and other accounting improprieties, AIG fraudulently improved its financial results.

Shortly after federal and state regulators contacted AIG about the Gen Re transaction, AIG commenced an internal investigation that eventually led to a restatement of its prior accounting for approximately 66 transactions or items. In its restatement, AIG admitted not only that its accounting for certain transactions had been improper, but also that the purpose behind some of those transactions

was to improve financial results that AIG believed to be important to the market. AIG also conceded in its restatement that certain transactions may have “involved documentation that did not accurately reflect the true nature of the arrangements ... [and] misrepresentations to members of management, regulators and AIG’s independent auditors.” Furthermore, the restatement summarized several transactions that AIG accounted for improperly, including, among others, two sham reinsurance transactions with Gen Re and certain transactions involving Capco and Union Excess. As a result of the restatement, AIG reduced its shareholders’ equity at December 31, 2004 by approximately \$2.26 billion or 2.7%.

In the Commission’s settlement, AIG has agreed, without admitting or denying the allegations of the complaint, to the entry of a Court order enjoining it from violating the antifraud, books and records, internal controls, and periodic reporting provisions of the federal securities laws. The order also requires that AIG pay a civil penalty of \$100 million and disgorge ill-gotten gains of \$700 million, all of which the Commission will seek to distribute to injured investors. AIG has also agreed to certain undertakings designed to assure the Commission that future transactions will be properly accounted for and that senior AIG officers and executives receive adequate training concerning their obligations under the federal securities laws.

AIG’s remedial measures include, among other things, (i) appointing a new Chief Executive Officer and Chief Financial Officer; (ii) putting forth a statement of tone and philosophy committed to achieving transparency and clear communication with all stakeholders through effective corporate governance, a strong control environment, high ethical standards and financial reporting integrity; (iii) establishing a Regulatory, Compliance and Legal Committee to provide oversight of AIG’s compliance with applicable laws and regulations; and (iv) enhancing its “Code of Conduct” for employees and mandating that all employees complete special formal ethics training. This proposed settlement is subject to court approval.

The settlement takes into consideration AIG’s cooperation during the investigation and its remediation efforts in response to material weaknesses identified by its internal review. From the outset of the investigation, AIG gave complete cooperation to the investigation by the Commission’s staff. Among other things, AIG (i) promptly provided information regarding any relevant facts and documents uncovered in its internal review; (ii) provided the staff with regular updates on the status of the internal review; and (iii) sent a clear message to its employees that they should cooperate in the staff’s investigation by terminating those employees, including members of AIG’s former senior management, who chose not to cooperate in the staff’s investigation.

The Commission acknowledges the assistance and cooperation of the Office of the New York State Attorney General, the Superintendent of Insurance of the State of New York, the U.S. Department of Justice, Fraud Section, Criminal Division, and the U.S. Postal Inspection Service

http://www.usatoday.com/money/industries/insurance/2004-10-15-spitzer-insurance_x.htm

Marsh & McLennan accused of price fixing, collusion

By Thor Valdmanis, Adam Shell and Elliot Blair Smith, USA TODAY

NEW YORK — The nation's biggest insurers are mired in a brewing scandal that many executives fear could shake the industry to its core.

After months of complaints from industry watchdogs, New York Attorney General Eliot Spitzer launched the first salvo against alleged conflicts of interest Thursday, charging the insurance brokerage arm of Marsh & McLennan (MMC) with price fixing and collusion. A damning civil suit accuses Marsh of steering clients to favoured insurers and working with major insurers to rig the bidding process for property-casualty insurance coverage. The lawsuit says the victims ranged from large companies to school districts to individuals. In addition to the civil complaint, Spitzer announced two guilty pleas on criminal charges against two executives at American International Group (AIG). They are cooperating with the investigation, which could ensnare other insurance giants and executives.

"This investigation is catching like wildfire. These charges radiate out to other insurance companies and brokerages," Spitzer said in an interview. "The entire business model of this industry seems to be predicated on the type of egregious behaviour outlined in our complaint."

Some of the nation's largest insurance companies are accused in Spitzer's suit of steering contracts and bid rigging, including AIG, ACE (ACE), The Hartford (HIG) and Munich American Risk Partners. Other insurance companies are being investigated in a scheme that Spitzer said raises everyone's insurance premiums. Wall Street reacted harshly Thursday, wiping out more than \$26 billion in market value of the four companies traded in the USA. Munich is a subsidiary of Germany's Munich Re. Marsh and others named in the complaint said they are cooperating with Spitzer. Some industry analysts were quick to point out a family connection to Spitzer's probe. Business legend Maurice "Hank" Greenberg runs AIG, while his sons Jeff and Evan are CEOs at Marsh & McLennan and ACE, respectively. Spitzer said he has no evidence of any family ties to the scandal. Most industry watchers expect Spitzer's investigation to trigger sweeping reform as well as massive lawsuits.

Plaintiffs lawyer John Stoia, who brought civil lawsuits against Marsh & McLennan, Aon and the Willis Group in California and New York — alleging many of the same unfair practices prior to the New York attorney general's complaint — said in a statement that the companies had falsely "represented themselves as honest brokers offering their customers the best coverage from many insurers at the lowest cost, (but) they steered them instead to a few companies that gave them kickbacks and other payoffs."

Spitzer said his six-month investigation was sparked by an anonymous letter and the Washington Legal Foundation, a conservative public policy think tank that in February urged regulators in New York and California to probe so-called contingent commissions.

The industry trade group, the Council of Insurance Agents & Brokers, responded by saying it believed the arrangements, which are at the heart of the Spitzer allegations of kickbacks and conflicts of interest, were being adequately disclosed. Last month, Marsh disclosed some contingent commission-related data and its code of conduct. At the time, Marsh CFO Sandra Wijnberg said, "What we found is that the bigger clients already were pretty knowledgeable, and they haven't been particularly agitated about this."

That did little to satisfy Spitzer, who noted that Marsh collected \$800 million in contingent commissions in 2003 alone, more than half of its \$1.5 billion net income. Spitzer said that when he first contacted Marsh executives, they said, "Don't waste your time." Some critics say the ambitious New York attorney general, who is eyeing the state governor's mansion, may be over-reaching. Steve Smith, a partner at law firm Bryan Cave, has represented Marsh & McLennan in professional liability cases. "Many of the allegations in the complaint are not very specific," Smith says. "The A.G. will have to come forward with evidence to support his case." But other industry veterans say the lawsuit is warranted. "Spitzer's right on this one," says former AIG executive Marc Vivori. "They were not acting in the best interests of their clients. At a minimum, they had an obligation to disclose any contingent commission arrangement with their clients."

In May, Advisen, an insurance industry research company, found that 69% of the 330 risk managers it canvassed in an anonymous survey considered contingent commission arrangements a conflict of interest. And 82% said broker disclosure of contingent commissions "was less than fully adequate." Advisen Executive Vice President Dave Bradford, who conducted the survey, said, "Whatever the outcome of the New York case, the enormous pressure this is going to exude on the industry is going to force it to abandon the contingent commission business or restructure it in a significant way." Bradford adds, "My feeling is this is the first domino. The other state attorneys general and insurance commissioners are pretty likely to follow suit." Unlike the securities industry, the insurance industry is not federally regulated.

Whether the arrangements constitute a conflict of interest is a question that may have to be litigated. But insurers may be legally vulnerable if they have not disclosed the arrangements. In 1998, the New York State Insurance Department issued a policy letter requiring that all compensation between brokers and insurers be disclosed to buyers "prior to the purchase so as to enable (them) to understand

the costs of the coverage and the motivation of their broker in placing the business." In that same letter, the department said undisclosed compensation "is sufficient to create the perception that brokers are conflicted in their loyalties." In the Advisen survey, 56% responded that their broker didn't disclose the agreements.

Thursday's dramatic action is Spitzer's latest crackdown on unethical and criminal behaviour in the power corridors of Corporate America, after tackling tainted Wall Street research and fraud in the mutual fund industry. "It makes you wonder what the other attorney generals and industry regulators are doing to earn their paychecks," says Columbia University law professor John Coffee. "Spitzer has had an extraordinary rate of success in uncovering smoking guns." Spitzer said the victims in this latest scandal were mostly large corporations, but also included small and midsize businesses, municipal governments, school districts and individuals who were deceived into buying property and casualty coverage that may have cost more than it should have.

For Marsh, the allegations are potentially disastrous. All three of its major businesses are now tainted by scandal. The company's Putnam mutual fund arm was charged last year in Spitzer's mutual fund crackdown. Its Mercer consulting unit was criticized for executive compensation work that helped to justify the \$140 million salary of former New York Stock Exchange chairman Richard Grasso. "We believe that the continuing stream of negative news continues to serve as an overhang for (Marsh & McLennan)," J.P. Morgan insurance industry analyst David Sheusi wrote in a recent report. "Each of its business segments is under significant accounting, regulatory and legal scrutiny."

Thursday's news sent Marsh shares tumbling 24%, which wiped out \$5.9 billion in market value. Although AIG shares fell only 10%, that erased \$18.2 billion in market value because of its many shares outstanding. AIG is in a tricky position. Karen Radke, 42, a senior vice president of an AIG division, and co-worker Jean-Baptist Tateossian pleaded guilty Thursday to felony charges of scheming to defraud in state Supreme Court in Manhattan. They face up to four years in prison, but their sentence will depend on how much more they cooperate, Spitzer said.

Spitzer relied on internal e-mail and memos, in which, he said, insurance executives openly discussed actions that were aimed at maximizing Marsh's revenue and insurance companies' revenue, without regard to clients, who ranged from distilled-spirits maker Fortune Brands to a public school district in Greenville County, S.C. Marsh stressed to insurance companies that it would more aggressively sell the policies of those companies who paid the biggest contingent commissions, the complaint states. Marsh employees who "moved" clients to insurers who paid big commissions were also "rewarded" with pay increases, Spitzer says.

In February 2002, one managing director at Marsh informed nine co-workers that "some (contingent commission agreements) are better than others." He added, "I will give you clear direction on who (we) are steering business to and ... who we are steering business from." Bid manipulation also appears to be widespread. In his complaint, Spitzer outlined this scheme involving AIG: When a policy with incumbent carrier AIG was up for renewal, Marsh took the following steps to assure that AIG would win back the business. First, Marsh provided AIG with a "target premium and the policy terms" for the quote. If AIG agreed to the quote, it got to keep the business, regardless of whether it could have quoted a lower premium. But for the deceit to succeed, Marsh had to let other carriers know what the winning quote was and ask them to submit a so-called backup quote, or "B Quote," that was higher, thus putting them out of contention for the business. Spitzer said the cooperation was nothing more than an "entrance fee" for future business.

In December 2002, the lawsuit says, ACE quoted \$990,000 for the excess casualty business of Fortune Brands. But the insurer later revised its bid higher to \$1.1 million. An e-mail from an ACE assistant vice president to ACE's vice president of underwriting explained the revision this way: "Original quote \$990,000. ... We were more competitive than AIG in price and terms. MMGB (Marsh McLennan Global Broking) requested we increase the premium to \$1.1M to be less competitive, so AIG does not lose the business," the complaint alleges.

Clients who were allegedly abused are not amused. "We're already investigating the matter," said Fortune Brands Vice President C. Clarkson Hine.

Prosecutors to decide whether to charge former AIG executive

By Greg Farrell in New York

Published: September 12 2009 03:00 | Last updated: September 12 2009 03:00

Federal prosecutors are close to deciding whether to bring criminal charges against former AIG executive Joseph Cassano over the adequacy of disclosures about the value of credit default swaps issued by AIG's financial products division, say people familiar with the matter.

A spokesman for the US attorney in Brooklyn, New York, which is working on the case with the Justice Department in Washington DC, declined to comment, as did AIG.

If charges are filed, Mr Cassano would be the most senior banker accused in the US of wrongdoing related to last year's financial crisis.

The possibility of criminal charges was first reported in the Wall Street Journal.

According to a person familiar with the matter, prosecutors are focusing on statements made by Mr Cassano on a conference call with investors in December 2007.

In that call, Mr Cassano assured investors of the overall health of AIG's CDS portfolio.

However, he also said that his division's numbers were unaudited, and in a state of flux.

F. Joseph Warin, Mr Cassano's attorney, did not return a call for comment.

Last year, federal prosecutors in Brooklyn accused two former Bear Stearns employees, Ralph Cioffi and Matthew Tannin, of misleading investors about the financial health of two hedge funds that had significant exposures to sub-prime mortgages. The case against the two men is scheduled to go to trial next month.

As head of AIG's financial products division, Mr Cassano championed the sale of credit default swaps (CDS), which insured banks and investors against counterparty risk on hundreds of billions of dollars of bond investments.

In the years leading up to the financial crisis, CDS sales generated billions in profits for AIG, with what seemed to be relatively low risk.

When the sub-prime mortgage crisis struck the US in 2007, the value of many bonds backed by credit default swaps began to sink.

In early 2008, AIG acknowledged that its auditor had discovered "material weaknesses" in the way the insurance company accounted for its CDS holdings.

Using a different valuation method, AIG posted a loss of \$5.3bn for the fourth quarter of 2007, led by \$11bn in CDS losses.

After the collapse of Lehman Brothers one year ago, AIG's debt was downgraded by rating agencies, forcing it to put up billions of dollars it didn't have.

Concerned about the effect on the financial system that an AIG collapse would have on top of Lehman's failure, US regulators stepped in, pumping \$85bn into the company and also acquiring a majority stake in it.

As AIG's financial condition worsened, the government stepped up again and again, turning the once respected insurance company into a poster child for the excesses of the financial crisis.

<http://www.ft.com/cms/s/0/41c61de0-8388-11dd-907e-000077b07658.html>

AIG forms keystone of financial system

By Andrea Felsted and Kate Burgess in London. Published: September 16 2008 03:00 | Last updated: September 16 2008 03:00

American International Group was until recently the world's biggest insurer by market capitalisation, but it remains a key part of the US financial system.

"Not every insurance group could approach the Federal Reserve and ask for liquidity. It is the sheer size of AIG. It is colossal. It is definitely the equivalent to, say, Citigroup in the insurance world," says one person who knows its business well. "It is much more than an insurance company. They are in so many different financial transactions, some of which got them into trouble," says Ronald Shelp, who has written a book on AIG. Allowing AIG to fail would be like "taking the foundation stone out of a skyscraper", said Trevor Jones, managing director of consultants Insurance Security Services.

AIG is the biggest provider of commercial insurance in the US, one of the biggest writers of life assurance there, and the biggest provider of fixed annuities, a popular retirement savings product. It has enormous global operations. But it also has a financial products division that acted like an investment bank and has been at the heart of the current problems.

"The key difference here is they were running at AIG a mini investment bank, a mini trading operation," says the person familiar with AIG's business. It is a counterparty in a large number of swap and hedging transactions. It wrote credit default swaps, which insure against corporate default, some protecting against losses on collateralised debt obligations, which sparked the problems. AIG has total derivative exposures of \$441bn, according to RBS.

John Coffee, law professor at Columbia University, says that if AIG were to fail, a number of other institutions that thought they were insured against default would find themselves "naked and exposed".

Bank of America chief executive Ken Lewis told CNBC: "I don't know of a major bank that doesn't have some significant exposure to AIG. That would be a much bigger problem than most that we've looked at."

Mr Jones says the picture is also complicated because AIG "lost the one guy who knew how it worked, which is Hank Greenberg". Mr Greenberg was ousted as chairman and chief executive in 2005 after 40 years with the group.

But while the focus has been on financial products, observers point out AIG's businesses generating sales and profits, such as general and life insurance.

There are questions about what would happen to AIG policyholders in the event of a failure. But investors and analysts were doubtful yesterday AIG would be allowed to collapse, hence an agreement with New York state to free up \$20bn.

The head of equities at one of the UK's biggest investors said the repercussions should AIG fail were "potentially bigger than Lehmans. It is too big to go bust. If it does, we will be eating baked beans out of a tin."

Despite the turmoil, the impact on other insurers was seen as limited. A London-based analyst estimated European insurers could face a "couple of hundred million euros" of investment losses each.

Others could be attracted by parts of AIG, for example its Asian operations. Analysts said these could appeal to Prudential, the UK life assurer, as could some of AIG's US assets.

"There is going to be a bit of damage and debris in terms of the investment losses. The more significant question is going to be who wants to buy what, if it ultimately comes to that," the London-based analyst says.

Fallen Giant: The Amazing Story of Hank Greenberg and the History of AIG. Ron Shelp(Author) and Al EhrBar(contributor).

<http://www.nytimes.com/2010/02/01/business/01swaps.html>

Risky Trading Wasn't Just on the Fringe at A.I.G. Sign in to Recommend

By MARY WILLIAMS WALSH, Published: January 31, 2010

Ever since the American International Group nearly collapsed, the conventional wisdom has been that the exotic derivatives that drove it to the brink were the product of a lone, unregulated subsidiary in London. The Federal Reserve chairman, Ben S. Bernanke, called the London branch “a hedge fund, basically, attached to a large and stable insurance company.”

American International Group

But the suggestion that A.I.G.'s core insurance business did not dabble in derivatives is not quite true. One of its biggest insurance units, incorporated in Delaware, was also dealing in the derivatives known as credit-default swaps, according to regulatory filings with the state. Though the Delaware division had a much smaller portfolio of those swaps than the London unit, and its portfolio did not pose a similar risk to the world financial system, the very presence of the swaps in a regulated insurance company points to a weakness in insurance oversight.

There is a continuing dispute over whether such swaps are insurance products or something else; who, if anyone, should regulate them; and whether insurers should have to set aside reserves to secure the promises that swap contracts make. A.I.G.'s insurance business did not set aside such reserves. Efforts afoot now in Washington to strengthen financial regulation tend to focus on banking, with insurance, which is regulated by the states, almost an afterthought. The Senate Banking Committee plans to consider a financial regulatory overhaul on Tuesday. The House has already passed a measure that would create a national office to gather information on insurance but would leave insurance regulation to the states. The bill does not treat credit-default swaps as a form of insurance.

“You have this blind spot on insurance companies,” said Christopher Whalen, a co-founder of Institutional Risk Analytics, a research firm. The National Association of Insurance Commissioners says insurers were the third-biggest issuers of credit-default swaps, after banks and hedge funds, with 18 percent of the market in 2007. “We have a desperate need for federal regulation and federal disclosure by the insurance companies,” Mr. Whalen said. “But even after A.I.G., we still don't have a proposal for federal regulation, or even enhanced disclosure, and that's the dirty secret here.”

Credit-default swaps, in essence, work like bond insurance, in which the issuer promises to make a bondholder whole in case of problems like a default. But the swaps differ from conventional insurance in important ways. There are no required reserves, for instance. And any institution can buy the swaps — not just bondholders. That has led critics to liken the use of swaps to buying insurance on a neighbour's house, in hopes of a payday when he has a fire. A.I.G.'s London branch used these swaps in huge volume, causing a disaster when the purchasers all descended at once, demanding payments, and A.I.G. ran out of money.

The Delaware insurance unit with the credit-default swaps is one of A.I.G.'s biggest. Known as Alico, or the American Life Insurance Company, the unit does its conventional insurance business overseas in more than 40 countries. Its counterparties on the swaps, though, are big United States banking companies. If the measure passed by the House became law, an insurer like Alico that used swaps to sell protection against bond defaults would be designated a “swap dealer,” and have to comply with capital requirements and other rules. That way, the company would be required to have money to stand behind its promises, said Andrew Williams, a spokesman for the Treasury Department, which supports the provision.

Insurance regulators said Delaware did not consider credit-default swaps to be insurance. “I don't think an insurance commissioner should tread on the toes of the banking industry,” said Karen Weldin Stewart, the commissioner in Delaware. “This started out as a bank product.” Her special deputy for examinations, John Tinsley, explained the reasoning. “In insurance, you're putting together a pool,” he said. Each customer would be charged a premium based on the total risk of the pool. A credit-default swap cannot be insurance, Mr. Tinsley said, because it does not involve a pool. There is just one seller and one buyer for every contract.

“It’s an investment product,” he said. “It’s closer to buying an option.”

Not everyone agrees. Eric R. Dinallo, New York State’s insurance superintendent when A.I.G. imploded, said he believed credit-default swaps were insurance and should be regulated as such. Even at its peak, in 2007, Alico’s portfolio of credit-default swaps was just a fraction of the one at A.I.G. Financial Products, the London shop whose collapsing business led the United States government to prop up A.I.G., the biggest bailout in American history.

If Alico’s entire portfolio had blown up that year, the maximum possible loss — a little more than \$1 billion — would not have wiped out the company’s total reported surplus of \$7 billion. Alico’s executives said they considered their swap program much safer as well. Michael Buthe, the chief investment officer, said that the company had sold protection only on investment-grade bonds, which the company considered unlikely to default.

Alico’s chief financial officer, Christopher J. Swift, added that the bonds were issued by companies in many commercial sectors, which diversified the portfolio. That differed starkly from A.I.G. Financial Products, whose swaps gave A.I.G. a vast, undiversified exposure to the housing markets. “This isn’t tied to real estate,” Mr. Swift said of his company’s program. “It diversified our holdings and increased yield.”

When the markets soured in 2008, the company realized a \$52 million loss as it terminated many of the contracts. “We’re constantly monitoring the market, and we saw the economics changing,” Mr. Buthe said. The program has been unwound, with only a few swaps remaining, and Mr. Buthe said the company was not planning.

<http://www.reuters.com/assets/print?aid=USMAR85972720080918>

How AIG fell apart

Thu, Sep 18 2008, By Adam Davidson

(The Big Money) When you hear that the collapse of AIG or Lehman Bros. or Bear Stearns might lead to a systemic collapse of the global financial system, the feared culprit is, largely, that once-obscure (OK, still obscure) instrument known as a credit default swap.

So, what is a CDS, and why is it so dangerous? At first glance, a credit default swap seems like a perfectly sensible financial tool. It is, basically, insurance on bonds. Imagine a large bank buys some bonds issued by General Electric. The bank expects to receive a steady stream of payments from GE over the years. That's how bonds work: The issuer pays the bondholder some money every six months. But the bank figures there's a chance that GE might go bankrupt. It's a small chance, but not zero, and if it happens, the bank doesn't get any more of those payments.

The bank might decide to buy a CDS, a sort of insurance policy. If GE never goes bankrupt, the bank is out whatever premium it paid for the CDS. If GE goes bankrupt and stops paying its bondholders, the bank gets money from whoever sold the CDS.

Who sells these CDSs? Banks, hedge funds, and AIG.

It's easy to see the attraction. Historically, bond issuers almost never go bankrupt. So, many banks and hedge funds figured they could make a fortune by selling CDSs, keeping the premium, and almost never having to pay out anything. In fact, beginning in the late '90s, CDSs became a great way to make a lot more money than was possible through traditional investment methods. Let's say you think GE is rock solid, that it will never default on a bond, since it hasn't in recent memory. You could buy a GE bond and make, say, a meagre 6 percent interest. Or you could just sell GE credit default swaps. You get money from other banks, and all you have to give is the promise to pay if something bad happens. That's zero money down and a profit limited only by how many you can sell.

Over the past few years, CDSs helped transform bond trading into a highly leveraged, high-velocity business. Banks and hedge funds found that it was much easier and quicker to just buy and sell CDS contracts rather than buy and sell actual bonds.

As of the end of 2007, they had grown to roughly \$60 trillion in global business. So, what went wrong? Many CDSs were sold as insurance to cover those exotic financial instruments that created and spread the sub-prime housing crisis, details of which are covered here. As those mortgage-backed securities and collateralized debt obligations became nearly worthless, suddenly that seemingly low-risk event—an actual bond default—was happening daily. The banks and hedge funds selling CDSs were no longer taking in free cash; they were having to pay out big money. Most banks, though, were not all that bad off, because they were simultaneously on both sides of the CDS trade. Most banks and hedge funds would buy CDS protection on the one hand and then sell CDS protection to someone else at the same time. When a bond defaulted, the banks might have to pay some money out, but they'd also be getting money back in. They netted out.

Everyone, that is, except for AIG. AIG was on one side of these trades only: They sold CDS. They never bought. Once bonds started defaulting, they had to pay out and nobody was paying them. AIG seems to have thought CDS were just an extension of the insurance business. But they're not. When you insure homes or cars or lives, you can expect steady, actuarially predictable trends. If you sell enough and price things right, you know that you'll always have more premiums coming in than payments going out. That's because there is low correlation between insurance triggering events. My death doesn't, generally, hasten your death. My house burning down doesn't increase the likelihood of your house burning down. Not so with bonds. Once some bonds start defaulting, other bonds are more likely to default. The risk increases exponentially.

Credit default swaps written by AIG cover more than \$440 billion in bonds. We learned this week that AIG has nowhere near enough money to cover all of those. Their customers—those banks and hedge funds buying CDSs—started getting nervous. So did government regulators. They started to wonder if AIG has enough money to pay out all the CDS claims it will likely owe. This week, Moody's Investors Service, the credit-rating agency, announced that it was less confident in AIG's ability to pay all its debts and would lower its credit rating. That has formal implications: It means AIG has to put up more collateral to guarantee its ability to pay.

Just when AIG is in trouble for being on the hook for all those CDS debts, along comes this credit-rating problem that will force it to pay even more money. AIG didn't have more money. The company started selling things it owned—like its aircraft-leasing division. All of this has pushed AIG's stock price down dramatically. That makes it even harder for AIG to convince companies to give it money to pitch in. So, it's asking the government to help out. AIG might be in trouble. But what do I care? Because the global economy could, possibly, come to a halt. Banks all over the world bought CDS protection from AIG.

If AIG is not able to make good on that promise of payment, then every one of those banks has lost that protection. Overnight, the banks have to buy replacement coverage at much higher rates, because the risks now are much worse than they were when AIG sold most of these CDS contracts. In short, banks all over the world are instantly worth less money. The numbers seem to be quite huge—possibly in the hundreds of billions. To cover that instantaneous loss, banks will lend out less money. That means other banks can't borrow to pay this new cost, and weaker banks might not have enough; they'll collapse. That will further shrink the global pool of money. This will likely spur a whole new round of CDS payouts—all those collapsed banks issue bonds that someone, somewhere sold CDS protection for. That new round of CDS payouts could cause another round of bank failures.

Generally, with enough time, financial markets can adjust to just about anything. This, though, would be an instantaneous transformation of the global financial system. Surely, the worst part will be the confusion. CDS are largely over-the-counter instruments. That means they're not traded on an exchange. One bank just agrees with another bank to do a CDS deal. There's no reliable central repository of information. There's no way to know how exposed a bank is. Banks would have no way of knowing how badly other banks have been affected. Without any clarity, banks will likely simply stop lending to each other.

Since we're only just now getting a handle on how widespread and intertwined they have become, it seems possible that AIG, alone, could bring the global economy to something of a standstill. It's also possible that it wouldn't.

Appendix C.2

CS 9 LTCM (Long Term Capital Management)

Lam, James (2003). *Enterprise Risk Management - from Incentives to Controls*. John Wiley & Sons, Inc., New Jersey, USA.

The LTCM (Long Term Capital Management) hedge fund suffered catastrophic losses in 1998. LTCM was a state-of-the-art hedge fund that was run by the trader John Meriwether and was associated with Myron Scholes (of Black-Scholes option pricing formula fame).

The catastrophic losses were caused by systemic risks that LTCM had not foreseen in its business model. As a result, the Federal Reserve Bank of New York managed to arrange (in September 1998) a US \$3,500 million bail out (via its creditor banks) of the liabilities that LTCM had incurred.

With the benefit of hindsight, the trigger for LTCM's eventual downfall was Russia's technical default on its sovereign debt obligations in August/September 2008. This led to repercussions across the world's financial markets. Panic spread quickly throughout emerging markets, even those that had little to do with Russia. In turn, the world's financial institutions were hit hard. The world's top 50 financial institutions reported overall losses in excess of US\$ 17,000 million during 1998 Quarter 3. Furthermore, the general "flight to quality" in the credit markets and the accompanying dwindling of liquidity led to the unprecedented spectacle of investors discriminating between near-identical US Treasury Bonds on the grounds of credit risk.

The associated losses from the above resulted in the downfall of LTCM, which was bailed out by its creditor banks to cover losses of US\$ 3,500 million. Several copycat hedge funds and proprietary trading desks also suffered large losses. In the aftermath, some of the interbank markets (e.g. option volatility market) were changed for good.

McNeil, Alexander J. et al, (2005). *Quantitative Risk Management: Concepts, Tools, Techniques*. Princeton Series in Finance, Princeton University Press, New Jersey, USA.

Any useful measures of **VaR** must take into account the costs of liquidation on the prospective basis. The events surrounding the near-bankruptcy of the hedge fund **LTCM** in the summer of 1998 clearly showed that such concerns are justifiable. In fact, the illiquidity of markets in nowadays regarded by many risk managers as the most important source of model risk.

In September 1998, "The Observer" newspaper, referring to the downfall of **LTCM**, summarised the mood of the times as "... *last week, free market economy died. 25 years of intellectual bullying by the University of Chicago has come to a close.*" The article continued: "*the derivatives markets are a rarefied world. They are pooled with individuals with an extraordinary grasp of mathematics – a strange collection of Greeks, misfits and rocket scientists*". Referring to the Black-Scholes formula, the article asked: "*is this really the key to future wealth? Win big, lose bigger.*"

A particular concern in multivariate modelling is the phenomenon of dependence between extreme outcomes, when many risk factors move against us simultaneously. Regarding the **LTCM** case, "Business Week" magazine (September 1998) quoted:

"Extreme, synchronised rises and falls in financial markets occur infrequently but they do occur. The problem with the models is that they did not assign a high enough chance of occurrence to the scenario in which many things go wrong at the same time – the "perfect storm" scenario."

In a perfect storm, the risk manager discovers that the diversification he thought he had is illusory; practitioners describe this also as a concentration of risk. Myron Scholes, has argued against the regulatory overemphasis of **VaR**, in the face of the more important issue of co-movements in times of market stress.

Crouhy, Michael et al, (2006). *The Essentials of Risk Management*, The McGraw-Hill Companies, Inc., USA.

VaR can provide a powerful way of assessing the overall market risk of trading positions over a short horizon, such as a 10-day period, and under “normal” market conditions. The methodology generates the capture of a single number the multiple components of market risk, such as curve risk, basis risk and volatility risk.

However, each time there is turmoil in the world’s markets, the limitations of even the most sophisticated measures of market risk are revealed. **VaR** has proved to be unreliable as a measure of risk over long time periods or under abnormal market conditions. The danger posed by exceptional market shocks, such as the crisis in the world markets in 1998 that led to near-collapse of **LTCM**, shocks that are often accompanied by a drying up of market liquidity, can be captured only by means of supplemental methodologies.

The failure of the hedge fund **LTCM** in September 1998 provides a classic example of model risk in the financial services industry. The failure shocked the financial community, not only because of the reputation of LTCM’s principals, but also because of the unprecedented amounts of capital represented by the firm’s positions. LTCM employed US\$ 125,000 million in total assets with an equity base (before the crisis) of US\$ 4,800 million, a leverage ratio in excess of 25.

LTCM’s crisis was triggered on 17 August 1998, when Russia devalued the rouble and declared a debt moratorium. LTCM’s portfolio value fell 44%, giving it a year-to-date decline of 52%, which amounted to a loss of almost US\$ 2,000 million. The hedge fund’s positions in the market were so great that the Federal Reserve Bank of New York took the unprecedented step of facilitating a bailout of the fund to avoid any risk of a meltdown in the world markets.

How could such a market event, however serious, have affected LTCM so badly? LTCM’s arbitrage strategy was based on “market neutral” or “relative-value” trading, which involves buying one instrument and simultaneously selling another. These trades are designed to make money whether prices rise or fall, as long as the spread between the two positions moves in the appropriate direction.

LTCM, like other hedge funds in early 1998, had positioned its portfolio on the basis of particular bets, albeit bets that seemed pretty safe at first sight. For example, LTCM bet that the spreads between corporate bonds and government Treasuries in different countries (e.g. USA and UK) were too large and would eventually return to their normal range (as they had always done before). Such strategies are based on intensive empirical research and advanced financial modelling. A trade to capture the relative-value opportunities uncovered by such modelling might consist of buying corporate bonds and selling the relevant government bonds short. Other positions involved betting on convergence in the key European bond markets by selling German government bonds against the sovereign debt of other countries, such as Spain and Italy, which were due to sign up for European EMU (economic and monetary union). When the spread in yield narrows, such positions make money, irrespective of whether the price level goes up or down.

The return on such apparently low-risk strategies tends to be quite small, and it becomes smaller and smaller as more players enter the market to take advantage of the “opportunity”. As a result, hedge funds are obliged to use leverage aggressively to boost their absolute performance. LTCM, for example, was trying to earn a 1.0% p.a. return on its assets, leveraged 25 times, which would yield a 25% p.a. return. LTCM was able to obtain large loans, collateralised by the bonds that it had invested in, because the strategy was widely viewed as safe by the institutions that were its lenders.

LTCM failed because both its trading models and its risk management models failed to anticipate the vicious cycle of losses during an extreme crisis when volatilities rose dramatically, correlations between markets and instruments became closer to 1, and liquidity dried up.

Risk control at LTCM relied on a VaR model. However, instead of the envisaged US\$ 44 million daily volatility, the fund experience daily volatility of US\$100 million and higher. While the 10-day VaR was US\$ 320 million, LTCM suffered losses from mid-August 1998 in excess of US\$ 1,000 million. In summary, LTCM’s risk modelling was inappropriate and let it down.

Drobny, Steven. (2003). *Inside The House Of Money*. John Wiley & Sons, Inc., New Jersey, USA.

LTCM was started in 1994 by the infamous Salomon Brothers trader John Meriwether, who hired an all all-star cast of financial minds including the Nobel Prize winners Robert Merton and Myron Scholes, the pioneers of option pricing theory and methodology.

LTCM started with US\$ 1.3 billion in assets and initially focused on fixed income arbitrage opportunities, which had become more attractive as spreads widened after the bond market rout of 1994. The original core strategy was to bet on the convergence of the spread between “off-the-run” and “on-the-run” bonds, as well as other relative value and arbitrage opportunities, primarily in fixed income. Due to the small spread of these arbitrage trades, the fund was leveraged many times in order to generate the annual returns of 40% plus that it posted for the first few years of its existence.

LTCM’s success at exploiting these arbitrages caused assets under management to grow at the same time that the opportunities were disappearing. It decided to increase its leverage in order to maintain returns as well as to allocate its risk capital into markets and trades that were beyond its original scope of expertise. Going into 1998, LTCM has US\$ 5 billion in assets with notional outstanding positions estimated at well over US\$ 1,000 billion. At the same time, risk arbitrage trades (bets on mergers and acquisitions), directional positions, and emerging market bets had become a larger portion of its portfolio risk.

As the summer of 1998 approached, global markets became increasingly unsettled. Russia’s eventual devaluation and default then led to a large scale reduction in risk appetite and a global flight to quality. Long-term fundamental values were deemed irrelevant by investors, causing a further widening of the spreads on LTCM’s arbitrage and relative value trades. Given the leverage and size of its positions, liquidation was all but impossible. At the same time, LTCM’s counterparties knew that they were in trouble and at risk of imploding, leading them to hedge their own counterparty risk, further compounding LTCM’s mark-to-market woes. To mitigate default, the Federal Reserve Bank of New York implemented its bailout package.

The LTCM collapse offers insight into some of the potential failings of risk management systems. Risk management systems that are based on historical prices provide one way to look at risk, but are in no way faultless. Financial market history has been filled with theoretically low probability or fat tail events. In LTCM’s case, its risk modelling systems calculated a 1-in-6 billion probability of a major blow-up. Ironically, LTCM neglected to consider the correlation coefficient of positions that were linked for no other reason than the fact that they were in LTCM’s portfolio. In other words, their risk models did not provide for the LTCM liquidity premium.

LTCM provides a reminder of the notion that there is no such thing as a risk-free arbitrage. Because the arbitrage positions they were exploiting were small, the fund had to be leveraged many times in order to produce meaningful investment returns. This put them at risk to their lender’s financing fees as well as general market liquidity. The problem with liquidity is that it is never there when it is really needed.

<http://en.wikipedia.org/wiki/LTCM>

Long-Term Capital Management (LTCM) was a U.S. hedge fund which used trading strategies such as fixed income arbitrage, statistical arbitrage, and pairs trading, combined with high leverage. It failed spectacularly in the late 1990s, leading to a massive bailout by other major banks and investment houses, which was supervised by the Federal Reserve. It was founded in 1994 by John Meriwether. The Board of Directors included Myron Scholes and Robert C. Merton, who shared the 1997 Nobel Memorial Prize in Economic Sciences. Initially enormously successful with annualized returns of over 40% (after fees) in its first years, in 1998 it lost \$4.6 billion in less than four months following the Russian financial crisis and became a prominent example of the risk

John Meriwether headed Salomon Brothers' bond trading desk until he was forced to resign in 1991 when his top bond trader, Paul Mozer, admitted to falsifying bids on U.S. Treasury auctions. Because Salomon was the largest bidder on treasury bonds at auction, the Treasury department feared that Salomon would be able to take a strategic position on the bonds in order to influence the price. In 1993 he announced that he would launch a hedge fund called LTCM. Meriwether used his well-established reputation to recruit several Salomon bond traders and some brilliant mathematicians.

The company used complex mathematical models to take advantage of fixed income arbitrage deals (termed *convergence trades*) usually with U.S., Japanese, and European government bonds. Government bonds are a "fixed-term debt obligation", meaning that they will pay a fixed amount at a specified time in the future. Differences in the bonds' present value are minimal, so according to economic theory any difference in price will be eliminated by arbitrage. Unlike differences in share prices of two companies, which could reflect different underlying fundamentals, price differences between a 30 year treasury bond and a 29 and three quarter year old treasury bond should be minimal—both will see a fixed payment roughly 30 years in the future. However, small discrepancies arose between the two bonds because of a difference in liquidity. By a series of financial transactions, essentially amounting to buying the cheaper 'off-the-run' bond (the 29 and three quarter year old bond) and shorting the more expensive, but more liquid, 'on-the-run' bond (the 30 year bond just issued by the Treasury), it would be possible to make a profit as the difference in the value of the bonds narrowed when a new bond was issued.

As LTCM's capital base grew, they felt pressed to invest that capital and had run out of good bond-arbitrage bets. This led LTCM to undertake more aggressive trading strategies. Although these trading strategies were non-market directional, i.e. they were not dependent on overall interest rates or stock prices going up (or down), they were not convergence trades as such. By 1998, LTCM had extremely large positions in areas such as merger arbitrage and S&P 500 options (net short long-term S&P volatility). LTCM had become a major supplier of S&P 500 vega, which had been in demand by companies seeking to essentially insure equities against future declines.

In a memorandum to Long Term's management committee dated November 12, 1996, Myron Scholes wrote: "We must decide in the near future (1) how to allocate these capital losses; (2) how to "trade" them so that they are held in high-valued hands; and (3) how to plan to be able to enjoy the benefits of the use of these losses for the longest period of time. If we are careful, most likely we will never have to pay long-term capital gains on the 'loan' from the Government." He went on, "How should LTCM pay those who brought the Tax Losses to Fruition and allocate the expenses of undertaking the trade?"

Although much success within the financial markets arises from immediate-short term turbulence, and the ability of fund managers to identify informational asymmetries, factors giving rise to the downfall of the fund were established prior to the 1997 East Asian financial crisis. In May and June 1998 returns from the fund were -6.42% and -10.14% respectively, reducing LTCM's capital by \$461 million. This was further aggravated by the exit of Salomon Brothers from the arbitrage business in July 1998. Such losses were accentuated through the Russian financial crises in August and September 1998, when the Russian Government defaulted on their government bonds. Panicked investors sold Japanese and European bonds to buy U.S. treasury bonds. The profits that were supposed to occur as the value of these bonds converged became huge losses as the value of the bonds diverged. By the end of August, the fund had lost \$1.85 billion in capital.

As a result of these losses, LTCM had to liquidate a number of its positions at a highly unfavourable moment and suffer further losses. A good illustration of the consequences of these forced liquidations is given by Lowenstein (2000). He reports that LTCM established an arbitrage position in the dual-listed company (or "DLC") Royal Dutch Shell in the summer of 1997, when Royal Dutch traded at an 8-10% premium relative to Shell. In total \$2.3 billion was invested, half of which long in Shell and the other half short in Royal Dutch. LTCM was essentially betting that the share prices of Royal Dutch and Shell would converge. This may have happened in the long run, but due to its losses on other positions, LTCM had to unwind its position in Royal Dutch Shell. Lowenstein reports that the premium of Royal Dutch had increased to about 22%, which implies that LTCM incurred a large loss on this arbitrage strategy. LTCM lost \$286 million in equity pairs trading and more than half of this loss is accounted for by the Royal Dutch Shell trade.

The company, which was providing annual returns of almost 40% up to this point, experienced a flight-to-liquidity. In the first three weeks of September, LTCM's equity tumbled from \$2.3 billion at the start of the month. By September 25, LTCM had just \$400 million in capital. With assets still over \$100 billion, this translated to an effective leverage ratio of more than 250-to-1.

LTCM did business with nearly everyone important on Wall Street. As LTCM teetered, Wall Street feared that its failure could cause a chain reaction in numerous markets, causing catastrophic losses throughout the financial system. After LTCM failed to raise more money on its own, it became clear it was running out of options. On September 23, Goldman Sachs, AIG, and Berkshire Hathaway offered then to buy out the fund's partners for \$250 million, to inject \$3.75 billion and to operate LTCM within Goldman's own trading division. The offer was stunningly low to LTCM's partners because at the start of the year their firm had been worth \$4.7 billion. Buffett gave Meriwether less than one hour to accept the deal; the time period lapsed before a deal could be worked out.

Seeing no options left the Federal Reserve Bank of New York organised a bailout of \$3.625 billion by the major creditors to avoid a wider collapse in the financial markets. In return, the participating banks got a 90% share in the fund and a promise that a supervisory board would be established. LTCM's partners received a 10% stake, still worth about \$400 million, but this money was completely consumed by their debts. The partners once had \$1.9 billion of their own money invested in LTCM, all of which was wiped out.

The fear was that there would be a chain reaction as the company liquidated its securities to cover its debt, leading to a drop in prices, which would force other companies to liquidate their own debt creating a vicious cycle. The total losses were found to be \$4.6 billion.

Unsurprisingly, after the bailout by the other investors, the panic abated, and the positions formerly held by LTCM were eventually liquidated at a small profit to the bailers.

Some industry officials said that Federal Reserve Bank of New York involvement in the rescue, however benign, would encourage large financial institutions to assume more risk, in the belief that the Federal Reserve would intervene on their behalf in the event of trouble. Federal Reserve Bank of New York actions raised concerns among some market observers that it could create moral hazard.

LTCM's strategies were compared (a contrast with the market efficiency aphorism that there are no \$100 bills lying on the street, as someone else has already picked them up) to "picking up nickels in front of a bulldozer"—a likely small gain balanced against a small chance of a large loss, like the payouts from selling an out-of-the-money option.

After the bailout, LTCM continued operations. In the year following the bailout, it earned 10%. By early 2000, the fund had been liquidated, and the consortium of banks that financed the bailout had been paid back; but the collapse was devastating for many involved. Goldman Sachs CEO Jon Corzine, who had been closely involved with LTCM, was forced out of the office in a boardroom coup led by Henry Paulson. Mullins, once considered a possible successor to Alan Greenspan, saw his future with the Reserve dashed. The theories of Merton and Scholes took a public beating. In its annual reports, Merrill Lynch observed that mathematical risk models "may provide a greater sense of security than warranted; therefore, reliance on these models should be limited."

Appendix C.3

CS 3 Union Carbide

Skipper, Harold D. and Kwon, W, Jean. (2007). *Risk Management and Insurance: Perspectives in a Global Economy*, Blackwell Publishing Ltd., Oxford, England.

This case study illustrates how a small foreign subsidiary can severely damage a global enterprise.

In December, 1984, over 40 tons of poisonous gases leaked from a pesticide factory in Bhopal, India, belonging to Union Carbide, killing more than 20,000 residents. The event has also had long-term health consequences for those victims who survived but with serious health problems. After much corrective action and legal wrangling, Union Carbide, which built the plant in 1969, settled a civil suit brought by the Indian government in 1989 by agreeing to pay US\$470 million for damages suffered by the 500,000 people who were exposed to the gas. The company maintained that the payment was made out of a sense of 'moral' rather than 'legal' responsibility since the plant was operated by a separate Indian subsidiary, Union Carbide India Ltd.

The court proceedings revealed that management's cost cutting measures had effectively disabled safety procedures essential to prevent or alert employees of such disasters. A chemical reaction was caused by the entry of water into a MIC (Methyl isocyanate) storage tank. This was the immediate cause of the gas leakage. The severity and impact of the event were also made worse by the lack of safety standards and effective containment measures at the factory in Bhopal. The physical manifestations of these failures included unreliable monitoring equipment, inoperative safety equipment, unsuitable/inadequate gas suppression equipment and alarm systems which failed. These internal factors were compounded by the lack of awareness, expertise, readiness and co-ordination of the public agencies to provide an effective response.

Dow Chemical has since taken over Union Carbide and denies responsibility for this disaster. However, because of the large loss of life there and the fact that Dow Chemical is much larger than what was once Union Carbide and its Union Carbide India Ltd. subsidiary, ongoing litigation continues to haunt Dow Chemical. The public agencies are also considered by some to have failed in their responsibility to help the survivors more than 20 years after the event. The Bhopal gas leak is an example of how a risk event at a distant and relatively small unit can have disastrous consequences on a firm and how the impact of a risk event can be heightened by an inadequate response from public agencies.

This case study demonstrates the need for thorough 'risk identification' and 'risk assessment' processes that consider catastrophic incidents, such as one this magnitude. Each operational business unit needs to recognise the likelihood and consequences of the risks that they face. A risk event at a small foreign subsidiary can bring down the entire enterprise - risk management at all levels should recognise that the potential for catastrophes always exists and that their impact can have both a large scale and a long-term impact. We can never predict risks of this major consequence, but an enterprise should accept that the risk always remains of a catastrophic disaster. The foundation of a risk management strategy is also often in strong fundamentals – in the case of Union Carbide the need to establish and ensure adherence to safety standards designed to fit the nature of the chemical processes and production activity which was taking place.

Lam, James (2003). *Enterprise Risk Management - from Incentives to Controls*. John Wiley & Sons, Inc., New Jersey, USA.

In December, 1984, a Union Carbide pesticide plant in Bhopal, India, was the site of what was then called the "world's worst industrial accident" in history. A tank in the pesticide plant leaked 5 tons of poisonous methyl isocyanate gas into the air, killing more than 3,000 people and injuring tens of thousands of people. Following this incident, the Indian Government successfully sued (in 1989) Union Carbide for US\$ 470 million. The associated criminal proceedings are still outstanding (as at 2003).

http://en.wikipedia.org/wiki/Union_Carbide

Union Carbide Corporation (*Union Carbide*) is one of the oldest chemical and polymer companies in the United States, currently employing more than 3,800 people. It became infamous for the worst ever industrial accident that took place in its Bhopal, Madhya Pradesh, India plant in 1984. Union Carbide was found liable for the disaster, but has denied responsibility.

Union Carbide became a wholly owned subsidiary of The Dow Chemical Company on February 6, 2001, following completion of its settlement and opening of The Bhopal Memorial Hospital and Research Centre, ending its chapter in India in the same year. It sells most of the products it manufactures to Dow Chemical. It is a former component of the Dow Jones Industrial Average.

In 1920, its researchers developed an economical way to make ethylene from natural gas liquids such as ethane and propane, giving birth to the modern petrochemical industry. Today, Union Carbide possesses some of the industry's most advanced process and catalyst technologies, and operates some of the most cost-efficient, large-scale production facilities in the world. Before divesting them, the chemical giant owned consumer products Eveready and Energizer batteries, Glad bags and wraps, Simoniz car wax and Prestone antifreeze. The company divested other businesses before being acquired by Dow including electronic chemicals, polyurethane intermediates, industrial gases and carbon products.

Union Carbide primarily produces chemicals and polymers that undergo one or more further conversions by customers before reaching consumers. Some of these materials are high-volume commodities, while others are specialty products meeting the needs of smaller market niches. The end-uses served include paints and coatings, packaging, wire and cable, household products, personal care, pharmaceuticals, automotive, textiles, agriculture and oil and gas.

Bhopal disaster

The Bhopal disaster was an industrial catastrophe that took place at a pesticide plant owned and operated by Union Carbide India Limited (UCIL) in Bhopal, Madhya Pradesh, India on December 3, 1984. At midnight on 3 December 1984, the plant released methyl isocyanate (MIC) gas and other toxins, resulting in the exposure of over 500,000 people. Estimates vary on the death toll. The official immediate death toll was 2,259 and the government of Madhya Pradesh has confirmed a total of 3,787 deaths related to the gas release. Other government agencies estimate 15,000 deaths. Others estimate 8,000 to 10,000 died within 72 hours and 25,000 have since died from gas-related diseases. 40,000 more were permanently disabled, maimed, or rendered subject to numerous grave illnesses; 521,000 exposed in all.

Some 25 years after the gas leak, 390 tonnes of toxic chemicals abandoned at the UCIL plant continue to leak and pollute the groundwater in the region and affect thousands of Bhopal residents who depend on it, though there is some dispute as to whether the chemicals still stored at the site pose any continuing health hazard. There are currently civil and criminal cases related to the disaster ongoing in the United States District Court, Manhattan and the District Court of Bhopal, India against Union Carbide, now owned by Dow Chemical Company, with an Indian arrest warrant pending against Warren Anderson, CEO of Union Carbide at the time of the disaster

As of early 2010, no one had yet been prosecuted for the disaster. However, a successful prosecution was eventually determined on 7th June 2010, when seven former executives of Bhopal were convicted of “death by negligence”, as reported below.

<http://www.independent.co.uk/news/world/asia/seven-found-guilty-of-bhopal-gas-tragedy-1993535.html>

Seven found guilty of Bhopal gas tragedy - Monday, 7 June 2010

Local activists insist the death toll was around 15,000

Seven former chemical company executives were today convicted of "death by negligence" for their roles in the Bhopal gas tragedy that killed 15,000 people more than 25 years ago in the world's worst industrial disaster.

Their firm, Union Carbide India Ltd., was convicted of the same charge. But the company no longer exists. The former employees, many of them in their 70s, face up to two years in prison. The judge did not immediately announce sentences. Large groups of survivors and relatives, along with rights activists, gathered in the city saying the verdict was too little, too late.

Early on December 3, 1984, a pesticide plant run by the subsidiary of US company Union Carbide leaked about 40 tons of deadly methyl isocyanate gas into the air in Bhopal in central India, quickly killing about 4,000 people. The lingering effects of the poison raised the death toll to about 15,000 over the next few years.

Local activists insist the real numbers are almost twice that, and say the company and government have failed to clean up toxic chemicals at the plant, which closed after the accident.

The verdicts, which were in a local court and are likely to be appealed, came as the case crawled through India's notoriously slow and ineffective judicial system.

India's Central Bureau of Investigation, the country's top investigative agency, had originally accused 12 defendants: eight senior Indian company officials; Warren Anderson, the head of Union Carbide at the time of the gas leak; the company itself and two subsidiary companies.

Seven of the eight Indian company officials were convicted today. The other one has since died. Anderson and Union Carbide have never appeared in court proceedings.

Union Carbide was bought by Dow Chemical in 2001. Dow says the legal case was resolved in 1989 when Union Carbide settled with the Indian government for 470 million dollars, and that all responsibility for the factory now rests with the government of the state of Madhya Pradesh, which now owns the site.

Last July, the same court in Bhopal had issued a warrant for Anderson's arrest and also ordered the Indian government to press Washington for his extradition.

Anderson was briefly detained immediately after the disaster, but he quickly left the country and now lives in New York. It was not immediately clear if the Indian government had begun to process the Bhopal court's request. Extradition proceedings are usually mired in a complex tangle of legal paperwork and can take years to complete.

Investigators say the accident occurred when water entered a sealed tank containing the highly reactive gas, causing pressure in the tank to rise too high.

Union Carbide said the accident was an act of sabotage by a disgruntled employee who was never identified. It has denied the disaster was the result of lax safety standards or faulty plant design, as claimed by some activists.

The Central Bureau of Investigation said the plant had not been following proper safety procedures.

The Bhopal disaster and its aftermath: a review

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Abstract

On December 3 1984, more than 40 tons of methyl isocyanate gas leaked from a pesticide plant in Bhopal, India, immediately killing at least 3,800 people and causing significant morbidity and premature death for many thousands more. The company involved in what became the worst industrial accident in history immediately tried to dissociate itself from legal responsibility. Eventually it reached a settlement with the Indian Government through mediation of that country's Supreme Court and accepted moral responsibility. It paid \$470 million in compensation, a relatively small amount of based on significant underestimations of the long-term health consequences of exposure and the number of people exposed. The disaster indicated a need for enforceable international standards for environmental safety, preventative strategies to avoid similar accidents and industrial disaster preparedness.

Since the disaster, India has experienced rapid industrialization. While some positive changes in government policy and behaviour of a few industries have taken place, major threats to the environment from rapid and poorly regulated industrial growth remain. Widespread environmental degradation with significant adverse human health consequences continues to occur throughout India.

Review

December 2004 marked the twentieth anniversary of the massive toxic gas leak from Union Carbide Corporation's chemical plant in Bhopal in the state of Madhya Pradesh, India that killed more than 3,800 people. This review examines the health effects of exposure to the disaster, the legal response, the lessons learned and whether or not these are put into practice in India in terms of industrial development, environmental management and public health.

History

In the 1970s, the Indian government initiated policies to encourage foreign companies to invest in local industry. Union Carbide Corporation (UCC) was asked to build a plant for the manufacture of Sevin, a pesticide commonly used throughout Asia. As part of the deal, India's government insisted that a significant percentage of the investment come from local shareholders. The government itself had a 22% stake in the company's subsidiary, Union Carbide India Limited (UCIL). The company built the plant in Bhopal because of its central location and access to transport infrastructure. The specific site within the city was zoned for light industrial and commercial use, not for hazardous industry. The plant was initially approved only for formulation of pesticides from component chemicals, such as MIC imported from the parent company, in relatively small quantities. However, pressure from competition in the chemical industry led UCIL to implement "backward integration" – the manufacture of raw materials and intermediate products for formulation of the final product within one facility. This was inherently a more sophisticated and hazardous process.

In 1984, the plant was manufacturing Sevin at one quarter of its production capacity due to decreased demand for pesticides. Widespread crop failures and famine on the subcontinent in the 1980s led to increased indebtedness and decreased capital for farmers to invest in pesticides. Local managers were directed to close the plant and prepare it for sale in July 1984 due to decreased profitability. When no ready buyer was found, UCIL made plans to dismantle key production units of the facility for shipment to another developing country. In the meantime, the facility continued to operate with safety

equipment and procedures far below the standards found in its sister plant in Institute, West Virginia. The local government was aware of safety problems but was reticent to place heavy industrial safety and pollution control burdens on the struggling industry because it feared the economic effects of the loss of such a large employer.

At 11.00 PM on December 2 1984, while most of the one million residents of Bhopal slept, an operator at the plant noticed a small leak of methyl isocyanate (MIC) gas and increasing pressure inside a storage tank. The vent-gas scrubber, a safety device designed to neutralize toxic discharge from the MIC system, had been turned off three weeks prior. Apparently a faulty valve had allowed one ton of water for cleaning internal pipes to mix with forty tons of MIC. A 30 ton refrigeration unit that normally served as a safety component to cool the MIC storage tank had been drained of its coolant for use in another part of the plant. Pressure and heat from the vigorous exothermic reaction in the tank continued to build. The gas flare safety system was out of action and had been for three months. At around 1.00 AM, December 3, loud rumbling reverberated around the plant as a safety valve gave way sending a plume of MIC gas into the early morning air. Within hours, the streets of Bhopal were littered with human corpses and the carcasses of buffaloes, cows, dogs and birds. An estimated 3,800 people died immediately, mostly in the poor slum colony adjacent to the UCC plant. Local hospitals were soon overwhelmed with the injured, a crisis further compounded by a lack of knowledge of exactly what gas was involved and what its effects were. It became one of the worst chemical disasters in history and the name Bhopal became synonymous with industrial catastrophe.

Estimates of the number of people killed in the first few days by the plume from the UCC plant run as high as 10,000, with 15,000 to 20,000 premature deaths reportedly occurring in the subsequent two decades. The Indian government reported that more than half a million people were exposed to the gas. Several epidemiological studies conducted soon after the accident showed significant morbidity and increased mortality in the exposed population.

Immediately after the disaster, UCC began attempts to dissociate itself from responsibility for the gas leak. Its principal tactic was to shift culpability to UCIL, stating the plant was wholly built and operated by the Indian subsidiary. It also fabricated scenarios involving sabotage by previously unknown Sikh extremist groups and disgruntled employees but this theory was impugned by numerous independent sources.

The toxic plume had barely cleared when, on December 7, the first multi-billion dollar lawsuit was filed by an American attorney in a U.S. court. This was the beginning of years of legal machinations in which the ethical implications of the tragedy and its affect on Bhopal's people were largely ignored. In March 1985, the Indian government enacted the Bhopal Gas Leak Disaster Act as a way of ensuring that claims arising from the accident would be dealt with speedily and equitably. The Act made the government the sole representative of the victims in legal proceedings both within and outside India. Eventually all cases were taken out of the U.S. legal system under the ruling of the presiding American judge and placed entirely under Indian jurisdiction much to the detriment of the injured parties.

In a settlement mediated by the Indian Supreme Court, UCC accepted moral responsibility and agreed to pay \$470 million to the Indian government to be distributed to claimants as a full and final settlement. The figure was partly based on the disputed claim that only 3000 people died and 102,000 suffered permanent disabilities. Upon announcing this settlement, shares of UCC rose \$2 per share or 7% in value. Had compensation in Bhopal been paid at the same rate that asbestosis victims were being awarded in US courts by defendant including UCC – which mined asbestos from 1963 to 1985 – the liability would have been greater than the \$10 billion the company was worth and insured for in 1984. By the end of October 2003, according to the Bhopal Gas Tragedy Relief and Rehabilitation Department, compensation had been awarded to 554,895 people for injuries received and 15,310 survivors of those killed. The average amount to families of the dead was \$2,200.

At every turn, UCC has attempted to manipulate, obfuscate and withhold scientific data to the detriment of victims. Even to this date, the company has not stated exactly what was in the toxic cloud that enveloped the city on that December night. When MIC is exposed to 200° heat, it forms degraded MIC that contains the more deadly hydrogen cyanide (HCN). There was clear evidence that the

storage tank temperature did reach this level in the disaster. The cherry-red colour of blood and viscera of some victims were characteristic of acute cyanide poisoning. Moreover, many responded well to administration of sodium thiosulfate, an effective therapy for cyanide poisoning but not MIC exposure. UCC initially recommended use of sodium thiosulfate but withdrew the statement later prompting suggestions that it attempted to cover up evidence of HCN in the gas leak. The presence of HCN was vigorously denied by UCC and was a point of conjecture among researchers.

As further insult, UCC discontinued operation at its Bhopal plant following the disaster but failed to clean up the industrial site completely. The plant continues to leak several toxic chemicals and heavy metals that have found their way into local aquifers. Dangerously contaminated water has now been added to the legacy left by the company for the people of Bhopal.

Lessons learned

The events in Bhopal revealed that expanding industrialization in developing countries without concurrent evolution in safety regulations could have catastrophic consequences. The disaster demonstrated that seemingly local problems of industrial hazards and toxic contamination are often tied to global market dynamics. UCC's Sevin production plant was built in Madhya Pradesh not to avoid environmental regulations in the U.S. but to exploit the large and growing Indian pesticide market. However the manner in which the project was executed suggests the existence of a double standard for multinational corporations operating in developing countries. Enforceable uniform international operating regulations for hazardous industries would have provided a mechanism for significantly improved safety in Bhopal. Even without enforcement, international standards could provide norms for measuring performance of individual companies engaged in hazardous activities such as the manufacture of pesticides and other toxic chemicals in India. National governments and international agencies should focus on widely applicable techniques for corporate responsibility and accident prevention as much in the developing world context as in advanced industrial nations. Specifically, prevention should include risk reduction in plant location and design and safety legislation.

Local governments clearly cannot allow industrial facilities to be situated within urban areas, regardless of the evolution of land use over time. Industry and government need to bring proper financial support to local communities so they can provide medical and other necessary services to reduce morbidity, mortality and material loss in the case of industrial accidents.

Public health infrastructure was very weak in Bhopal in 1984. Tap water was available for only a few hours a day and was of very poor quality. With no functioning sewage system, untreated human waste was dumped into two nearby lakes, one a source of drinking water. The city had four major hospitals but there was a shortage of physicians and hospital beds. There was also no mass casualty emergency response system in place in the city. Existing public health infrastructure needs to be taken into account when hazardous industries choose sites for manufacturing plants. Future management of industrial development requires that appropriate resources be devoted to advance planning before any disaster occurs. Communities that do not possess infrastructure and technical expertise to respond adequately to such industrial accidents should not be chosen as sites for hazardous industry.

Since 1984

Following the events of December 3 1984 environmental awareness and activism in India increased significantly. The Environment Protection Act was passed in 1986, creating the Ministry of Environment and Forests (MoEF) and strengthening India's commitment to the environment. Under the new act, the MoEF was given overall responsibility for administering and enforcing environmental laws and policies. It established the importance of integrating environmental strategies into all industrial development plans for the country. However, despite greater government commitment to protect public health, forests, and wildlife, policies geared to developing the country's economy have taken precedence in the last 20 years.

India has undergone tremendous economic growth in the two decades since the Bhopal disaster. Gross domestic product (GDP) per capita has increased from \$1,000 in 1984 to \$2,900 in 2004 and it continues to grow at a rate of over 8% per year. Rapid industrial development has contributed greatly

to economic growth but there has been significant cost in environmental degradation and increased public health risks. Since abatement efforts consume a large portion of India's GDP, MoEF faces an uphill battle as it tries to fulfil its mandate of reducing industrial pollution. Heavy reliance on coal-fired power plants and poor enforcement of vehicle emission laws have resulted from economic concerns taking precedence over environmental protection.

With the industrial growth since 1984, there has been an increase in small scale industries (SSIs) that are clustered about major urban areas in India. There are generally less stringent rules for the treatment of waste produced by SSIs due to less waste generation within each individual industry. This has allowed SSIs to dispose of untreated wastewater into drainage systems that flow directly into rivers. New Delhi's Yamuna River is illustrative. Dangerously high levels of heavy metals such as lead, cobalt, cadmium, chrome, nickel and zinc have been detected in this river which is a major supply of potable water to India's capital thus posing a potential health risk to the people living there and areas downstream.

Land pollution due to uncontrolled disposal of industrial solid and hazardous waste is also a problem throughout India. With rapid industrialization, the generation of industrial solid and hazardous waste has increased appreciably and the environmental impact is significant.

India relaxed its controls on foreign investment in order to accede to WTO rules and thereby attract an increasing flow of capital. In the process, a number of environmental regulations are being rolled back as growing foreign investments continue to roll in. The Indian experience is comparable to that of a number of developing countries that are experiencing the environmental impacts of structural adjustment. Exploitation and export of natural resources has accelerated on the subcontinent. Prohibitions against locating industrial facilities in ecologically sensitive zones have been eliminated while conservation zones are being stripped of their status so that pesticide, cement and bauxite mines can be built. Heavy reliance on coal-fired power plants and poor enforcement of vehicle emission laws are other consequences of economic concerns taking precedence over environmental protection.

In March 2001, residents of Kodaikanal in southern India caught the Anglo-Dutch company, Unilever, red-handed when they discovered a dumpsite with toxic mercury laced waste from a thermometer factory run by the company's Indian subsidiary, Hindustan Lever. The 7.4 ton stockpile of mercury-laden glass was found in torn stacks spilling onto the ground in a scrap metal yard located near a school. In the fall of 2001, steel from the ruins of the World Trade Centre was exported to India apparently without first being tested for contamination from asbestos and heavy metals present in the twin tower debris. Other examples of poor environmental stewardship and economic considerations taking precedence over public health concerns abound.

The Bhopal disaster could have changed the nature of the chemical industry and caused a re-examination of the necessity to produce such potentially harmful products in the first place. However the lessons of acute and chronic effects of exposure to pesticides and their precursors in Bhopal has not changed agricultural practice patterns. An estimated 3 million people per year suffer the consequences of pesticide poisoning with most exposure occurring in the agricultural developing world. It is reported to be the cause of at least 22,000 deaths in India each year. In the state of Kerala, significant mortality and morbidity have been reported following exposure to Endosulfan, a toxic pesticide whose use continued for 15 years after the events of Bhopal.

Aggressive marketing of asbestos continues in developing countries as a result of restrictions being placed on its use in developed nations due to the well-established link between asbestos products and respiratory diseases. India has become a major consumer, using around 100,000 tons of asbestos per year, 80% of which is imported with Canada being the largest overseas supplier. Mining, production and use of asbestos in India is very loosely regulated despite the health hazards. Reports have shown morbidity and mortality from asbestos related disease will continue in India without enforcement of a ban or significantly tighter controls.

UCC has shrunk to one sixth of its size since the Bhopal disaster in an effort to restructure and divest itself. By doing so, the company avoided a hostile takeover, placed a significant portion of UCC's assets out of legal reach of the victims and gave its shareholder and top executives bountiful profits.

The company still operates under the ownership of Dow Chemicals and still states on its website that the Bhopal disaster was "cause by deliberate sabotage".

Some positive changes were seen following the Bhopal disaster. The British chemical company, ICI, whose Indian subsidiary manufactured pesticides, increased attention to health, safety and environmental issues following the events of December 1984. The subsidiary now spends 30–40% of their capital expenditures on environmental-related projects. However, they still do not adhere to standards as strict as their parent company in the UK.

The US chemical giant DuPont learned its lesson of Bhopal in a different way. The company attempted for a decade to export a nylon plant from Richmond, VA to Goa, India. In its early negotiations with the Indian government, DuPont had sought and won a remarkable clause in its investment agreement that absolved it from all liabilities in case of an accident. But the people of Goa were not willing to acquiesce while an important ecological site was cleared for a heavy polluting industry. After nearly a decade of protesting by Goa's residents, DuPont was forced to scuttle plans there. Chennai was the next proposed site for the plastics plant. The state government there made significantly greater demand on DuPont for concessions on public health and environmental protection. Eventually, these plans were also aborted due to what the company called "financial concerns".

Conclusions

1. The tragedy of Bhopal continues to be a warning sign at once ignored and heeded. Bhopal and its aftermath were a warning that the path to industrialization, for developing countries in general and India in particular, is fraught with human, environmental and economic perils.
2. Some moves by the Indian government, including the formation of the MoEF, have served to offer some protection of the public's health from the harmful practices of local and multinational heavy industry and grassroots organizations that have also played a part in opposing rampant development.
3. The Indian economy is growing at a tremendous rate but at significant cost in environmental health and public safety as large and small companies throughout the subcontinent continue to pollute. Far more remains to be done for public health in the context of industrialization to show that the lessons of the countless thousands dead in Bhopal have truly been heeded.

Marine Piracy

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1 INTRODUCTION AND SCOPE

- 1.1 The purpose of this paper is three fold. Firstly it is to give an introduction to the subject of Marine Piracy, and how it has developed. The second is to consider rating and risk management issues and thirdly to establish a framework as to how actuaries might manage new emerging risks.
- 1.2 Piracy is not a new risk; it has been around ever since there has been maritime trade. It has been undertaken by bands of outlaws at one extreme and sponsored by governments and private investors at the other. There are significant volumes of data, some reliable, others not so. Of the reliable data some are relevant to the issue at hand, others not. Thus we have incomplete sets of data which may or not be relevant to the task at hand. It is the role of the actuary to make sense of the data and recognise how it may be used. It is also the actuary's role to recognise weaknesses and bias (government sponsored databases may be used to justify a particular political point).
- 1.3 The working party also considered briefly other forms of Piracy. Aviation Piracy appeared to us to have limited (if any) data, and was not considered as important by Aviation Insurers (Most events such as hijacking are territorial and hence do not form part of the legal framework for piracy). Downloading of Films and Music is a quite different type of issue, has little in common with marine piracy and has less immediate relevance to insurance. We therefore considered this outside the scope of this paper.
- 1.4 Piracy takes a number of forms from theft to kidnap and ransom and murder. Over time the forms it takes will vary in response to changing conditions. We also consider the potential for marine terrorism and how this may impact on the world economy. Marine terrorism certainly is a major focus of concern in the United States.
- 1.5 The major steps in any analysis of any risk may be considered as follows
 - 1.5.1 Understand the risk and how it impacts on any potential insurance claim
 - 1.5.2 Understand the quality and shortfall in any data
 - 1.5.3 Consider how to mitigate the risk
 - 1.5.4 Estimate a cost benefit analysis of this mitigation process
- 1.6 For emerging risks the first element is the most important, yet often ignored by actuaries who are mainly interested in the data. By understanding the risk we can better assess the quality and use of any data.
- 1.7 The third element is also important. As actuaries we often only consider insurance products as the way to mitigate risk. If there is a cost effective alternative then the market will use it, and creation and rating of an insurance product is a complete waste of time. Insurance should be complementary to other risk mitigation measures and cover the residual risk that cannot be cost-effectively mitigated.
- 1.8 Although we have collected data, (the sources are given in Section 6), and have undertaken some analysis, we would point out that this analysis is based on data which may be unreliable (for instance we have not been able to discuss it with those responsible for collecting it), makes assumptions that may not hold and so on. The usual caveats and warranties that apply to any actuarial report apply to the technical analysis. This paper is not intended to give technical results and rates that can be used in practice by readers.
- 1.9 We pose one further consideration. Piracy is a moving feast, and anything might have happened between finalising this paper and its publication at the 2010 GIRO conference.

2 BACKGROUND

DEFINITION OF PIRACY

- 2.1 We first need to closely define what we mean by piracy. This is not easy.
- 2.2 Consider the following four examples.
 - 2.2.1 As part of warfare, ships belonging to or trading with the enemy are liable to be seized or attacked.
 - 2.2.2 It is common to attempt to blockade the enemy's ports.
 - 2.2.3 A ship is likely to be considered to belong to the enemy if it is registered in the enemy state or is owned by a national of the enemy state.
 - 2.2.4 Neutral shipping is liable to be attacked if it strays into an prohibited area, and in any case may be attacked if it is thought that it may be an enemy ship or trading with the enemy.
- 2.3 None of these acts are considered as piracy, if carried on in good faith. Both the International Maritime Bureau ("IMB") & UN Convention on Piracy (UN Convention, see Appendix F) definitions exclude acts of war. The IMB restricts itself to crimes and duly authorised acts of war are not crimes. The UN Convention not only restricts itself to illegal acts but also to acts committed for private ends. The IMB defines piracy as "the act of boarding any vessel with an intent to commit theft or any other crime, and with an intent or capacity to use force in furtherance of that act."
- 2.4 The IMB & UN Convention should not be regarded as definitions of piracy. Instead they are used for particular purposes. However, the fact that they exclude acts of war is illustrative of some of the issues
- 2.5 Privateering can be distinguished from piracy in that it is authorised by a national government. Originally letters of Marque (a licence granted by a state to a private citizen to arm a ship and seize merchant vessels of another nation) were issued to shipowners or merchants whose property had been seized abroad to enable them to recover their losses by seizing the property of a fellow-national of the original wrongdoer. However later they were issued to authorise seizure of ships of an hostile state. Of course the state against which privateering was directed might not recognise the legitimacy of the letters of Marque. Spain, for instance, hanged English privateers as pirates. As well as legalised piracy, privateers were used as naval forces. Privateering was abolished in Europe by the Declaration of Paris in 1856 following the Crimean war. The US refused to sign. There is further discussion of this issue in section 3.
- 2.6 Piracy on the other hand is committed purely for personal motives, usually gain. Political acts are, strictly speaking, not piracy, though if the legitimacy of the action is not recognised, the perpetrator may be found guilty of piracy. Piracy not only includes action by one vessel against another. It may also include mutiny by the crew or passengers of a vessel. Unlawful seizure of the vessel or of property on the vessel may constitute piracy. The exclusion of same ship piracy from the IMB and UN Convention definitions is a matter of convenience and does not necessarily reflect the legal definition. There is no single universally accepted legal definition of piracy. Different states may have different definitions.

HISTORIC CONSIDERATIONS

- 2.7 Although piracy has existed with maritime trade since pre-history, the incidence varies over time. For example South Wales was once a hotbed for pirate activity (see Appendix C). Indeed the Welsh Pirate model for the 14th and 15th centuries, where baron lords ruled and there was no effective central government, bears much similarity with the modern Somalia. The “War Lord” for the Welsh pirates was Warwick. We can use this similarity to help identify factors which encourage piracy while others discourage it. However the Somalia pirates have now move to a sophisticated “business model” which is very similar to that of privateers (see Appendix E)
- 2.8 It is therefore important to understand these factors in determining any risk management or risk mitigation (including insurance) process in managing the issue
- 2.9 From the brief history of piracy set out in Appendices A and B the main original purpose of piracy was gain, in that most pirates took ships for their own use. They also hoped to sell the cargoes and get ransom for or (where slavery is permitted) sell any captives that they took. This required access to places where the stolen goods could be sold or captives held pending ransom.

CURRENT CONSIDERATIONS

- 2.10 Much recent modern piracy (and specifically the activity of Somali pirates) differs from this in that the whole ship and cargo are being subjected to ransom, and in certain cases the pirates have only been interested in the ransom. They often have no use for the ship, or no ready market in which to sell the vessel. However certain vessels have been noted as “missing” after being taken by pirates and much piracy does not involve any attempt to seize the ship or the crew but is merely directed at the cargo or valuables on board.
- 2.11 The main factors which enable piracy can be summarised as
- easy availability of vessels to capture,
 - ready markets for captives and stolen goods and
 - secure places for rest and resupply.
- 2.12 However these alone are not enough. One of the key risk drivers in global economics is 1 billion people in the world who are below the poverty line and with little or no real prospects. The main source of pirates is from this population. Furthermore, they appear, in certain respects, in many cases, not to have the “democratic” arrangements seen in 18th century piracy with which we are “familiar” via cinematic interpretation. We cover this in section 4.
- 2.12 Government action and insurance sit hand in hand in most areas. However in marine piracy there is a significant interlinking. Insurance spreads the risk, but if the risk becomes too great, then insurance becomes no longer available or unduly expensive, and governments need to act. For instance, hijacking of lorries was a major problem in the UK a few years ago. The driver is isolated, the hijackers can quickly unload valuable cargoes and then abandon or reregister the vehicle. Remedies included tracking devices, provision of safe lorry parks, restricting access to information on movement of high value cargoes and generally improved security measures. Such measures have significantly reduced the incidence of lorry hijacking. In the case of motor insurance, government regulates who can drive, the manner in which we drive and the standard of the car. Offenders are brought to a national civil court. In the case of marine piracy, the ability to set standards and regulate them is significantly more difficult.

3 PIRACY AND THE LAW

UN CONVENTION ON THE HIGH SEAS (1958)

UN CONVENTION ON THE LAW OF THE SEA (1982).

- 3.1 The starting point of modern law is the UN Convention on the High Seas. The section dealing with piracy on the high seas (or in any other place outside the jurisdiction of any State) was restated in the UN Convention on the Law of the Sea as articles 100-107. These articles are set out in Appendix F.
- 3.2 Whatever else the UN Convention may be, it is a political document and represents something of a lowest common denominator agreed between the signing parties. It represents what everyone could agree on. Accordingly it lacks many of the features of a legal document and as a call to action it is somewhat lacking.
- 3.3 Article 100 requires all States to cooperate to repress piracy on the high seas. It does not impose any specific duties on States. It does not require them to do anything to restrict piracy in their territorial waters.
- 3.4 The term "high seas" gives rise to certain difficulties. It certainly excludes areas within the 12 mile territorial limit: this includes not just areas within 12 nautical miles of land but the device of straight baselines allows states to increase territorial waters by including bays and offshore islands. However, states can create a "contiguous" zone of an additional 12 nautical miles, which is no longer unambiguously part of the high seas. The fact that coastal states have the power to enforce customs and sanitary regulations etc within this area gives rise to political and operational ambiguities which may deter other states from operating against pirates since the coastal state might object to their intervention. The 200 mile exclusive economic zone gives rise to further ambiguities.
- 3.5 Article 101 restricts piracy to illegal acts without making it clear how illegality is to be defined. Could a Somali pirate argue that piracy is legal under Somali law, or that there is no law in Somalia?
- 3.6 Interestingly, piracy by and against aircraft is included in the Convention. Piracy against aircraft has been largely controlled by airport security checks (the controls have been somewhat less successful against terrorism). As far as we are aware no aircraft have been used in maritime piracy.
- 3.7 Article 101 also restricts piracy to actions for private ends. This is in line with traditional definitions of piracy, though political ends, in themselves, are not defined. Individual member states and their courts will make their own decisions, having regard to their political circumstances. One man's terrorist is another man's freedom fighter, so this is inevitable.
- 3.8 Actions by government vessels are excluded. Clearly third parties meddle in inter-government disputes at their peril, and this is a simple recognition of that fact. However this gives rise to difficulties where pirates masquerade as government officials or where rogue officials act as pirates. Article 102 clarifies that if a government vessel mutinies, this exclusion no longer applies.
- 3.9 Article 105 allows, but does not require, third party states to intervene to prevent piracy and arrest pirates. While article 107 restricts this right to clearly marked government vessels, presumably it is not intended to prevent self-defence or rendering assistance to those under attack.

THE HIGH SEAS

- 3.10 Where piracy occurs has great significance. Piracy in territorial waters is a matter for that country. Piracy in international waters is a matter for everyone and no-one.
- 3.11 Foreign navies may not intervene in the territorial waters of a country except with permission of that country and it is the responsibility of that country to deal with and prosecute pirates. The ships attacked have the right of self-defence but they must conform to local law. There is no right of pursuit: pirates who attack in international waters and escape into territorial waters are relatively safe unless the local navy happens to be patrolling in the area or the country allows the pursuit.
- 3.12 In international waters, the only states directly interested are those of the attacked ship and that (if any) to which the pirates belong (or, we believe, where their ship is registered). Third parties had no standing to intervene and it would be difficult for them to prosecute pirates of a different nationality who attacked a third party ship (the UN Convention gives them the right to do so, but they would first have to pass the requisite legislation). The country whose ship is attacked could prosecute (it has the right to defend its citizens); as could the country whence the pirates come. The following examples illustrate the difficulties these definitions cause in dealing with piracy
- 3.13 An interesting and well documented hijack is that of the Maersk Alabama, where pirates found they had hijacked a US vessel with a US crew some 280 miles off the coast of Somalia. (<http://news.bbc.co.uk/1/hi/world/africa/10126248.stm> and Discovery Channel). All but one of the pirates were eventually killed. Interestingly, a Somali official has criticised the US Government's prosecution of a man alleged to be the ringleader of a group of pirates that attacked the Maersk Alabama (a US ship). Although the Somali government is clearly wrong to deny US jurisdiction, (the Maersk Alabama was a US vessel on the high seas) this does illustrate the sensitive nature of any decision to prosecute.
- 3.14 Such considerations explain the difficulty in controlling the Thai pirates who attacked Vietnamese boat people. The Thai authorities had no interest since the activities occurred outside their territory and did not affect their national interests. The Vietnamese had no interest in protecting the boat people who might be regarded as disloyal.
- 3.15 This contrasts with the robust action by the Thai authorities in tracing and prosecuting the men who attacked a British yacht in their waters in March 2009 and killed the owner, but allowed his wife to live after forcing her to help sail the boat to shore. They were quickly arrested; two were sentenced to 25 years and the third (a minor) to a lesser term. (<http://news.bbc.co.uk/1/hi/england/sussex/8384949.stm>). This illustrates the many interpretations in marine law of jurisdiction issues
- 3.16 The Dutch navy released a pirate crew for the same reason in April 2009. According to the BBC (<http://news.bbc.co.uk/1/hi/world/africa/8005730.stm>) a Dutch spokesman said the pirates were set free because NATO did not have a maritime detainment policy, meaning Dutch national law would apply. "They can only arrest them if the pirates are from the Netherlands, the victims are from the Netherlands, or if they are in Netherlands waters," he said. Since then the Dutch attitude has hardened: in June, 10 alleged pirates who attacked a German ship were extradited to Germany although the judge accepted that the Netherlands had the power to try the men. (<http://news.bbc.co.uk/1/hi/world/europe/10295396.stm>)
- 3.17 Kenya has been prosecuting captured pirates under an agreement with the EU. A new court opened in June, funded by international donors (including the UN, EU, Canada and Australia), putting to an end a period of uncertainty following a Kenyan Government statement at the end of March that it would not accept any more seized Somali pirates because it had not received the promised assistance to cope with this "burden". Prosecuting pirates gives rise to considerable costs to the courts, the prosecution authorities and potential witnesses or their employer and, once convicted, they are a

burden to the prison system. There are also difficulties in assembling evidence.
(<http://news.bbc.co.uk/1/hi/world/africa/8599347.stm> &
<http://news.bbc.co.uk/1/hi/world/africa/10401413.stm>)

- 3.18 The Seychelles also tries pirates seized by EU naval units. It recently amended its criminal code to enable it to prosecute pirates under universal jurisdiction.
(<http://news.bbc.co.uk/1/hi/world/africa/8664623.stm> & <http://www.bbc.co.uk/news/world-africa-10763605>)
- 3.19 The UK has not, to date, been prepared to try pirates, mainly due to fears that on expiry of their sentence, or if they are not convicted, that human rights considerations may prevent them being returned to their home countries. Instead it has handed suspected pirates over to the Kenyan or Seychelles authorities.

HUASCAR

- 3.20 In 1877 the crew of the Peruvian warship Huascar mutinied. Two British ships were temporarily detained by the Huascar but the boarding parties left peaceably when demands for mail and dispatches were refused. The Huascar did however take that part of a cargo of coal allegedly belonging to Peruvian owners. Arguably this would have been a legitimate seizure of contraband, if Huascar were given belligerent rights. Two British men joined the Huascar's crew, apparently voluntarily.
- 3.21 Later the Huascar was attacked by British warships in Peruvian waters but escaped and surrendered to a Peruvian government squadron. The Peruvian government made a diplomatic protest about the attack on a Peruvian vessel in Peruvian waters. While the UK Government justified its actions on the grounds that the Huascar was a pirate ship, the matter was raised in Parliament. Whatever the rights and wrongs of the case, it does illustrate the dangers of meddling in another nation's affairs.

REBELLION & TERRORISM

- 3.22 In the event of a rebellion, foreign states need to act carefully. If they recognise the rebellious forces as legitimate combatants, they risk antagonising the existing government. If they simply treat them as criminals (which they may do), they risk antagonising the new government if the rebellion succeeds. The examples below illustrate some of the issues when dealing with dealing with revolutionaries.
- 3.23 During the American Civil War many foreign states, including Britain and France, recognised the Confederacy as a legitimate belligerent, and did not arrest Confederate privateers as pirates. A Canadian court refused to extradite Confederates who had seized a Union merchant ship, the Chesapeake, in New York harbour, killing one man and wounding another.
- 3.24 However they did not allow Confederate prizes in their ports and reclaimed prizes captured in their waters.
- 3.25 Although the Union government condemned Confederate privateers as pirates, the legal position was somewhat ambiguous. A prize crew aboard the Jeff Davis, which was recaptured, were convicted of piracy and sentenced to hang. However, when the crew of the privateer Savannah was charged, the Court allowed evidence to support the defence case that the United States had to acknowledge combatant status and treat the crew as prisoners of war and not pirates. Probably as a result the jury could not agree and the crew was not convicted.

- 3.26 In the event, because of threats of threats to execute Union prisoners in retaliation, the convicted men in the Jeff Davis case were not hung. Eventually all the Confederate privateers in Union custody were exchanged for other prisoners of war.

SANTA MARIA (OPERATION DULCINEA)

- 3.27 In 1961 the Portuguese cruise ship, Santa Maria, was seized by a group led by Dr Henrique Galvão, aiming to inspire a revolt against the Salazar dictatorship. The Portuguese government appealed for foreign naval help to suppress the “pirates”, but other states refused to intervene when they learned that the hijacking was political. The journey of the hijacked Santa Maria was eventually cut short due to a troubled engine and problems with the 900 captives on the ship.
- 3.28 Dr Galvão was at pains to assure the world that the passengers were safe and not under threat, but were being treated courteously. He maintained that the seizure was not an act of piracy but part of an insurrection. He desired the good will of the whole world especially Brazil and her new president, Janio Quadros. General Delgado, the leader of those opposed to the Salazar regime, in whose name Galvão was acting, supported this and asked foreign governments not to interfere. The US was concerned for the welfare of the US citizens on board and the US navy shadowed the ship once it had been located.
- 3.29 There were negotiations over a period of days with the US and Brazilian governments. Galvão was happy to allow the passengers to disembark but wanted assurances that he could resupply the ship and head out to sea again. While President Quadros was sympathetic to the political aims of Galvão, he was not prepared to permit this. However problems with the steerage class passengers and a troubled engine meant that Galvão had to yield. After almost a fortnight the hijacked ship finally docked in Recife. Brazil granted political asylum to those involved to end the incident which had resulted in one death. No prosecutions followed.

ACHILLE LAURO

- 3.30 In 1985, the Abu Abbas faction of the Palestine Liberation Front seized the cruise ship, Achille Lauro, off Egypt and took the passengers and crew hostage. They demanded the release of 50 Palestinian prisoners held by Israel, threatening to kill their hostages if Israel did not meet their demands. They killed a wheel-chair bound American Jew but Israel refused to negotiate. Eventually they were persuaded to surrender the ship in return for safe passage to Tunis. The US forced the plane to land at a NATO base in Italy, where the perpetrators were tried and convicted. Abu Abbas, who was on the plane, was permitted to continue his journey.

1988 CONVENTION FOR THE SUPPRESSION OF UNLAWFUL ACTS AGAINST THE SAFETY OF MARITIME NAVIGATION

- 3.31 Following the Achille Lauro, the UN introduced the 1988 Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation. This can be found in Appendix G. It covers terrorism as well as piracy, but only covers the more serious pirate attacks (roughly major criminal hijack – see section 4).

3.32 The following is from *Insurance Day on Friday 26 March 2010*

“In a recent judgment arising out of Gulf of Aden piracy, the Commercial Court rejected the proposition that capture by pirates automatically gives rise to a total loss of the insured property.

In Masfield v Amlin (2010), the Commercial Court has confirmed in the context of cargo insurance that capture by pirates is not sufficient to found a total loss claim.

The “BUNGA MELATI DUA” and her cargo of bio-diesel were captured by pirates in the Gulf of Aden in August 2008. One month after capture, while ransom negotiations were progressing well, cargo owners tendered Notice of Abandonment indicating their intention to claim a constructive total loss (“CTL”). [CTL refers to insured property that has been abandoned because its actual total loss appears to be unavoidable, or because it could not be preserved or repaired without expenditure in excess of its value]. “Notice was rejected by underwriters. Ransom was subsequently paid and the vessel and cargo were released. The assured nevertheless proceeded with a total loss claim.

The assured’s primary argument, based on old authority, was that the cargo had become an actual total loss (“ATL”) from the moment it was seized by the pirates. The assured argued that, at that moment, they had been “irretrievably deprived” of the cargo in accordance with sect. 57(1) MIA 1906. The Court rejected this argument.

Steel J found that, to be “irretrievably deprived” of the insured property, the assured must show that recovery of possession is legally and physically impossible. The pattern of Somali piracy incidents was that vessels and their cargoes were released on payment of a ransom within around six to eight weeks of capture. The shipowners and cargo owners in this case both intended and expected their property to be released in such a way, as it eventually was. Therefore, upon capture, the assured had not been “irretrievably deprived” of the insured cargo. The old authority was held not to apply on the basis that the assured had lost possession of their property but not dominion over it or title to it. The piratical seizure alone was not enough to found an ATL claim.

The assured argued in the alternative that the seizure gave rise to a CTL as the cargo had been abandoned because an ATL appeared unavoidable. Steel J held that “abandonment” for the purposes of this provision means the abandonment of any hope of recovery. There had not been any such abandonment in this case as the shipowner and cargo owner expected to recover their property.

The Court also considered an argument raised by the assured that the payment of a ransom was contrary to public policy, and therefore the fact that a ransom would secure release of the vessel and cargo could not be taken into account when considering whether the vessel was irretrievable for the purposes of the ATL claim. Steel J held that, while the payment of ransom may perpetuate and encourage piracy, it was not contrary to public policy because ransom payments are not illegal in England and are often the only option if crew members are to be taken out of harm’s way.

The court also cited with apparent approval the principle laid down in Royal Boskalis Westminster NV v Mountain (1999) that ransom payments are recoverable as a sue and labour expense.” [This is a standard clause in a maritime insurance policy which allows the insured to recover from the insurer any reasonable

expenses incurred by the insured in attempting to minimize or avert a loss to the insured property, for which loss the insured would have been liable under the policy]

“All in all, the decision is a welcome one for insurers. If the Court had held that Gulf of Aden piracy incidents automatically gave rise to total loss claims for vessel and cargo, then the risk of piracy could quickly become uninsurable with dramatic consequences for world trade. The reassurance that ransom payments are not contrary to public policy should assist owners in the recovery of contribution to ransom payments in general average from other interests at risk, principally cargo.”

- 3.33 There is possibly more going on than revealed in this summary. The seizure was for a period of only 41 days and the cargo in question did not deteriorate. It was insured for \$13.3m and the claim was for \$7m, allowing for the proceeds of sale. Any general average contribution to the ransom would have been relatively small, so that whether or not the claim allowed for a contribution, it is clear that the cargo was sold for less than half its insured value. [General average is a principle of maritime law where, in the event of emergency, if a cargo is jettisoned or expenses incurred, the loss is shared proportionately by all parties with a financial interest in the voyage.]
- 3.34 At the time oil prices were falling sharply. So part of the loss claimed would have arisen anyway, though the delay caused by the seizure of the ship would have increased this loss.
- 3.35 In the absence of a finding of a constructive total loss, there may have been no recovery against the insurance: that is that the economic loss caused by a combination of falling oil prices and delay might not have been covered.

COSCO BULK CARRIER CO LTD V TEAM-UP OWNING CO LTD (2010)

- 3.36 This case was reported in *Insurance Day* on Friday 25 June 2010. It concerned the interpretation of a common clause in the agreement relating to the charter of the *Saldanha* to Cosco. The *Saldanha* was hijacked in the Gulf of Aden in 2008. It was held that the vessel remained on hire during the period it was held by pirates. The judgement has implications for the liabilities of charterers and owners of hijacked ships and their insurers. It may lead to changes in charterparty agreements.

PAYMENT OF RANSOM

- 3.37 The judgment in *Masefield v Amlin* also found that ransom payments were legal, something which other countries, and in particular the US, find difficult. The UK Government has a policy of not paying ransom to kidnappers or hijackers and does not encourage such payments, though it has no power of veto. Her Majesty's Government has refused to assist in paying or negotiating ransom.
- 3.38 President Obama signed on 13 April 2010 an executive order that is likely to restrict or make more difficult the payment of ransom to Somali pirates. In conjunction with the issue of the executive order, the U.S. Treasury's Office of Foreign Asset Controls (OFAC) issued a list of Somali individuals and organizations that have been added to its SDN list. [SDNs are specially designated nationals – organisations or individuals – who are restricted from doing business with the US, its businesses and its citizens] U.S. persons are prohibited from having any dealings with persons on the SDN list. These include two known pirate leaders. This may have consequence on any insurer assisting in paying a ransom. (See Appendix H)
- 3.39 For instance: payments involving an US bank would be caught by the order and insurers would need to be careful that payments were not routed through New York; an US person might be prohibited from contributing to a ransom to a gang with which

one of the named individuals was likely to be associated. This would create difficulty, for instance, in collecting any general average contribution in respect of a ransom. The US government has advised that if an US vessel, US crew, or US cargo is captured by Somali pirates, the owner, employer, or cargo interests should notify the US government immediately and liaise with it.

4 MODERN PIRACY

- 4.1 Piracy has never gone away and remains a global issue. There were, for instance, two incidents in 2002 when robbers escaped with goods from ships berthed in Goole (Yorkshire). (Ref House of Commons Library)
- 4.2 Modern piracy is generally undertaken by small groups usually (but not always) in coastal waters operating in high-speed boats or by stealth. On the high seas they generally operate from motherships. They use surprise and deception, often coming aboard disguised as coast guards or harbour police.

FORMS OF MODERN PIRACY

- 4.3 The International Chamber of Shipping (ICS) classifies pirate attacks into three basic categories:
 - 4.3.1. **Low-Level Armed Robbery (LLAR)**
An attack with the intention of stealing, usually under cover of darkness. The culprits take whatever they can carry from the deck and the hold. Violence only occurs when the crew tries to stop them.
 - 4.3.2 **Medium-Level Armed Assault and Robbery (MLAAR)**
Armed assault with violence or threats of violence. The pirates usually come on board unnoticed and force the crew to hand over their cash and valuables. Cargo is also stolen if possible. Each raid is over in less than an hour. The financial loss is usually in the order of between US\$ 10,000 and 20,000.
 - 4.3.3 **Major Criminal Hijack (MCHJ)**
Carefully planned theft of the entire cargo. The pirates know every detail of the cargo and the ship's stowage plan. Often, while some of the attackers hold the crew captive below deck, others transfer the cargo to another ship. When the raid is over, the ship drifts in the ocean with the bridge unmanned. This type of attack usually results in a double digit million dollar loss.
 - 4.3.4 In the worst case, the entire ship is hijacked along with its cargo, with organised gangs operating "to order" in some cases. The crew is marooned at sea or killed and the cargo transferred to another vessel or discharged illegally in a port other than the original destination. The ship is reregistered in a foreign port, given a new name, a new flag, and a new coat of paint. It is then supplied with false papers and loaded with goods which will never reach their original port of destination. These so-called phantom ships have been a familiar phenomenon since the 1980s, especially in Southeast Asia. Organised crime operates hand-in-hand with corrupt officials in local authorities: without bribery, it would be almost impossible to obtain false papers and sell the cargo. The ISPS Code (see later) should reduce the ability of pirates to reregister ships.
 - 4.3.5 MCHJ includes the seizure of ships and crew for ransom, primarily by Somali pirates (see below).

ISPS CODE (INTERNATIONAL SHIPS AND PORT FACILITY SECURITY CODE)

- 4.4 The ISPS code was originally used in the fight against terrorism. It is now being used to combat both piracy and organised crime. It was relatively easy to operate a phantom ship with false papers and certificates and to sail into ports unrecognised. However, the regulations and requirements of the ISPS Code make it extremely difficult for a phantom ship to remain unnoticed. It is not enough simply to have false ISPS papers and certificates on board, as the ISPS certification is additionally registered in databases like Seasearcher or Equasis. This entry is based on information provided by the issuing authority and theoretically cannot be changed. The ISPS Code also requires the vessel to have its IMO number visibly marked on the hull, making it more difficult for the vessel to assume a false name. The ISPS Code should prove to be an almost insurmountable hurdle even for well-organised criminal gangs.

SOMALI (PUNTLAND) PIRATES

- 4.5 Although this paper deals with piracy throughout the world, the major region for recent modern piracy has been from Somali. This has attracted much publicity due to the high profile reporting of certain incidents, in particular the unsuccessful hijacking of the Maersk Alabama which was highlighted on US television
- 4.6 The incentives for the pirate have always been about the potential riches. These incentives must be higher than the risk of being caught. Historically, in part, piracy was about an alternative lifestyle, with greater individual freedom compared to work as a regular sailor on a commercial ship or in a national navy. This was balanced with an efficient form of organisation that prevents internal predation, minimising conflicts (see Appendix E).
- 4.7 In the first instance Somali piracy did not contain any such system. Piracy provided a way to earn a living in a country deprived of employment opportunities (including fishing as a result of the depletion of fish stocks off the Somali coast through international fishing). There was an opportunity for earnings incomparable to the alternative choices and this is the major reason for the existence of the Somali piracy.
- 4.8 Similar considerations apply elsewhere. There are 1 billion people below the poverty line where the rewards of such ventures outweigh any risk. What is interesting is to see how the economic wealth of individuals has changed over time and how this impacts on piracy. During the 1980's and 1990's the area with low economic wealth were concentrated in Asia, During the last 20-30 years the economic wealth of the Asian area has increased significantly whilst that in the African continent has declined. The trend in piracy has followed the shift in economic wealth.
- 4.9 The Somali pirates' methods are varied, and they have been known to change tactics. On one hand there are several groups under an overlord, with no defined structure. In many ways this is similar to the medieval Welsh Pirates (See Appendix C). On the other hand there are other groups with a clearly defined pay and structure similar to that seen in 18th century Caribbean pirates (see Appendices A and B).
- 4.10 Early success encouraged the Somali pirates to escalate their attacks, the increase coming from both an increase in the number of locals participating, but also from other communities along the Somali coast turning to piracy. Each group will have a differing structure and organisation – there is no one model to describe piracy in Somalia
- 4.11 In 2007 the estimated turnover from piracy was around US\$ 30 million Puntland's general economy is estimated to something around US\$ 20 million. Readers may draw their own conclusion

- 4.12 The level of piracy also appears to depend on the stability of government. When the UIC [Union of Islamic Courts] took power in June 2006 there was a clear decline in piracy activity which reversed when the UIC fell. Many people are dependent on piracy as their main source of income.
- 4.13 The Centre for Piracy is Puntland which is relatively calm compared to South and Central Somalia. This enables a secure environment for negotiations with a safe harbour, accommodation for the hostages, reliable communication and a minimum level of movement.
- 4.14 Bargaining is important. Payments may be made directly to the pirates, or the handover may be made in a third country, such as Yemen or Kenya. A part of the ransom often goes to the Somali diaspora, if this is a “share”, for safekeeping. There are also examples where Somali expatriates have been instrumental in getting telephone numbers to civil-servants to accommodate the bargaining procedure concerning a hijacked merchant vessel. Payments are also made to higher officials
- 4.15 However, for any state that “sponsors” or condones piracy, there is a clear risk of losing control. History tells us that although pirates and privateers may be valuable in times of war and useful in tapping competing states’ trade in peacetime; they may eventually become a liability. For example when England, during the reign of the Stuarts in 1604, sought a more stable peace with Spain, the privateers became an acute problem. Sir Walter Raleigh’s sacking of San Thom , in 1616, prompted the Spanish ambassador to demand compensation and the imminent execution of Raleigh. England acceded, and Sir Walter Raleigh lost his head. Captain Kidd was a similar, but less political, example,
- 4.16 In respect of Somalia, the historical case which has been considered the most relevant is the Barbary Corsairs. In the 18th and 19th centuries, many of the European states (England, France, Spain, Holland and Sweden) negotiated protection treaties with the Barbary Corsairs to have their ships spared. The treaties were, however, notoriously unreliable as they were often simply ignored when another nation cut a better deal. The constant menace by the pirates caused many states to resort to violence. England, France, Holland and the USA all carried out punitive expeditions, at one point, to stop the piracy activity. But, it was not until France invaded Algeria in 1830 that the pirate activity was finally stamped out.

MALACCA STRAITS

- 4.17 The Malacca Straits are 500 nautical miles long, just nine nautical miles wide at their narrowest point, and only 30 metres deep in some places. It is one of the most highly frequented waterways in the world. A vessel transits the Straits every ten minutes. It has been a hot-bed of piracy since pre-history and the need to combat piracy was used to justify British colonial expansion into South East Asia (currently known as Malaysia)
- 4.18 In the latter part of the twentieth century there was a resurgence of piracy. This has included MCHJ with ships either being reregistered in a foreign port or abandoned to drift at sea. A fear has been that a large ship or one with a hazardous cargo might be left to drift and collide with another ship, blocking a key channel.
- 4.19 The situation has improved following the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP), initiated by Japan in 2001. Since then the three coastal states (Singapore, Malaysia and Indonesia) have cooperated to suppress piracy in the straits, assisted by funding by other countries, notably Japan. These efforts have resulted in a reduction in piracy in the straits (no major incidents reported to the IMB in Q1 2010),(http://www.icc-ccs.org/index.php?option=com_content&view=article&id=406:worldwide-hijackings-rise-as-pirates-expand-area-of-operation&catid=60:news&Itemid=51)

NIGERIA

- 4.20 This is another piracy hotspot. Pirates are violent and have attacked and robbed vessels or kidnapped crews. Delays at Lagos have provided opportunities for pirates. An insurrectionary movement in the coastal areas, partly directed at oil companies, has led to a general increase in lawlessness and the availability of weapons. Loss of fishing grounds, through a combination of pollution, exploitation by foreign fishing fleets and intimidation by militants have reduced opportunities for local fishermen, encouraging them to turn to piracy.

OTHER HOTSPOTS

- 4.21 These include: Bangladesh (particularly ships waiting to enter Chittagong), South China Seas, Conakry (Guinea), Santos (Brazil), Callao (Peru) and many more.
- 4.22 A dramatic incident in April in the South China Seas serves as an example that piracy in these and other areas can be as much a threat as in Somalia. A tug towing a barge was seized. The shipowner reported that the ship had deviated from its planned course. The Malaysian authorities located the barge and tug the next day. The barge had been detached, apparently to allow the tug to travel more quickly. The barge was recovered by the Malaysian authorities, while the tug headed towards Indonesian waters. Subsequently the tug was located (less than 3 days after the hijack), with the crew safe on board. It had been abandoned by the pirates who had painted over its name. It was escorted into Singapore by the Singapore navy. It is believed that the prompt response and presence of the law enforcement agencies from Malaysia and Indonesia was a key factor causing the pirates to abandon the tug. (From report by RECAAP ISC)
- 4.23 Piracy has been cited by the Cameroon authorities as a factor leading to a reduction in investment in their offshore oil industry, leading to a fall in production.
(<http://af.reuters.com/article/topNews/idAFJOE6370PW20100408>)

ATTACKS ON YACHTS

- 4.24 Pirates have also been known to attack private yachts in certain coastal regions far from the usual commercial shipping routes. Traditionally high-risk regions include the Caribbean, Philippines, the China Sea, the Somali coast and the Gulf of Aden. Elsewhere too, as poverty increases in some coastal regions, there is a growing readiness to assure survival by illegal means, with the result that attacks have also been reported off the coasts of South America, Morocco, Mauretania, and Albania in recent years.
- 4.25 It is difficult to estimate the precise number of attacks every year. The International Maritime Bureau (IMB) includes sailing yachts and motor yachts in its statistics, their numbers are far from complete and other sources suggest significantly higher numbers. There is a suggestion that the actual number is three times that reported.

5 TERRORISM AT SEA

INTRODUCTION

- 5.1 Since the Achille Lauro incident, which led to the 1988 Convention (see section 3) this has been a major concern.
- 5.2 Piracy has increasingly been linked with the risk terrorist attacks at sea. The international shipping industry is responsible for the carriage of around 90% of world trade.. In most cases, it has to pass through a narrow body of water such as the Straits of Malacca or the Suez Canal, at least once during its journey. Even a partial blockage of these passages would have a serious impact on world trade and give rise to additional costs in the order of billions of pounds
- 5.3 In addition the US has been concerned about the possibility of a terrorist attack from a vessel entering a US port with explosives.
- 5.4 Terrorists could adopt the same methods as pirates to seize a ship. The distinction between acts of terrorism and piracy may be relevant from a legal point of view, particularly with regard to rights of pursuit and the possibility of penal sanctions
- 5.5 From the insurer's point of view the distinction would be important if the insurance contract contained a terrorism exclusion.
- 5.6 The US is also concerned that terrorists might fund their terrorist activities through piracy and has blocked the payment of ransom by US persons that might benefit two known pirates (see section 3 above).

PHILIPPINES

- 5.7 There are several armed insurrectionary movements in the Philippines, mainly seeking autonomy or independence for Moslem areas. These insurrectionists have been responsible for terrorist bomb attacks on ferries. The most notorious was by the Abu Sayyaf group in 2004 on the Superferry 14 in Manila bay which killed 116 people. We believe this to be largest marine terrorism incident to date. The US suspected the Abu Sayyaf group was connected with Al Qaida.(<http://news.bbc.co.uk/1/hi/world/asia-pacific/3732356.stm>. There a reference on the BBC website to at least one other bomb attack on a ferry)

MALACCA STRAITS

- 5.8 As noted in section 4, the Malacca Straits between Malaysia, Singapore and Indonesia, are long, narrow, shallow and very busy. Its traffic includes oil tankers carrying 40% of the worldwide output. Almost the entire Far East's oil supply depends on whether or not this waterway can be transited. Any blockage due to terrorist attack would have a devastating effect on the world economy.
- 5.9 If the Straits of Malacca were to be blocked by a terrorist attack, ships would have to make a detour of roughly 1,000 miles, leading to higher freight rates and consequently also to higher commodity prices. Considering that 80% of Japan's oil is imported from the Middle East, for example, such an attack would clearly have a significant impact on the world economy

SUEZ CANAL

- 5.10 The following is an extract from the Jerusalem Post of 9th July 2009

“Egyptian authorities have arrested 25 al-Qaida-linked terrorists on suspicion of plotting attacks on oil pipelines and ships crossing the Suez Cana.

The Egyptian Interior Ministry said the new cell was led by a Palestinian and included 24 Egyptians, mostly engineers and technicians.

They planned to use mobile phones to detonate explosives against ships crossing the Canal, the statement said. The group learned how to make car bombs through communicating with al-Qaida terrorists on jihadi Web sites, according to an Interior Ministry statement. The detainees confessed to funding their activities through contributions from Islamic charities abroad and in one case robbed a jewelry store and murdered its Coptic Christian owner”

- 5.11 According to the U.S. Energy Information Administration, an estimated 3.9 million barrels of oil per day are transported from the Middle East to the west via the Suez. Nearby is the Sumed pipeline, a major transportation route that pumps another 2.3 million barrels per day. 4.7 percent of the world’s daily output of oil travels through the area. If the Suez were ever closed, ships trying to make it from the Middle East to Europe would have to travel around Africa to complete their journey. On top of delays in supply, the cost of shipping would also increase. As a result, the price of crude would increase significantly

PANAMA CANAL

- 5.12 The Panama Canal accounts for about 5% of world shipping. The Panama Canal crosses the Isthmus of Panama at the narrowest point of the Americas. Fifty miles long, including the approaches, the Panama Canal raises ships by sets of locks at each end so that they can pass across manmade Lake Gatun in Central Panama.
- 5.13 Roughly forty ships make the eight hour passage through the Panama Canal each day. Because of increasing traffic and a need to accommodate larger ships the Panama Canal Authority has started the Panama Canal Expansion. This ten year long project will widen the central channels and build a second set of large locks on each end of the Panama Canal. The Panama Canal Expansion will more than double Panama Canal capacity.
- 5.14 Exercises involving simulated terrorist attacks are held involving many American (North, Central and South) countries

US PORTS

- 5.15 Another major concern is the United States There are 361 deep water ports. Each year, nearly 8 million shipping containers pass through U.S. ports. This stream of cargo is the lifeline of the American economy. The US Government sees it as a potential magnet for a possible nuclear attack. They have also identified potential targets. Terrorists could be expected to target a port that handled a large volume of oil and other goods and that had a densely-populated area that tankers passed on their way through a harbour to an unloading terminal. Various cities worldwide meet these criteria. If terrorists sought major economic damage while minimizing loss of life, they might try to target the Louisiana Offshore Oil Port, or LOOP, the only U.S.deepwater oil port that can handle fully loaded supertankers. LOOP, 18 miles off the Louisiana coast, currently handles about 10% of U.S. crude oil imports.

6 INSURANCE AND PIRACY

INTRODUCTION

- 6.1 There are many different interests impacted by piracy including ship owners, cargo owners, ship crew, charters etc. There is therefore a wide range of different insurance products which come into play. This section details the types of insurance policies impacted by piracy along with some of the coverage issues arising.
- 6.2 For clarity this section of the paper will focus on Marine policy wordings used in the London Market. Although the overall coverages are similar throughout the world the terms and conditions do vary. For instance the coverage issues between Hull and War described below were not an issue for the Japanese and Norwegian hull markets where piracy has been consistently covered by the War policies.

HULL INSURANCE

- 6.3 Hull Insurance provides insurance to cover the physical damage of the ship. It is often split into a Hull & Machinery (H&M) policy which covers both partial and total losses up to a specified percentage of the ship's value and an Increased Values (IV) policy which insures the remainder of the ship for total loss only.
- 6.4 Piracy claims may contribute to both H&M and IV policies: total losses arise from theft of the vessel or from scuttling due to pirate attack; partial losses can come from damage incurred to the ship even if the pirates were unsuccessful.

WAR

- 6.5 Marine War cover provides insurance against the danger of loss to a war peril. As well as hull cover it provides cover for P&I and Crew up to the hull value. The insured has to notify the insurer if there are plans to enter a war risk area and the insurer has the option to charge an additional premium or even cancel the policy when this happens. The war risks areas are suggested by the London-based Joint War Committee. In May 2008 The Joint War Committee added the Gulf of Aden as a war risks area due to piracy.
- 6.6 Under the Marine clauses used in the London Market piracy has moved several times between the Hull and War policies. Until 1937, piracy was one of the named insured perils in the combined Lloyd's hull and cargo policy. At that point, driven by events in the Spanish civil war, piracy was classified as a war risk. However, in the 1982 Institute Time Clauses (ITC) Hull policy wording it was again moved back to being a hull risk to try to avoid problems differentiating between piracy and theft. In 2005 the Joint Hull Committee introduced optional exclusions for piracy in the hull policy and a corresponding war clause incorporating piracy. Initially there was little take up for this option. However the piracy threat in the Gulf of Aden has led to a significant increase in its use.
- 6.7 There are significant advantages for the insurer of having piracy covered under War as it allows them to better manage and understand their piracy exposure and also to charge premiums which better reflect the risk taken. War policies also have a cancellation

provision which allows the insurer to react quickly to the changing conditions of modern piracy.

- 6.8 There are also advantages to the insured particularly in providing clarity of coverage. Given the possible links between piracy and global terrorist networks the distinction between piracy and terrorism risks can be blurred. While a Hull policy may cover piracy, terrorism is excluded. Therefore the insured cannot be certain that they will be covered for all piracy claims. A war policy will also cover terrorism and therefore may be preferable.
- 6.9 Obviously there are also some disadvantages to the insured as it will reduce the flexibility to navigate certain waters without first advising the insurer.

CARGO

- 6.10 Piracy impacts on cargo from robbery, damage or delay of the insured goods. Damage could be during pirate attack or once captured; delay particularly comes into effect for perishable goods.
- 6.11 Cargo carried by a ship is not insured by the ship owner but by the owner of the cargo – which may well be a large number of different parties for a large ocean-going cargo ship (who in turn are likely to have different insurers). This variety of different interests on a ship has led to the development of a particular legal principle of marine insurance – General Average. This states that when two or more parties are engaged in the same sea risk, all the parties proportionally share any losses resulting from a voluntary sacrifice of part of the ship or cargo to save the whole in an emergency
- 6.12 Historically ransom payments for the release of hijacked vessels, cargo and crew have been paid by the owner of the vessel (and their insurer). However during 2008 as the size and frequency of ransom claims increased owners have started to make General Average declarations. At the time of writing, despite a lack of case law, General Average has generally been accepted by Hull and Cargo insurers as the fairest way of dealing with ransom claims.

PROTECTION AND INDEMNITY (P&I)

- 6.13 P&I insurance provides cover against third party liabilities and expenses arising from owning ships or operating ships as principals. More than 90% of ocean-going ships are insured by the mutual P&I Clubs that are members of the International Group of P&I Clubs.
- 6.14 Ransom payments are neither included nor specifically excluded under standard P&I wordings. Hull and Cargo insurers have started to suggest that P&I cover should contribute if General Average is declared given that part of the ransom will be for the crew. At the time of writing this has been resisted by the P&I Club Managers.
- 6.15 One area that is covered under P&I is crew liability. An example of where this would be impacted by piracy is where a member of the crew is injured or killed in the pirates' attack.

K&R

- 6.16 Standard Kidnap and Ransom (K&R) insurance would provide cover for ransom requests in respect of the crew of a vessel but would not cover the vessel and cargo. However marine specific coverages have been developed with wordings that reflect both the crew and property exposures. K&R coverage includes the cost of delivering the ransom and its attendant insurance cost. The policy also covers the cost of negotiators and their disbursement expenses.

- 6.17 Purchasing a K&R policy as well as the standard Hull and War policies obviously raises the potential for duplication of piracy cover. The resolution to this is for the insured to disclose to the Hull/War insurer that they are also purchasing K&R cover (given the confidential nature of K&R policies they may need permission from the K&R underwriters before doing this). As long as the K&R cover is purchased with a waiver of rights of subrogation the piracy exposure of the Hull/War underwriter is reduced (but does not disappear as they will still pick up claims for damage in unsuccessful piracy attempts). This should then be reflected in a reduction in the Hull/War premium.
- 6.18 There are significant advantages to the insured parties of purchasing K&R cover for piracy. It provides clarity of coverage as there is no longer the potential for disputes between the Hull, Cargo and P&I interests on General Average apportionment. K&R insurance also provides certainty of coverage: Hull and Cargo will only provide ransom payments up to the value of the insured vessel and cargo. Finally K&R cover also provides an expert support service beyond pure insurance.

LOSS OF HIRE (LOH)

- 6.19 LOH insurance can be thought of being comparable to Business Interruption insurance. It covers a shipowner's (or charterer's) loss of freight (or charter hire) income in the case of defined risks being triggered. Traditional LoH covers would only respond to physical damage to the insured ship. Specific "non damage" loss of hire cover would need to be purchased to cover the vessel's loss of earnings if captured by pirates. During 2008 a number of piracy specific LoH policies were launched.
- 6.20 Cover is for a defined maximum number of days and the daily indemnity is fixed and agreed at inception.

SMALL CRAFT

- 6.21 Small craft operators normally purchase H&M, War and P&I from the same provider so there are less coverage issues
- 6.22 There is a potential concern that, given the smaller size of ship, the ransom demand (which may include an amount for captured crew) will exceed the value of the ship. As the value of the ship is the limit of the H&M cover it may result in the insurer not being prepared to pay the ransom in full.

RISK MANAGEMENT

- 6.23 Before looking at specific measures it is worth noting that the threat of piracy is continually evolving. Techniques that provide successful risk management currently are likely to become obsolete as pirates adapt to them (a recent example would be the capture of the Asian Glory on 1st January 2010 in the Gulf of Aden – as it had a 23 m high freeboard it was expected to be immune to pirate attack). The reader should keep this in mind when considering the approaches described below. There are various sources of guidance for shipowners and masters, aimed at minimising the risk of pirate attack and the consequences and anyone interested should review this guidance.
- 6.24 Turning first to measures available to a ship's owner, an obvious starting point would be avoiding the pirates all together. Steps to achieve this while transiting high risk areas would include:
- 24 Hour standing watch
 - Constant monitoring of radars
 - Crossing areas during the night

- Maintaining high speed throughout
 - Minimising external communication to essential safety and security related matters
 - Minimising deck lighting to only what is required for safety
 - Avoiding known pirate areas altogether
- 6.25 Specifically in the Gulf of Aden ships should register with the MSC HOA (Maritime Security Centre – Horn of Africa), use the Coalition patrolled channels and consider joining a convoy.
- 6.26 If these measures fail and a vessel is attacked by pirates there are various approaches that can be considered to repel the pirates:
- Use of Long Range Acoustic Devices
 - Use of Electric Fences / Barbed Wire
 - Less high tech fencing e.g. drums tied around ship which float in the water with the aim of capsizing the pirate skiffs
 - Use of Water Jets to repel the pirates
 - Again the lower tech option would be the use of Fire hoses for the same purpose
- 6.27 Another potential approach for repelling pirates is the use of armed escorts. These could either be on board the ship or on a separate guard ship. While this may well be very effective there are some serious concerns with this approach:
- There is considerable uncertainty of the legal impact if an armed guard killed a pirate. There is potential they could be tried for murder. It is not at all clear what jurisdiction this would fall under.
 - If the crew are armed and then kill people the ship owner could be vicariously liable – especially if any innocent bystanders were harmed. There is a potential for this to feed through into a P&I claim.
 - There is also the danger of escalation of violence. Using armed guards may repel the pirates the first time but is likely to mean the pirates will return with heavier weaponry. Additionally if you were a crew member on a chemical tanker you are unlikely to want to encourage the pirate in the picture below to make use of his rocket-propelled grenade launcher!



- 6.28 If there is a secure facility on board to which the crew can retire during an attack, this can buy time. If the authorities can be alerted they may be able to recapture the ship, knowing that the crew are safe. This enabled the Russian navy to recover a Russian ship that had been captured by Somali pirates
(<http://news.bbc.co.uk/1/hi/world/africa/8667640.stm>).
- 6.29 While the risk management techniques described above may well reduce the impact of piracy the most important aspect should always be advanced planning combined with appropriate training of the crew.
- 6.30 A full Contingency Plan should be drawn up detailing the risk management approaches that should be implemented. This would cover what should be done to avoid pirates, what to do if attacked and also what should be done if captured by pirates. Appropriate insurance should play a key part of this planning. In particular Kidnap and Ransom insurance can play a vital part in the Risk Management process. Purchase of the cover should also include individual risk advice with specific loss prevention measures tailored to the insured vessels. If a ship is captured the K&R insurance may provide a crisis management team to give advice and potentially negotiate with and arrange ransom delivery to the pirates.
- 6.31 A contingency plan on its own without suitable training will not suffice. All relevant crew and support staff should be fully briefed on the Contingency Plan and will need regular training on all aspects of the threat of piracy. This will need to be ongoing and should include emergency drills and regular refresher courses.
- 6.32 For the insurer part of their risk management is likely to be ensuring that the insured themselves implements a sensible risk management approach as described above. However there are also risk management issues that the insurer themselves will need to tackle.

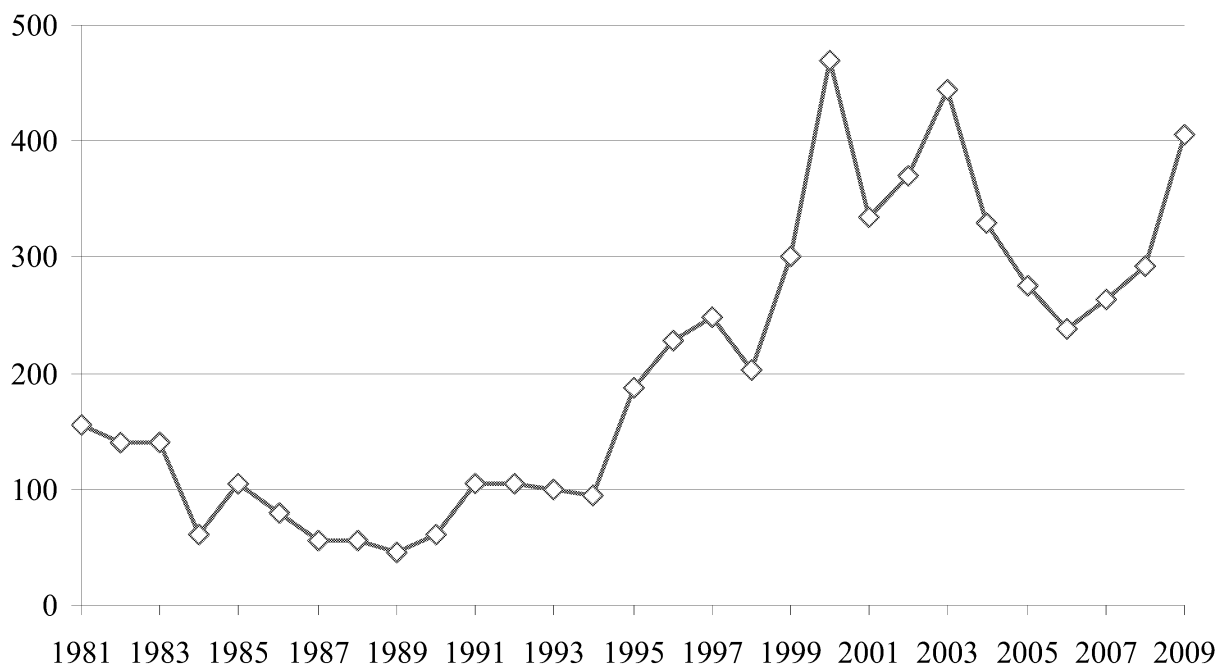
- 6.33 A key part of this could be managing their aggregated exposure to piracy. As discussed above a significant part of this for the London Market is ensuring that piracy is covered under the War rather than the Hull policy. Since the War policy requires the insured to report when it plans to enter a war risk area, the insurer can monitor their piracy exposure in any area at a given point in time. This allows the insurer to define a risk tolerance for piracy exposure and to ensure that they do not exceed it.
- 6.34 Another issue, which is pertinent to all insurance and not just piracy, is that of the cargo aggregation issue – i.e. by chance the entire cargo of a container ship could be covered by one insurer.
- 6.35 Finally shipowners and insurers should continually monitor key piracy developments. As discussed above the piracy landscape is continually evolving with the threat areas and pirate techniques never remaining set. All interested parties therefore need to be aware of the developments and react accordingly.

7 STATISTICS AND COSTS OF PIRACY

FACTS AND FIGURES

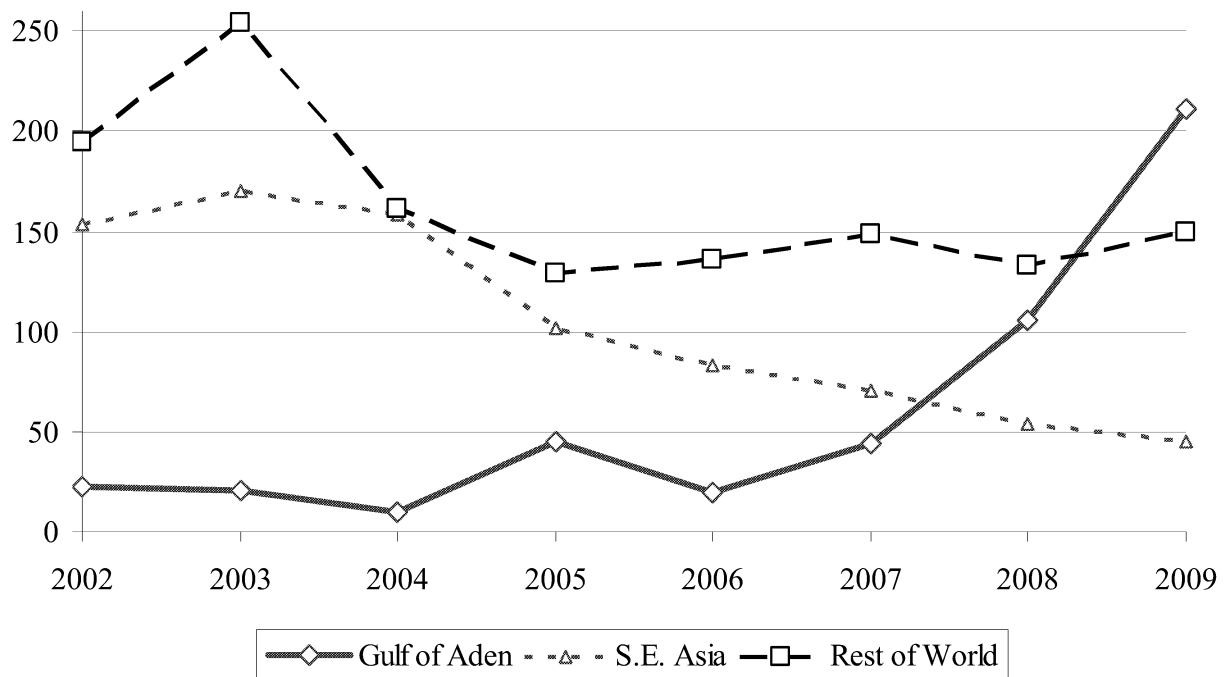
- 7.1 The number of worldwide maritime pirate attacks declared to the International Maritime Bureau since 1981 is shown on the graph below. (NB: figures prior to 1994 are rounded estimates)

Number of attacks per year - Global



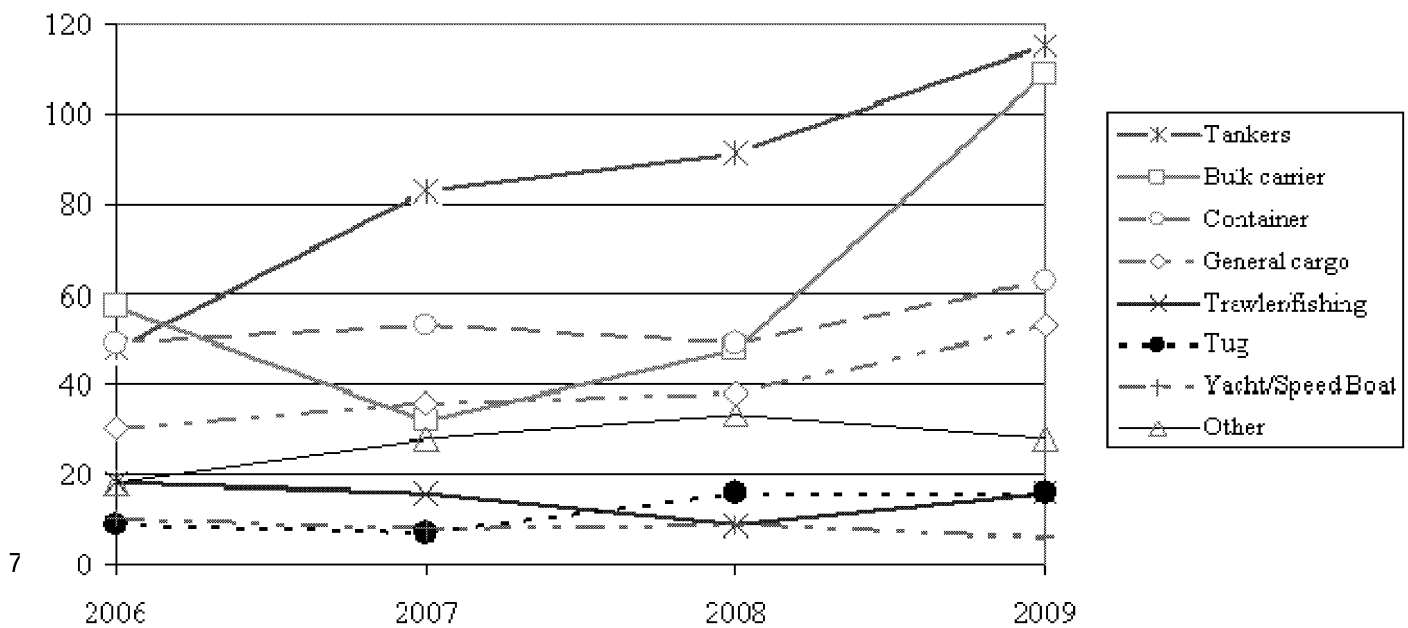
- 7.2 There has been a clear increasing trend over the past 15 years, with the number of reported attacks quadrupling between 1994 and 2009. The number of piracy acts has been rising at a faster pace since 2006: while 239 acts were reported over 2006, by 2009 the number tallied to 406, averaging an annual increase of 20%.
- 7.3 This is due, in particular, to an increased number of attacks in the Gulf of Aden. The next graph shows changes in attack by area which highlights that the recent region of concern is in and around this part of the world. However piracy continues to be an issue in other parts of the world despite the media and inter-governmental focus on Somalian piracy, though has been in decline in South East Asia and the Malacca Straits in particular.

Number of attacks per year - by Area



- 7.4 The graph below shows attacks split by vessel categories since 2006 and suggests that pirates are increasingly capable of targeting larger vessels as their modus operandi become more sophisticated.

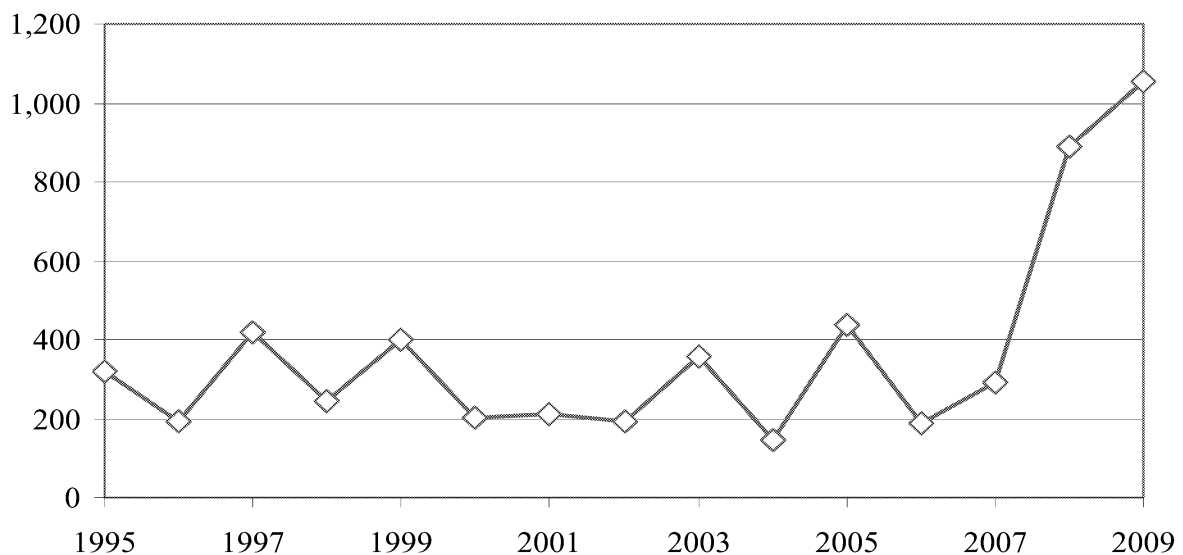
Split of type of attacks by vessel type



the transported goods (if any) captive until a ransom is paid. The number of crew

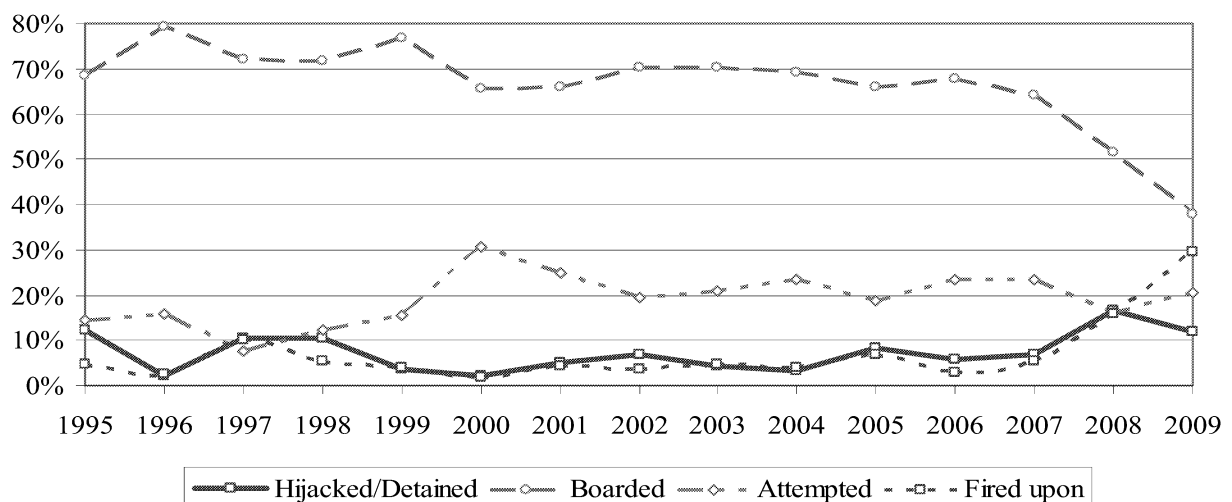
members held hostages by pirates since 1995 is shown in the graph below, based on IMB data. This graph shows that while the number of hostages held globally was relatively steady before 2007, there has been a significant increase in the number of hostages since then. Whilst 292 people were reported as being taken hostage during 2007, in 2009 this figure increased to 1,052 hostages, averaging a 90% per annum increase between those two dates.

Number of crewmembers held hostage by year

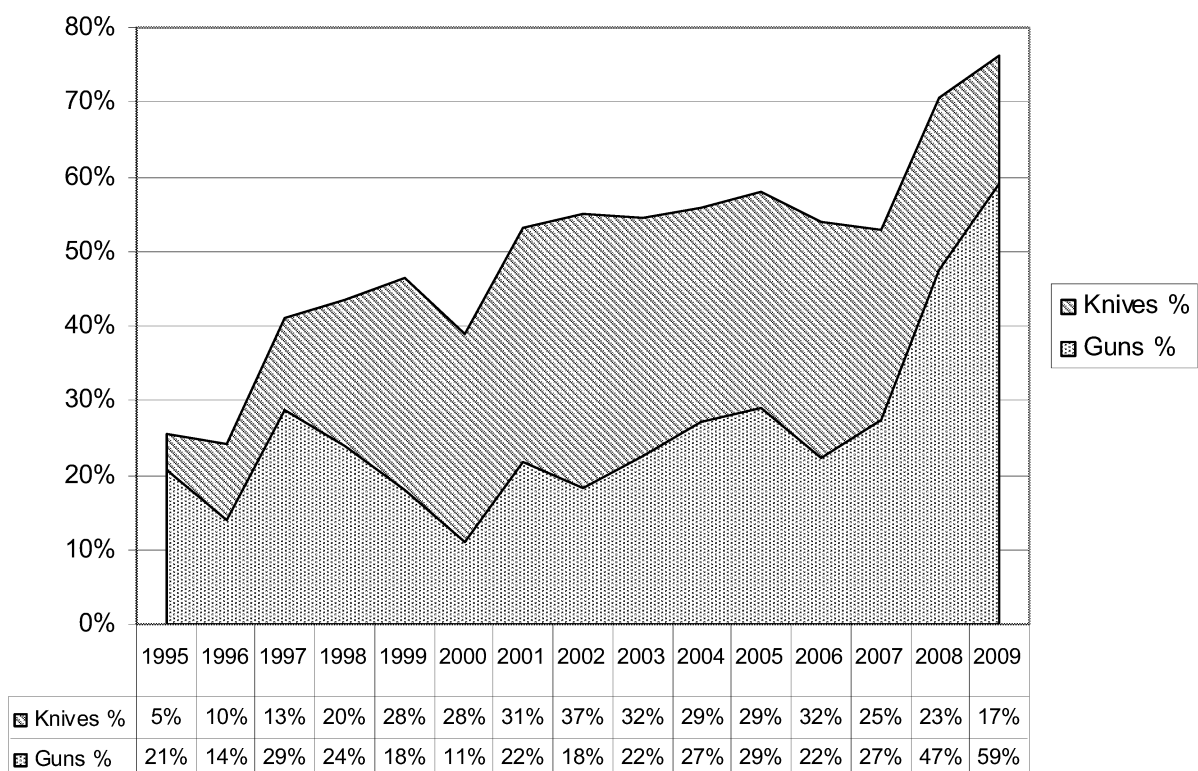


- 7.6 The split of attacks by types is also available in the IMB annual reports and is shown in the next graph. From this data source it is evident that although the overall number of hijacks has increased, they do not represent an increasing share of globally reported attacks. The perception that hijacks are becoming a more prevalent method of piracy is most likely a consequence of the increase in media attention.

Split of type of attacks by year



7.7 A recent trend is an increasing use of weapons by pirates, and in particular arming themselves with guns. The reasons for this are twofold. Firstly, the pirates are able to purchase more weapons using previously received ransom payments. Secondly, as shipowners continue to increasingly employ armed security guards an “arms race” is developing. This situation sees no signs of abating and the trend is expected to continue, with potential consequences to the safety of the ships’ crew. The following graph shows the percentage of all attacks where pirates have been reported as being armed with either knives or guns



ADDITIONAL COSTS

7.8 Increased piracy activity creates a number of additional costs, which arise when stakeholders seek protection against the risk of piracy acts, risk-mitigation, or incur losses caused by piracy events. These costs should be used in any cost-benefit analysis carried out when considering a number alternative measures to mitigate the effects of piracy.

ALTERNATIVE TRANSPORT ROUTES

7.9 Avoiding risky options is the easiest solution to reducing risk exposure. When other transportation means such as planes or roads cannot be used to move the cargo, cargo

owners may want to consider taking alternative sea routes. This can incur a number of additional costs to:-

- Port authorities, terminal operators: operating earning losses due to reduced transit activity.
- Local or regional economies: loss of foreign currency earnings, increased unemployment and reduced GDP.
- Charterers: increased total expenditures, possibly passed on to cargo owners.
- Industries: price increases passed on to them, disruption of supply chain, longer in-transit and delivery time.
- Consumers: price increases depending on cargo value and market conditions.
- Local legalities and 'customs'.
- Other political issues at other locations (e.g. Nigeria, Sierra Leone, Venezuela).

7.10 Some of these costs are net costs, whereas others will result in benefits to other stakeholders, e.g. port and terminal authorities located on the new shipping route.

7.11 A number of shipping routes have very strong geographical positions compared to alternative transport routes (e.g. Suez Canal vs re-route via Cape, Panama Canal, etc.). This increases the likelihood that they remain preferred routes even in the presence of the piracy threat. However the range of pirate activities is increasing – particularly by using captured vessels as “mother ships” from which to launch attacks, such as the capture of Asian Glory on 1 January 2010. So routes currently felt to be safe may not be so in future. V. Ships Ship Management estimate that avoiding Somalian pirates in the Indian Ocean is currently adding on average 3 days to a voyage¹. Paragraphs 7.41-7.44 contain an analysis of the financial consequences of rerouting around the Cape of Good Hope rather than taking the short-cut through the Suez Canal.

SECURITY AND PROTECTION

7.12 In order to secure their ship against piracy acts, shipowners can hire the services of security companies, which usually employ ex-soldiers. Guards were not necessarily armed, though are becomingly increasingly so.

7.13 Hiring a team of guards can be quite costly. For instance, the cost is deemed to vary between \$25,000 and \$100,000 for crossing the Gulf of Aden². The US Congressional Research Service put this figure at \$60,000. Guards usually board ships at port in Djibouti, Oman or Yemen and hire local fishermen to take them out to the vessel which needs protection. Once the Suez Canal has been reached, the men are usually flown back to their base or board a ship heading back to the Gulf of Aden.

7.14 Hiring such protection may also have hidden costs in the event of casualties caused by a fire fight. Due to the implication of multiple jurisdictions, legal issues are an uncertain business in the shipping industry. In the event of litigation in a foreign country, it is possible that shipowners may not have their rights respected or could potentially be barred from doing business in the future.

¹ Letter to Daily Telegraph 19 May 2010

² Wall Street Journal, 6 Jan 2010, “Freighters ready to shoot across pirate bow”

SECURITY AT THE INTERNATIONAL LEVEL

- 7.15 Piracy can disturb sea transit and thus impair regional and global trade. About 90% of goods are transported by sea. In that respect, security on the seas can be a matter of national or international dimension.
- 7.16 In the wake of the global fight against terrorism, a number of measures have been taken in the last decade to fight piracy, mostly of political or military nature. The following are a few examples³
- NATO mission “Active Endeavour” has been protecting the Mediterranean since October 2001. NATO warships additionally escort ships through the Straits of Gibraltar.
 - Project Atlanta (see Appendix) EUNAVFOR Somalia, aka Operation Atalanta⁴ is a EU-led military operation launched in 2008 to deter and prevent acts of piracy off Somalia
 - In July 2003, the UN International Labour Organization (ILO) introduced biometric ID cards for the roughly 1.2 million seamen employed in merchant shipping at the time.
 - On 28 April 2005, Japan, Laos, Singapore, and Cambodia agreed to join forces in the fight against piracy and armed attacks against vessels in Asia.
 - Combined Task Force 151⁵ is an international US-led naval task force formed on January 2009 to combat piracy off Somalia
- 7.17 Political bodies also spend resources such as research services or congressional committees to monitor piracy and consider options to mitigate its effects.
- 7.18 The costs incurred from these measures mostly bear upon governmental or international bodies and armed forces. To some extent, these costs come in substitution to costs incurred by private stakeholders. These costs are also eventually supported by taxpayers.
- 7.19 On April 13 2010, US President Obama signed an Executive Order on Somalia which makes certain ransom payments illegal. Although this only directly impacts on US citizens and organisations, it will clearly have consequences for the global shipping and insurance industries. For the purposes of this section, it is presumed that ransom payments will continue to be made pending clarification of the effect of this Executive Order (please refer to the LMA’s Bulletin “US Executive Order on Somalian Piracy” dated May 7 2010 for more information).(See also para 3.38 above)

INSURANCE

- 7.20 A number of insurance contracts are available to protect stakeholders against the consequences of piracy acts (see section 5 on Insurance and Piracy for more detail). The Congressional Research Service noted that the cost of insuring a container passing through the region rose from \$900 in 2007 to \$9,000 by the end of 2008. Munich Re assessed that Kidnap and Ransom premiums rose tenfold between 2008 and the first quarter of 2009. On exception is insurer Hiscox, which announced it would reduce premiums by 50% for ships having armed protection⁶.

HUMAN COSTS

- 7.21 Facing the risk of piracy can come at a cost for individuals as well, including:

³ Source: Munich Re, “Piracy – Threat at Sea, a risk analysis”

⁴ Source: Wikipedia

⁵ Source: Wikipedia

⁶ Source: Wall Street Journal, 6 Jan 2010, “Freighters ready to shoot across pirate bow”

- fear of blacklisting for crew members refusing to work in dangerous waters, or associated pressure from peers, employers or unions;
- distress and trauma caused by hijacking/kidnapping experience (which may incur subsequent counselling costs);
- wounds and deaths.

DATA

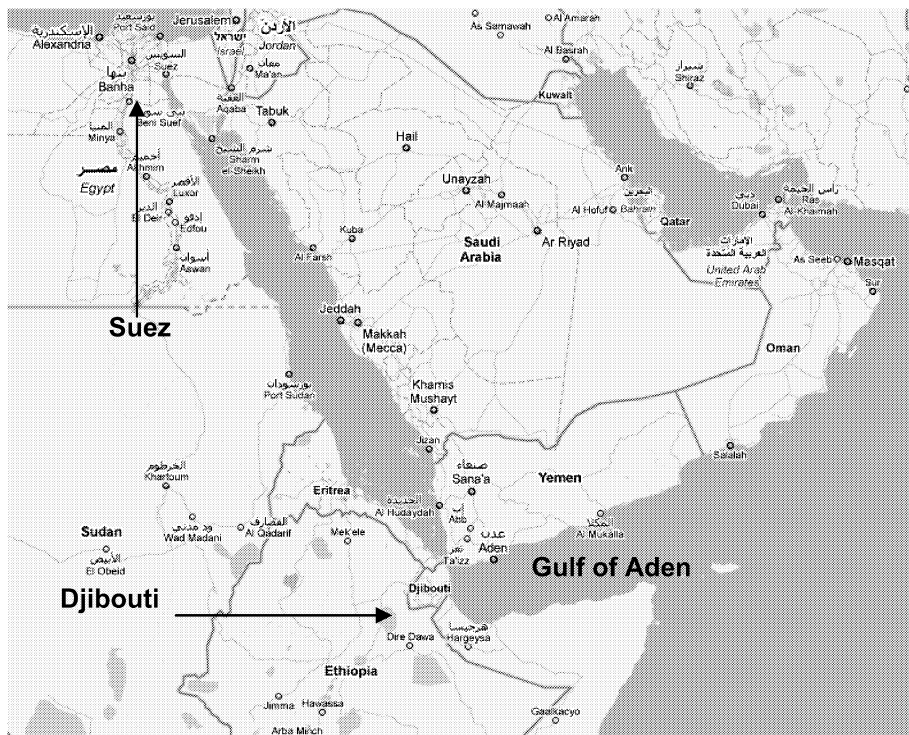
- 7.22 The amount of publicly available information on piracy acts is reduced or subject to a certain degree of uncertainty. A number of reasons are behind this, which we set out below.
- 7.23 A large majority of the material we could gather on piracy acts only seems to use figures published by the International Maritime Bureau. We found no alternative information source to validate IMB data and some sources indicate that the IMB data may also have some political bias.
- 7.24 Victims of attempted or realized acts of piracy do not always report this to their insurer or to non-profit organizations like the International Maritime Bureau. Such reasons as the fear of seeing their premium increase or the presence of deductibles dampens reporting to insurers, in particular for small claims. Reporting to the IMB is not mandatory and is made on a best-effort basis, which limits the incentive for shipowners to report incidents. Consequently, the data available on actual acts of piracy only represents a share of total actual acts.
- 7.25 Whenever a vessel is seized and a ransom payment is demanded, confidentiality becomes a key issue. It is not in the best interests of the shipping and insurance industry to publicly divulge a pirate's demands, whether a ransom has been paid or actual ransom amounts. This is because any revealed information could further encourage potential pirates to either act or for existing pirates to increase their own ransom demands.
- 7.26 Some ransom payments can be found rather easily in the press, like the US\$4 million⁷ paid in December 2009 for the release of the Chinese coal ship De Xin Hai and its 25 crew, and which were rather dramatically delivered by helicopter. This is the exception rather than the rule however. It is difficult to assess the accuracy of press reports, since it is usually unclear whether different sources are used to confirm the figures given. Also, press articles seldom specify whether the amounts are ransoms or total costs incurred, which include delivery costs (e.g. private plane hire, helicopter delivery), negotiation management costs (e.g. satellite calls or trauma consultants), repair costs and any other earning losses. These add-ons costs are thought to double the actual amount paid to the pirates⁸.
- 7.27 When piracy is prevalent in a region, it can become a politically sensitive issue. Gathering information on piracy could potentially be exposed to political bias. In particular, governments may wish to downplay the incidence because of potential economic consequences or to avoid "loss of face". This risk can be reduced when a number of competing sources gather information.
- 7.28 Exposure to piracy risk can also be challenging to assess. Transit volume through piracy-prone areas appears to be a natural exposure measure, but it is relatively hard to define what transit is. Specific geographic situations can sometimes make things easier, for instance when all ships are forced to take the same passage.
- 7.29 Due to the considerations above, we have chosen to focus our attention to the Gulf of Aden / Somalia. Not only is this area a piracy hotbed, but it is relatively easy to assess

⁷ Source: ABC news, 27 December 2009

⁸ Source: Insurance Times 19 March 2010

exposure by using Suez Canal transit⁹ as a proxy. There are three underlying assumptions here:

- All vessels potentially exposed to pirate attacks in the Gulf of Aden or at large of Somali coasts go through the Gulf of Aden. This is not quite true, since a number of ships follow the West African coast without entering the Gulf. This was the case of the De Xin Hai, which was hijacked when travelling from South Africa to the Indian port of Mundra.
- All vessels going through the Gulf of Aden eastward go through the Suez Canal from the Mediterranean beforehand. This is not quite true, since ships could start their journey anywhere between the Suez Canal and the Gulf of Aden, in particular in the sizeable port of Djibouti.
- All vessels going through the Gulf of Aden westward continue their journey through the Suez Canal into the Mediterranean. This is not quite true, since vessels can stop anywhere between the Gulf of Aden and the Suez Canal, in Djibouti in particular.



7.30 Nevertheless, we think it is not unreasonable to assume that the two last points could cancel each other out and we feel that Suez Canal transit is a reasonable risk exposure measure.

COST MODEL

FREQUENCY-SEVERITY APPROACH

7.31 Given the limited data publicly available, we have decided to use a simple frequency-severity approach to model the cost of piracy related kidnap and ransom insurance. The underlying assumption is that the frequency and severity are independent random variables.

7.32 This may not be entirely true. For instance, larger ships as tankers tend to be more prone to pirate attacks because of their lower speed. They also attract higher ransom demands

⁹ Available online at www.suezcanal.gov.eg

because they are expensive vessels, they carry larger cargo volumes, and can have a higher media profile (e.g. oil tankers).

- 7.33 Note that no allowance for potential – and probable – under-reporting has been allowed for in this analysis. Also the impact of pirates confiscating or sinking vessels has not been allowed for.

ASSESSING SEVERITY

- 7.34 Based on a publicly available sample of alleged ransom payments from an array of sources, we have compiled the following average ransom costs as at 30 April 2010:

Year	Observed average ransom (US\$)
2007	1.5
2008	2.1
2009	3.4
2010	5.4

- 7.35 We have then regressed linearly against individual ransom amounts and come up with an average ransom of US\$6.8 million as at 30 June 2010. Note that it is rumoured that the pirates who seized Asian Glory were seeking a ransom of \$15m before releasing it on 14 June 2010¹⁰. While what was actually paid remains unknown, it is thought to have been \$7m plus costs.
- 7.36 We have then assumed additional costs (e.g. negotiation, delivery) to represent 50% of ransom amounts. This results in a total cost of US\$10.2 million as at the middle of 2010.

¹⁰ The Sofia Echo http://www.sofiaecho.com/2010/06/14/916628_asian-glory-arrives-safely-in-oman 14 June 2010

ASSESSING FREQUENCY

7.37 Based on Suez Canal transit data and IMB reports, we have come up with the summary in the table beneath

Year	Exposure (vessels)	Number of pirate attacks	Number of hijacks / boarded vessels	Attack rate	Hijack success rate	Claims frequency
2002	13,447	22	n/a	0.16%	n/a	n/a
2003	15,667	21	n/a	0.13%	n/a	n/a
2004	16,850	10	n/a	0.06%	n/a	n/a
2005	18,224	45	n/a	0.25%	n/a	n/a
2006	18,664	20	6	0.11%	30%	0.03%
2007	20,384	44	12	0.22%	27%	0.06%
2008	21,415	106	44	0.49%	42%	0.21%
2009	17,228	211	47	1.22%	22%	0.27%

7.38 A number of observations can be drawn from this table.

- Transit volumes have significantly reduced in 2009 in the wake of the trade slump caused by the global financial crisis.
- The attack rate has more than doubled every year between 2006 and 2009, averaging an annual increase of 125%.
- The reduction in the hijack success rate in 2009 could be a sign that risk management measures are already working and enabling ships to better defend themselves.

Despite this last point, the net combined effect is a dramatic and continuing increase in claims frequency.

7.39 Based on these observations, we have made a number of assumptions for 2010, which are set out as follows:

- Given the general feeling that economies have now stabilised globally and the uncertainty around when global growth will start again, we have assumed that global trade will be similar in 2010 to the year before.

- Given the success of pirate operations so far, we think that the number of tentative attacks will continue to increase at least at a similar rate. We have thus assumed another 125% increase in the attack rate, up from 1.22% in 2009 to 2.76% in 2010.
- No clear pattern emerge from the hijack success rate series, and it is hard to predict whether the 2010 value will increase or decrease from the 2009 value of 22%. It could increase if pirates adapt to the risk-mitigating techniques adopted by shipowners and develop new ways of improving their success rate, even in Monsoon periods. It could also decrease as a consequence of the continuously strengthening military presence in the area. We have thus resorted to selecting a subjective value. Given the large swings observed in the recent years, we have chosen to calculate the average hijack rate over the last three years (30%) and slightly decrease it to give more weight to the most recent year. Our final selection is 28%, and it is evidently subject to a large degree of subjectivity and uncertainty.

The result is a claim frequency of 0.77% in 2010, up from 0.27% in 2009.

- 7.40 An average cost of \$10.2m and a frequency of 0.77% produces a resultant expected cost for 2010 amounts of around US\$79,000 per vessel, which is equivalent to US\$1.9 per tonne, and totals to around US\$1.4bn dollars (RAND estimated that global piracy would cost the maritime industry between US\$1bn and US\$19bn in 2009).

COST OF REROUTING VESSELS AROUND THE CAPE

- 7.41 By considering the costs of sailing around the Cape of Good Hope and then offsetting the additional insurance and security costs of passing through the Suez Canal – though taking into account the savings in toll fees – it is possible to estimate the increased cost of transit due to selecting the long way around Africa.



- 7.42 The additional costs of sailing through the Suez Canal are estimated to be:

Increased insurance costs

- War / Kidnap and Ransom – using the expected cost of \$79,000 from the analysis above and assuming underwriters write to a 50% loss ratio gross of brokerage, the cost of insurance is \$158,000.
- Cargo – The Journal of Commerce recently announced that CMA GM would be charging an additional US\$41 per TEU (i.e. Twenty-Foot Equivalent Units, the intermodal shipping container unit standard) from 15 December 2009 for transporting containers through the Gulf of Aden. Based on 17,228 vessels carrying nearly 40 million TEUs passing through the Suez Canal in 2009 – i.e. an average of 2,300 TEUs per vessel – the additional cost is US\$94,000.
- Increased security costs – the Congressional Research's estimate of \$60,000 per trip has been selected.

Therefore total additional costs are US\$312,000.

7.43 The impact of sailing around the Cape is assessed as follows:

The DeMoine Policy Research Corporation in 2009 estimated that re-routing 33% of Cargoes around the Cape would have cost an additional US\$7.5bn in 2007 terms. So this evaluates to \$1.3m per vessel currently going through the Suez Canal.

However, vessels would not have to pay the Canal toll fee. In 2009 – and assumed to be the same for 2010 – the total amount of tolls was US\$4.3bn which equals US\$250,000 per transit.

Therefore total costs of going around the Cape are US\$1,050,000.

7.44 From the above analysis, the additional cost of sailing around the Cape rather than via the Canal is in the order of US\$750,000.

8 CONCLUSION

- 8.1 The paper has concentrated on maritime piracy, leaving other forms of such theft to future working parties. While many definitions of maritime piracy exist, the paper concentrated on the actions of small bands, possibly operating from the hub of a mothership, in international waters, without the direct sanction of any national state. Its objectives were monetary rather than political or ideological: the attack and capture of vessels, with a view to seizure (and resale) of vessel and cargo, and possibly kidnap and ransom of crew. Historically piracy has been controllable (with great effort and considerable manpower) but virtually impossible to eradicate
- 8.2 Piracy is nothing new, despite the media and insurance industry's recent interest. However the structure and methodology of the Somali pirates in particular is rapidly evolving
- 8.3 Its protagonists do not play by accepted maritime rules either amongst themselves or when in conflict with authority.
- 8.4 It has forever been driven by the anxiety of the poor to improve their lot – but the pirates themselves have not always retired from the game once their own financial position has been resolved.
- 8.5 The location where piracy will thrive needs a number of features:
- Bases on a mainland where the government is not aggressive in suppressing piracy (for reasons of inability or possible acquiescence)
 - Support services on land (from among the impoverished whom they are trying to help)
 - A ready supply of attackable vessels – they come in all shapes, sizes and purposes of voyage
 - Access to weaponry
 - A market for the onward sale of vessels or cargo
 - A population in poverty with no alternative source of income
- Currently these features are most noteworthy in Somalia, the Persian Gulf and Red Sea states, particularly Aden.
- 8.6 Matters have escalated in the last 20 years. Despite the best efforts of united western powers, pirates thrive. During that time the UN objective to erase poverty in the world has been remarkably successful in many parts of the world (Caribbean and Asia) but unsuccessful in Africa.
- 8.6a The possibility that terrorists may use pirates or techniques learned from pirates to carry out terrorist attacks should not be discounted. Terrorists may also use profits from piracy to finance terrorism.
- 8.7 We have made no secret of the difficulty there was in obtaining base statistics in trying to assess the cost of the piracy coverages within today's maritime insurance policies.. Perhaps more than in any other insurance, underwriters have very good reasons for not releasing frequency and severity statistics for the world's prying eyes. Equally the "near misses" will not be logged. What is available requires judicious extrapolation.
- 8.8 By way of illustration, the paper attempted to estimate the cost of a kidnap and ransom section to shipping insurance, based on the exposure of vessels navigating the Suez Canal. Using judgement rather than strict financial modelling, the paper estimated that in 2010, the team estimated an average claim cost (ransom and ancillary expenses) of over \$10m, with a hit rate of about 2.75% and a "success" rate of some 0.77%. The estimate is thus a K&R cost per vessel of some \$79,000 – this is line with other analyses of the same insurance cost.

- 8.9 We further note that Piracy is an extremely nasty business, especially for the sailors on attacked boats. It has the potential to severely damage world trade and has caused material damage to the economy of some countries.
- 8.10 Co-ordinated action is necessary to suppress or control it (coastal states, other states, shipowners etc). Economic & political measures are needed as well as "policing". Although there are many common features, local conditions give rise to differences in the nature of piracy. (So the response, both in relation to control and risk mitigation, could differ.) However history has taught us that piracy in general can only be solved by a land-based solution, in particular finding work opportunities
- 8.11 Risk mitigation is Important, both to avoid incidents and to minimise their impact when they do occur. There is clear evidence for taking prompt action when an incident occurs. There have been a number of cases where this has frustrated pirates (see para 4.22).
- 8.12 As an emerging issue, we have tried to understand the risk and the factors that drive it, sought risk management solutions and from statistics derived some initial costs. The lack of data and other issues places considerable uncertainty around the cost of mitigation. We are now well placed to comment on this uncertainty.

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Piracy off the coast of Somalia

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APPENDIX A PIRACY – A VERY BRIEF HISTORY

EXTRACT FROM WIKIPEDIA

ANCIENT ORIGINS

- A.1 Pirates have been around as long as people have used the oceans as trade routes. The earliest documented instances of piracy are the exploits of the Sea Peoples who threatened the Aegean and Mediterranean in the 13th century BC. In Classical Antiquity, the Illyrians and Tyrrhenians were known as pirates, as well as Greeks and Romans. The island of Lemnos long resisted Greek influence and remained a haven for Thracian pirates. During their voyages the Phoenicians seem to have sometimes resorted to piracy, and specialized in kidnapping boys and girls to be sold as slaves.
- A.2 In the 3rd century BC, pirate attacks on Olympos (city in Anatolia) brought impoverishment. Among some of the most famous ancient pirateering peoples were the Illyrians, populating the western Balkan peninsula. Constantly raiding the Adriatic Sea, the Illyrians caused many conflicts with the Roman Republic. It was not until 68 BC when the Romans finally conquered Illyria, making it a province that ended their threat.
- A.3 During the 1st century BC, there were pirate states along the Anatolian coast, threaten the commerce of the Roman Empire in the eastern Mediterranean. On one voyage across the Aegean Sea in 75 BC, Julius Caesar was kidnapped by Cilician pirates and held prisoner in the Dodecanese islet of Pharmacusa. He maintained an attitude of superiority and good cheer throughout his captivity. When the pirates decided to demand a ransom of twenty talents of gold, Caesar is said to have insisted that he was worth at least fifty, and the pirates indeed raised the ransom to fifty talents. After the ransom was paid and Caesar was released, he raised a fleet, pursued and captured the pirates, and had them put to death.
- A.4 The Senate finally invested Pompey with powers to deal with piracy in 67 BC (the Lex Gabinia), and Pompey after three months of naval warfare managed to suppress the threat.
- A.5 As early as 258 AD, the Gothic-Herulic fleet ravaged towns on the coasts of the Black Sea and Sea of Marmara. The Aegean coast suffered similar attacks a few years later. In 264, the Goths reached Galatia and Cappadocia, and Gothic pirates landed on Cyprus and Crete. In the process, the Goths seized enormous booty and took thousands into captivity.
- A.6 In 286 AD, Carausius, a Roman military commander of Gaulish origins, was appointed to command the Classis Britannica, and given the responsibility of eliminating Frankish and Saxon pirates who had been raiding the coasts of Armorica and Belgic Gaul.
- A.7 In the Roman province of Britannia, Saint Patrick was captured and enslaved by Irish pirates.
- A.8 Early Polynesian warriors attacked seaside and riverside villages. They used the sea for their hit-and-run tactics - a safe place to retreat to if the battle turned against them.

MIDDLE AGES TO 19TH CENTURY

- A.9 The most widely known and far reaching pirates in medieval Europe were the Vikings, warriors and looters from Scandinavia who raided from about 783 to 1066, during the Viking Age in the Early Middle Ages. They raided the coasts, rivers and inland cities of all Western Europe as far as Seville, attacked by the Norse in 844. Vikings even attacked coasts of North Africa and Italy. They also plundered all the coasts of the Baltic Sea, ascending the rivers of Eastern Europe as far as the Black Sea and Persia. The lack of centralized powers all over Europe during the Middle Ages favoured pirates all over the continent.
- A.10 Meanwhile, Muslim pirates terrorized the Mediterranean Sea. Toward the end of the 9th century, Muslim pirate havens were established along the coast of southern France and northern Italy.[9] In

846 Muslim raiders sacked Rome and damaged the Vatican. In 911, the bishop of Narbonne was unable to return to France from Rome because the Muslims from Fraxinet controlled all the passes in the Alps. Muslim pirates operated out of the Balearic Islands in the 10th century. From 824 to 961 Arab pirates in Crete raided the entire Mediterranean. In the 14th century, raids by Muslim pirates forced the Venetian Duke of Crete to ask Venice to keep its fleet on constant guard

- A.11 After the Slavic invasions of the Balkan peninsula in the 5th and 6th centuries, a Slavic tribe settled the land of Pagania between Dalmatia and Zachlunia in the first half of the 7th century. These Slavs revived the old Illyrian piratical habits and often raided the Adriatic Sea. By 642 they invaded southern Italy and assaulted Siponte in Benevento. Their raids in the Adriatic increased rapidly, until the whole Sea was no longer safe for travel.
- A.12 The "Narentines", as they were called, took more liberties in their raiding quests while the Venetian Navy was abroad, as when it was campaigning in Sicilian waters in 827-82. As soon as the Venetian fleet would return to the Adriatic, the Narentines temporarily abandoned their habits again, even signing a Treaty in Venice and baptising their Slavic pagan leader into Christianity. In 834 or 835 they broke the treaty and again the Neretva pirates raided Venetian traders returning from Benevento, and all of Venice's military attempts to punish the Marians in 839 and 840 utterly failed. Later, they raided the Venetians more often, together with the Arabs. In 846 the Narentines broke through to Venice itself and raided its lagoon city of Kaorle. In the middle of March of 870 they kidnapped the Roman Bishop's emissaries that were returning from the Ecclesiastical Council in Constantinople. This caused a Byzantine military action against them that finally brought Christianity to them.
- A.13 After the Arab raids on the Adriatic coast c. 872 and the retreat of the Imperial Navy, the Narentines restored their raids of Venetian waters, causing new conflicts with the Italians in 887-888. The Narentine piracy traditions were cherished even while they were in Serbia, serving as the finest Serb warriors. The Venetians futilely continued to fight them throughout the 10th-11th centuries.
- A.14 In 937, Irish pirates sided with the Scots, Vikings, Picts, and Welsh in their invasion of England. Athelstan drove them back.
- A.15 The Slavic piracy in the Baltic Sea ended with the Danish conquest of the Rani stronghold of Arkona in 1168. In the 12th century the coasts of western Scandinavia were plundered by Curonians and Oeselians from the eastern coast of the Baltic Sea. In the 13th and 14th century pirates threatened the Hanseatic routes and nearly brought sea trade to the brink of extinction. The Victual Brothers of Gotland were a companionship of privateers who later turned to piracy. Until about 1440, maritime trade in both the North Sea and the Baltic Sea was seriously in danger of attack by the pirates.
- A.16 H. Thomas Milhorn mentions a certain Englishman named William Maurice, convicted of piracy in 1241, as the first person known to have been hanged, drawn and quartered, which would indicate that the then-ruling King Henry III took an especially severe view of this crime. (Nnote, hanged drawn and quartering was considered a punishment for treason. Henry III also legitimised piracy by granting licence " Know that we have granted and given license...to [person's name]...to annoy our enemies at sea or by land...so that they shall share with us half of all their gain")
- A.17 The ushkuiniks were Novgorodian pirates who looted the cities on the Volga and Kama Rivers in the 14th century.
- A.18 As early as Byzantine times, the Maniots - one of Greece's toughest populations - were known as pirates. The Maniots considered piracy as a legitimate response to the fact that their land was poor and it became their main source of income. The main victims of Maniot pirates were the Ottomans but the Maniots also targeted ships of European countries.
- A.19 The Haida and Tlingit tribes, who lived along the coast of southern Alaska and on islands in northwest British Columbia, were traditionally known as fierce warriors, pirates and slave-traders, raiding as far as California.

ON THE INDIAN COAST

- A.20 Since the 14th century the Deccan (Southern Peninsular region of India) was divided into two entities: on the one side stood the Muslim-ruled Bahmani Sultanate, and on the other stood the Hindu kings rallied around the Vijayanagara Empire. Continuous wars demanded frequent resupplies of fresh horses, which were imported through sea routes from Persia and Africa. This trade was subjected to frequent raids by thriving bands of pirates based in the coastal cities of Western India.
- A.21 During the 16th and 17th centuries there was frequent European piracy against Mughal Indian vessels, especially those en route to Mecca for Hajj. The situation came to a head, when Portuguese attacked and captured the vessel Rahimi which belonged to Mariam Zamani the Mughal queen, which led to the Mughal seizure of the Portuguese town Daman. In the 18th century, the famous Maratha privateer Kanhoji Angre ruled the seas between Mumbai and Goa. The Marathas attacked British shipping and insisted that East India Company ships pay taxes if sailing through their waters.
- A.22 The most famous pirate utopia is that of Captain Misson and his pirate crew, who allegedly founded the free colony of Libertatia in northern Madagascar in the late 17th century. In 1694, it was destroyed in a surprise attack by the island natives.
- A.23 The southern coast of the Persian Gulf became known as the Pirate Coast as raiders based there harassed foreign shipping. Early British expeditions to protect the Indian Ocean trade from raiders at Ras al-Khaimah led to campaigns against that headquarters and other harbors along the coast in 1819.

IN EAST ASIA

- A.24 From the 13th century, Wokou based in Japan made their debut in East Asia, initiating invasions that would persist for 300 years.
- A.25 Piracy in South East Asia began with the retreating Mongol Yuan fleet after the betrayal by their Javanese allies (who, incidentally, would found the empire of Majapahit after the Mongols left). They preferred the junk, a ship using a more robust sail layout. Marooned navy officers, consisting mostly of Cantonese and Hokkien tribesmen, set up their small gangs near river estuaries, mainly to protect themselves. They recruited locals as common foot-soldiers known as 'lang' (lanun) to set up their fortresses. They survived by utilizing their well trained pugilists, as well as marine and navigation skills, mostly along Sumatran and Javanese estuaries. Their strength and ferocity coincided with the impending trade growth of the maritime silk and spice routes.
- A.26 However, the most powerful pirate fleets of East Asia were those of Chinese pirates during the mid-Qing dynasty. Pirate fleets grew increasingly powerful throughout the early 19th century. The effects large-scale piracy had on the Chinese economy were immense. They preyed voraciously on China's junk trade, which flourished in Fujian and Guangdong and was a vital artery of Chinese commerce. Pirate fleets exercised hegemony over villages on the coast, collecting revenue by exacting tribute and running extortion rackets. In 1802, the menacing Zheng Yi inherited the fleet of his cousin, captain Zheng Qi, whose death provided Zheng Yi with considerably more influence in the world of piracy. Zheng Yi and his wife, Zheng Yi Sao (who would eventually inherit the leadership of his pirate confederacy) then formed a pirate coalition that, by 1804, consisted of over ten thousand men. Their military might alone was sufficient to combat the Qing navy. However, a combination of famine, Qing naval opposition, and internal rifts crippled piracy in China around the 1820s, and it has never again reached the same status.
- A.28 The Buginese sailors of South Sulawesi were infamous as pirates who used to range as far west as Singapore and as far north as the Philippines in search of targets for piracy. The Orang laut pirates controlled shipping in the Straits of Malacca and the waters around Singapore,[19] and the

Malay and Sea Dayak pirates preyed on maritime shipping in the waters between Singapore and Hong Kong from their haven in Borneo.

IN EASTERN EUROPE

- A.29 One example of a pirate republic in Europe from the 16th through the 18th century was Zaporizhian Sich. Situated in the remote Steppe, it was populated with Ukrainian peasants that had run away from their feudal masters, outlaws of every sort, destitute gentry, run-away slaves from Turkish galleys, etc. The remoteness of the place and the rapids at the Dnepr river effectively guarded the place from invasions of vengeful powers. The main target of the inhabitants of Zaporizhian Sich who called themselves "Cossacks" were rich settlements at the Black Sea shores of Ottoman Empire and Crimean Khanate. By 1615 and 1625, Zaporozhian Cossacks had even managed to raze townships on the outskirts of Istanbul, forcing the Ottoman Sultan to flee his palace. Don Cossacks under Stenka Razin even ravaged the Persian coasts

IN NORTH AFRICA

- A.30 The Barbary pirates were pirates and privateers that operated from North African (the "Barbary coast") ports of Tunis, Tripoli, Algiers, Salé and ports in Morocco, preying on shipping in the western Mediterranean Sea from the time of the Crusades as well as on ships on their way to Asia around Africa until the early 19th century. The coastal villages and towns of Italy, Spain and Mediterranean islands were frequently attacked by them and long stretches of the Italian and Spanish coasts were almost completely abandoned by their inhabitants; after 1600 Barbary pirates occasionally entered the Atlantic and struck as far north as Iceland. According to Robert Davis^{[24][25]} between 1 million and 1.25 million Europeans were captured by Barbary pirates and sold as slaves in North Africa and Ottoman Empire between the 16th and 19th centuries. The most famous corsairs were the Ottoman Hayreddin and his older brother Barbarossa (Redbeard), Turgut Reis (known as Dragut in the West), Kurtoğlu (known as Curtogoli in the West), Kemal Reis, Salih Reis and Koca Murat Reis. A few Barbary pirates, such as Jan Janszoon and John Ward, were renegade Christians who had converted to Islam.
- A.32 According to recent legal analysis^[citation needed] by the U.S. Supreme Court, the United States treated captured Barbary corsairs as prisoners of war, indicating that they were considered as legitimate privateers by at least some of their opponents, as well as by their home countries.

IN THE CARIBBEAN

- A.33 In 1523, Jean Fleury seized two Spanish treasure ships carrying Aztec treasures from Mexico to Spain. The great or classic era of piracy in the Caribbean extends from around 1560 up until the mid 1720s. The period during which pirates were most successful was from 1700 until the 1730s. Many pirates came to the Caribbean after the end of the War of the Spanish Succession. Many people stayed in the Caribbean and became pirates shortly after that. Others, the buccaneers, arrived in the mid-to-late 17th century and made attempts at earning a living by farming and hunting on Hispaniola and nearby islands; pressed by Spanish raids and possibly failure of their means of making a living, they turned to a more lucrative occupation (not to mention more active and conducive to revenge). Caribbean piracy arose out of, and mirrored on a smaller scale, the conflicts over trade and colonization among the rival European powers of the time, including the empires of Britain, Spain, the Netherlands, Portugal and France. Most of these pirates were of English, Dutch and French origin. Because Spain controlled most of the Caribbean, many of the attacked cities and ships belonged to the Spanish Empire and along the East coast of America and the West coast of Africa. Dutch ships captured about 500 Spanish and Portuguese ships between 1623 and 1638. Some of the best-known pirate bases were New Providence, in the Bahamas from 1715 to 1725, Tortuga established in the 1640s and Port Royal after 1655. Among the most famous Caribbean pirates are Edward Teach or "Blackbeard" and Henry Morgan.

PIRATE DEMOCRACY

- A.34 Unlike traditional Western societies of the time, many pirate crews operated as limited democracies. Pirate communities were some of the first to institute a system of checks and balances similar to the one used by the present-day United States and many other countries. The first record of such a government aboard a pirate sloop dates to the 1600s, a full century before the United States' and France's adoption of democracy in 1789, or Spain's move to democracy in 1812.
- A.35 Both the captain and the quartermaster were elected by the crew; they, in turn, appointed the other ship's officers. The captain of a pirate ship was often a fierce fighter in whom the men could place their trust, rather than a more traditional authority figure sanctioned by an elite. However, when not in battle, the quartermaster usually had the real authority. Many groups of pirates shared in whatever they seized; pirates injured in battle might be afforded special compensation similar to medical or disability insurance.
- A.36 There are contemporary records that many pirates placed a portion of any captured money into a central fund that was used to compensate the injuries sustained by the crew. Lists show standardised payments of 600 pieces of eight (\$156,000 in modern currency) for the loss of a leg down to 100 pieces (\$26,800) for loss of an eye. Often all of these terms were agreed upon and written down by the pirates, but these articles could also be used as incriminating proof that they were outlaws.
- A.37 Pirates readily accepted outcasts from traditional societies, perhaps easily recognizing kindred spirits, and they were known to welcome them into the pirate fold. For example as many as 40% of the pirate vessels' crews were slaves liberated from captured slavers. Such practices within a pirate crew were tenuous, however, and did little to mitigate the brutality of the pirate's way of life.

TREASURE

- A.38 Even though pirates raided many ships, few, if any, buried their treasure. Often, the "treasure" that was stolen was food, water, alcohol, weapons, or clothing. Other things they stole were household items like bits of soap and gear like rope and anchors, or sometimes they would keep the ship they captured (either to sell off or because it was better than their ship). Such items were likely to be needed immediately, rather than saved for future trade. For this reason, there was no reason for the pirates to bury these goods. Pirates tended to kill few people aboard the ships they captured; oftentimes they would kill no one if the ship surrendered, because if it became known that pirates took no prisoners, their victims would fight to the last and make victory very difficult. Contrariwise, ships would quickly surrender if they knew they would be spared. In one well-documented case 300 heavily armed soldiers on a ship attacked by Thomas Tew surrendered after a brief battle with none of Tew's 40-man crew being injured.

REWARDS OF PIRACY

- A.39 Pirates had a system of hierarchy on board their ships determining how captured money was distributed. However, pirates were more "egalitarian" than any other area of employment at the time. In fact pirate quartermasters were a counterbalance to the captain and had the power to veto his orders. The majority of plunder was in the form of cargo and ship's equipment with medicines the most highly prized. A vessel's doctor's chest would be worth anywhere from £300 to £400, or around \$470,000 in today's values. Jewels were common plunder but not popular as they were hard to sell, and pirates, unlike the public of today, had little concept of their value. There is one case recorded where a pirate was given a large diamond worth a great deal more than the value of the handful of small diamonds given his crewmates as a share. He felt cheated and had it broken up to match what they received
- A.40 Spanish pieces of eight minted in Mexico or Seville were the standard trade currency in the American colonies. However, every colony still used the monetary units of pounds, shillings and pence for bookkeeping while Spanish, German, French and Portuguese money were all standard

mediums of exchange as British law prohibited the export of British silver coinage. Until the exchange rates were standardised in the late 1700s each colony legislated its own different exchange rates. In England, 1 piece of eight was worth 4s 3d while it was worth 8s in New York, 7s 6d in Pennsylvania and 6s 8d in Virginia. One 18th century English shilling was worth around \$58 in modern currency so a piece of eight could be worth anywhere from \$246 to \$465. As such, the value of pirate plunder could vary considerably depending on who recorded it and where

- A.41 Ordinary seamen received a part of the plunder at the captain's discretion but usually a single share. On average, a pirate could expect the equivalent of a year's wages as his share from each ship captured while the crew of the most successful pirates would often each receive a share valued at around £1,000 (\$1.17 million) at least once in their career.[30] One of the larger amounts taken from a single ship was that by captain Thomas Tew from an Indian merchantman in 1692. Each ordinary seaman on his ship received a share worth £3,000 (\$3.5 million) with officers receiving proportionally larger amounts as per the agreed shares with Tew himself receiving 2½ shares. It is known there were actions with multiple ships captured where a single share was worth almost double this.
- A.42 By contrast, an ordinary seamen in the Royal Navy received 19s per month to be paid in a lump sum at the end of a tour of duty which was around half the rate paid in the Merchant Navy. However, corrupt officers would often "tax" their crews' wage to supplement their own and the Royal Navy of the day was infamous for its reluctance to pay. From this wage, 6d per month was deducted for the maintenance of Greenwich Hospital with similar amounts deducted for the Chatham Chest, the chaplain and surgeon. Six months' pay was withheld to discourage desertion. That this was insufficient incentive is revealed in a report on proposed changes to the RN Admiral Nelson wrote in 1803; he noted that since 1793 more than 42,000 sailors had deserted. Roughly half of all RN crews were pressganged and these not only received lower wages than volunteers but were shackled while the vessel was docked and were never permitted to go ashore until released from service
- A.43 Although the Royal Navy suffered from many morale issues, it answered the question of prize money via the 'Cruizers and Convoys' Act of 1708 which handed over the share previously gained by the Crown to the captors of the ship. Technically it was still possible for the Crown to get the money or a portion of it but this rarely happened. The process of condemnation of a captured vessel and its cargo and men was given to the High Court of the Admiralty and this was the process which remained in force with minor changes throughout the Revolutionary and Napoleonic Wars.
- A.44 There was a great deal of money to be made in this way. The record breaker, admittedly before our wars, was the capture of the Spanish frigate the HERMIONE, which was carrying treasure in 1762. The value of this was so great that each individual seaman netted £485! The two captains responsible, Evans and Pownall, got just on £65,000 each. In January 1807 the frigate CAROLINE took the Spanish SAN RAFAEL which brought in £52,000 for her captain, Peter Rainier (who had been only a Midshipman some thirteen months before). All through the wars there are examples of this kind of luck falling on captains. Another famous 'capture' was that of the Spanish frigates THETIS and SANTA BRIGADA which were loaded with specie. They were taken by four British frigates who shared the money, each captain receiving £40,730. Each lieutenant got £5,091, the Warrant Officer group, £2,468, the midshipmen £791 and the individual seamen £182.
- A.45 It should also be noted that it was usually only the frigates which took prizes; the ships of the line were far too ponderous to be able to chase and capture the smaller ships which generally carried treasure. Nelson always bemoaned that he had done badly out of prize money and even as a flag officer received little. This was not that he had a bad command of captains but rather that British mastery of the seas was so complete that few enemy ships dared to sail.

PUNISHMENT

- A.46 During the seventeenth and eighteenth centuries, once pirates were caught, justice was meted out in a summary fashion, and many ended their lives by "dancing the hempen jig", or hanging at the end of a rope. Public execution was a form of entertainment at the time, and people came out to watch them as they would to a sporting event today. Newspapers were glad to report every detail,

such as recording the condemned men's last words, the prayers said by the priests for their immortal souls, and their final agonising moments on the gallows. In England most of these executions took place at Execution Dock on the River Thames in London.

- A.47 In the cases of more famous prisoners, usually captains, their punishments extended beyond death. Their bodies were enclosed in iron cages (for which they were measured before their execution) and left to swing in the air until the flesh rotted off them- a process that could take as long as two years. The bodies of captains such as William Kidd, Charles Vane, William Fly, and Jack Rackham were all treated this way.

APPENDIX B PIRACY – EXTRACT FROM ROYAL NAVAL MUSEUM

- B.1 Pirates are sea robbers who prey on other ships and rob them of their goods and sometimes capture the ship itself for their own purposes. Piracy began over 2000 years ago in Ancient Greece, when sea robbers threatened the trading routes of Ancient Greece. Since then, this threat has continued amongst seafaring nations ever since, until the birth of regular navies. Roman ships were attacked by pirates who seized their cargoes of grain, and olive oil. The Vikings (which means sea-raider) were renowned for attacking shipping and coastal settlements. However, piracy really flourished between 1620 and 1720, and this period is known as the golden age of piracy. Between the sixteenth and nineteenth centuries, there have been different types of pirates, these being, privateers, buccaneers, and corsairs.
- B.2 Privateers were lawful pirates who were authorised by their government to attack and pillage ships of enemy nations. They shared their profits with the government. Between the sixteenth and eighteenth centuries governments issued 'letters of marque' which were licenced these sailors to plunder alien ships. This was to prevent privateers from being charged with piracy, which was an offence punishable by death. Francis Drake was England's most famous privateer. In the sixteenth century he attacked Spanish treasure ships returning from the new world, sharing his profits with Elizabeth I, who knighted him for his services. Buccaneers were pirates and privateers who operated from bases in the West Indies, and attacked Spanish shipping in the Caribbean. Corsairs were Muslim or Christian pirates who were active in the Mediterranean from the sixteenth to the nineteenth centuries. The Barbary Corsairs were Muslim, and operated solely from the North African states of Algiers, Tunis, Tripoli and Morocco, and were authorised by their government to attack the ships of Christian countries. In contrast the Maltese Corsairs were Christian and were granted a licence by the Christian Knights of St John to attack the 'barbarian' Turks.
- B.3 Many pirates had served in merchant or naval ships prior to turning to piracy. Life on a pirate ship appeared more attractive as they were independent of national laws, the crew were treated much better than normal sailors and prize money was shared out equally. Most seamen became pirates as they hoped to become rich on plunders of treasure and cargo ships. When pirate ships captured merchant ships, the pirate captain would ask for volunteers to serve under him. Many of the crew would volunteer as life on a merchant ship was harsh and conditions awful.
- B.4 There were not many women pirates, as seamen believed that it was unlucky to have women onboard ships. Women therefore had to disguise themselves as men. However there were some extremely powerful women pirates, such as Ching Shih who commanded a pirate community of 80,000. The two most famous women pirates were Anne Bonney and Mary Reed, who were captured in 1720 and put on trial in Jamaica. They were both sentenced to death, but escaped execution as they were both pregnant. Mary Reed died of fever a few months after the trial, but Anne Bonney was released.
- B.5 Becoming a pirate was called 'going on the account' and they had to agree to live by the rules of the ship. These rules were often strict and breaking them could mean flogging or even death. If a pirate was found stealing from their comrades or deserting during battle, they were marooned on a desert island with meagre supplies. Most would die a slow death from starvation if they could not hunt or fish.
- B.6 Pirates used flags to frighten passing ships into surrendering without a fight. The original pirate flags were blood red, and this signalled that no mercy would be shown once the pirates boarded and battle ensued. As piracy developed, more flags were used, and pirates often had their own flags. The Jolly Roger, (a skull and crossbone) is the most famous pirate flag. The symbol had been appropriated from the symbol used in ships' logs, where it represented death on board. It

was first used as pirate flag around 1700 and quickly became popular with pirates, who designed their own version of the flag, e.g. a skull and crossed swords.

- B.7 Pirates required ships that were fast, powerful, and had as shallow a depth below the water as possible. This was because surprise was vital to a pirate attack, and they needed to be able to navigate in shallow coastal waters and hide in secluded coves and inlets. Schooners were used by pirates in North American waters. They were fast, easily manoeuvred, with a shallow draught but were large enough to carry many guns and a large crew. In the seventeenth and eighteenth centuries, the Barbary Corsairs used galleys, which were long and narrow with a sail. During action, these vessels were rowed to allow travel at speed. Each oar was manned by up to six slaves who were chained to benches. The aim of the corsairs was to ram the enemy ship, board and defeat the crew in hand-to-hand battle. The galleys were only suited to the Mediterranean where conditions were calm. Junks which were flat bottomed boats, with three masts and sails held together with bamboo rods, were used in Chinese waters. The largest junks held twelve guns and carried rowing boats to raid coastal villages or board enemy ships. Pirates often took over captured merchant ships and altered them to suit their purpose, such as to increase speed, cut more gunports, and also to hide the true identity of the ship. They also utilised weapons, clothes, medicines, and food found on board.
- B.8 Pirates boarded ships by jamming the rudder with wooden wedges so that the ship could not be steered. They would then use grappling hooks to board the ship, heavily armed with pistols, daggers and cutlasses, which were suited to hand-to-hand fighting. Pirates also used homemade weapons, such as hand grenades made by filling wine bottles with gunpowder and created smoke screens by setting fire to yellow sulphur. Merchant seamen under attack tried to prevent pirates boarding by greasing decks or scattering dried peas or broken glass on the decks. However, they knew if they put up a strong resistance and lost, the pirates would show no mercy and they would be seriously maimed or murdered. The pirates would take all the treasure or cargo that the ship carried. These might include silks, jewels, spices, wine, brandy, linen, money or slaves. Sometimes the pirates added the captured ship to their fleet or sank it to get rid of any evidence that would convict them. The seamen would be killed, ransomed, taken as slaves or joined the pirate crew.
- B.9 Pirates also became involved in the lucrative slave trade. The Barbary Corsairs found that by selling ships' crews slaves or demanding a ransom for them was more profitable than the ship's cargo. During the seventeenth and eighteenth centuries, when the slave trade was a lucrative business, the profits from slavery attracted many pirates. Some became slavers, whilst others sold cargoes of slaves captured from the merchant ships bound for the American colonies, or from raids on the West African slave ports. Thus many pirates became a combination of slaver, privateer and pirate, and by the 1830's the term picaroon had come to mean both pirate and slaver. John Hawkins (1532-95) was the first English privateer to realise that the slave trade was a profitable trade. In 1562 he made the first of three voyages as a slaver, sailing from England to West Africa to load up 3000 slaves and took them to the Caribbean to be sold on the island of Hispaniola. Pirate captains in the Caribbean welcomed runaway slaves, who made up as much as one-third of some pirate crews. For slaves joining a pirate ship was more appealing than living the harsh life on the plantations as a slave.
- B.10 The punishment for piracy was death by public hanging. The bodies of executed pirates were often tarred to preserve them to be hung from a gibbet. The corpse would be chained into an iron cage to prevent relatives from burying the body. The notable pirate, William Kidd, received this fate and his body hung for three years at Tilbury Point in the Thames estuary as a warning to seamen and pirates. A condemned man was measured for his iron cage before his execution, and many pirates feared this more than the hanging. After Blackbeard was killed in battle, his head was cut off and tied as a trophy to the yardarm of *HMS Pearl*.
- B.11 Organised piracy and privateering was finally ended in the nineteenth century. In 1816, the bombardment of Algiers marked the end of the Barbary pirates power in the Mediterranean. Dutch warships patrolled Southeast Asia, and the British navy attacked pirates in the South China seas. However, at the beginning of the nineteenth century, lawful privateers were still flourishing until 1856 when the majority of maritime nations signed the Declaration of Paris. This banned letters of marque, and therefore outlawed privateering. Navies of each country were used to enforce this law. The age of steam also helped to end piracy as anti-slavery operations were now undertaken

by steam ships. These could sail without wind and at great speed, while pirates still relied upon more cumbersome sailing ships. By 1850 there were only a small number of pirates remaining.

- B.12 Although piracy has never returned to the level it was in previous centuries, it has not completely disappeared and the world's navies continue to try to prevent piracy. Attacks occur worldwide, mainly in developing countries. In the 1990s, political groups hijacked ships, threatening crews and passengers with death if their demands were not met. Pirates in South East Asia have attacked merchant shipping and in the Caribbean, ships have been attacked and robbed. Modern day pirates still rely on speed and surprise in their attacks. They use fast dinghies and arm themselves with assault rifles to overpower ships. Many ships today have smaller crews, relying on technology and so can be easily overpowered.

APPENDIX C NEWPORT AND PIRACY

- C.1 Welsh Pirates were amongst the most notorious in the world - Henry Morgan who made his fortune in Jamaica, Black Bart from Newport who devised the skull and crossbones flag and Hywel Davis, the 'Cavalier Prince of the Pyrates'.
- C.2 Henry Morgan was thought to have been born in Llanrumney, then a village between Cardiff and Newport. Tredegar House in Newport was the ancestral home of the Morgan Family, later lords Tredegar, for over 500 years. To give you an idea of their importance, at the end of the 18th century the Morgans owned over 40,000 acres in Monmouthshire, Breconshire and Glamorgan.
- C.3 The connection between Henry Morgan and Tredegar House is tenuous, but other members of the family were also pirates

MYSTERY OF NEWPORT'S MEDIAEVAL SHIP

Aug 5 2003 By Gemma Collins, PA News

A medieval ship older than the Mary Rose may have been a Portuguese vessel captured by pirates, an expert said today. The 15th century ship was discovered in June last year during the construction of a theatre and arts centre on the banks of the River Usk in Newport, South Wales.

Now the mystery of who the ship belonged to and why it was in Newport may be close to being solved. Bob Trett, chairman of the trustees of Glamorgan Gwent Archaeological Trust, believes it may have been part of a fleet belonging to the Earl of Warwick.

"The ship has been enigmatic from the very beginning," he said.

Tree ring dating identified some timbers of the ship as having been cut down in about 1465 or 1466.

But later excavation led experts to think that that timber had been used in repairs and that the ship itself actually dated from much earlier.

"There were all sorts of questions we really didn't have the answers to," said Mr Trett.

"What was the ship doing in Newport, who owned it, why were the repairs started and not completed, who paid for them, what was it called?"

Mr Trett then set about researching whether the ship could have belonged to the Earl of Warwick, who, he said, was notorious for being involved in piracy.

He had gained custody of Newport from the Earl of Pembroke, who was killed in battle.

"It is unlikely many people could afford to build, repair or run a ship of this size," said Mr Trett.

"But the Earl of Warwick had his own fleet of ships." Mr Trett then discovered a document which showed that the Earl had authorised payment for "making a ship at Newport", dated a few months after he had taken control of the town. Mr Trett believes it could refer to the repairing of a vessel.

"It fits very nicely," he said. "We cannot prove it at the moment but the facts are so close it really could fit."

Among artefacts found on the 65ft vessel were shoes, woollen cloth and Portuguese pottery.

"We thought, 'Why has it been abandoned?'" said Mr Trett.

"One must assume they found it was much too big a job. There was a lot of damage it had been in a fight. It may well have been brought in after being captured by the Earl of Warwick, who was fairly notorious for piracy.

"He captured ships, and there were lots of fights going on at sea."

The ship is due to be housed beneath a glass floor in the new arts centre for visitors to see.

Mr Trett said: "This ship is the most complete 15th century ship to survive in Europe. From a ship archaeologist's point of view it is a tremendous find, but also now we are putting it centre-stage into the European politics of the time."

(see also BBC Timewatch programme)

APPENDIX D LLOYDS MARINE INSURANCE CONTRACT (1779)

Lloyd's ship and goods policy: Settled in the form below in 1779, but most of its provisions are of much older date.

Be it known that ["John Brown"] as well in his own name and names of all and every other person or persons to whom the same doth, may, or shall appertain, in part or in all doth make assurance and cause himself and them, and every of them, to be insured lost or not lost, at and from ["Madras to London"]. Upon any kind of goods and merchandises, and also upon the body, tackle, apparel, ordnance, munition, artillery, boat, and other furniture, of and in the good ship or vessel called the ["Calliope"] whereof is master under God, for this present voyage, ["William Smith" but usually left blank] or whosoever else shall go for master in the said ship, or by whatsoever other name or names the said ship, or the master thereof, is or shall be named or called; beginning the adventure upon the said goods and merchandises from the loading thereof aboard the said ship, [as above] upon the said ship, etc. [as above] and so shall continue and endure, during her abode there, upon the said ship, etc. And further, until the said ship, with all her ordnance, tackle, apparel, etc., and goods and merchandises whatsoever shall be arrived at [as above] upon the said ship, etc., until she hath moored at anchor twenty – four hours in good safety; and upon the goods and merchandises, until the same be there discharged and safely landed. And it shall be lawful for the said ship, etc.. in this voyage, to proceed and sail to and touch and stay at any ports or places whatsoever [usually left blank] without prejudice to this insurance. The said ship, etc., goods and merchandises, etc., for so much as concerns the assured by agreement between the assured and assurers in this policy, are and shall be valued at ["A.B. 100 bales of cotton valued at £1,000."] Touching the adventures and perils which we, the assurers, are contented to bear and do take upon us in this voyage: they are of the seas, men of war, fire, enemies, **PIRATES**, rovers, thieves, jettisons, letters of mart and countermart, surprisals, takings at sea, arrests, restraints, and detainments of all kings, princes, and people, of what nation, condition, or quality soever, barratry of the master and mariners, and of all other perils, losses, and misfortunes, that have or shall come to the hurt, detriment, or damage of the said goods, and merchandises, and ship etc., or any part thereof. And in case of any loss or misfortune it shall be lawful to the assured, their factors, servants and assigns, to sue, labour, and travel for, in and about the defence, safeguards, and recovery of the said goods and merchandises, and shop, etc., or any part thereof, without prejudice to this insurance; to the charges whereof we, the assurers, will contribute each one according to the rate and quantity of his sum herein assured. And it is especially declared and agreed that no acts of the insurer or insured in recovering, saving, or preserving the property insured shall be considered as a waiver, or acceptance of abandonment. And it is agreed by us, the insurers, that this writing or policy of assurance shall be of as much force and effect as the surest writing or policy of assurance heretofore made in Lombard Street, or in the Royal Exchange, or elsewhere in London. And so we, the assurers, are contented, and do hereby promise and bind ourselves, each one for his own part, our heirs, executors, and goods to the assured, their executors, administrators, and assigns, for the true performance of the premises, confessing ourselves paid the consideration due unto us for this assurance by the assured, at and after the rate of In Witness whereof we, the assurers, have subscribed our names and sums assured in London.

APPENDIX E PIRACY BUSINESS MODELS

Found on page 100 of a UN Security Council Report by a group of investigators sent to Somalia to monitor conditions there:- Compare with paragraphs A.34 to A.41 in Appendix A above

Piracy business model

The typical piracy 'business model' has evolved since the Monitoring Group's Piracy business model. The typical piracy 'business model' has evolved since the Monitoring Group's December 2008 report (S/2008/769). The success and expansion of pirate militias has necessitated new organizational arrangements and practices.

Although leadership of pirate networks remains anchored in Puntland and central Somalia, participation in maritime militias and investment in pirate operations is open to a broad cross-section of Somali society. The refined business model guarantees every participant in the operation, if successful, a well-defined percentage or share of the ransom money. A basic piracy operation requires a minimum eight to twelve militia prepared to stay at sea for extended periods of time,

in the hopes of hijacking a passing vessel. Each team requires a minimum of two attack skiffs, weapons, equipment, provisions, fuel and preferably a supply boat. The costs of the operation are usually borne by investors, some of whom may also be pirates. To be eligible for employment as a pirate, a volunteer should already possess a firearm for use in the operation. For this 'contribution', he receives a 'class A' share of any profit. Pirates who provide a skiff or a heavier firearm, like an RPG or a general purpose machine gun, may be entitled to an additional A-share. The first pirate to board a vessel may also be entitled to an extra A-share.

At least 12 other volunteers are recruited as militiamen to provide protection on land if a ship is hijacked. In addition, each member of the pirate team may bring a partner or relative to be part of this land-based force. Militiamen must possess their own weapon, and receive a 'class B' share--usually a fixed amount equivalent to approximately US\$15,000.

If a ship is successfully hijacked and brought to anchor, the pirates and the militiamen require food, drink, qaad, fresh clothes, cell phones, air time, etc. The captured crew must also be cared for. In most cases, these services are provided by one or more suppliers, who advance the costs in anticipation of reimbursement, with a significant margin of profit, when ransom is eventually paid.

When ransom is received, fixed costs are the first to be paid out. These are typically:- Reimbursement of supplier(s)

- Financier(s) and/or investor(s): 30% of the ransom
- Local elders: 5 to 10 % of the ransom (anchoring rights)-
- Class B shares (approx. \$15,000 each): militiamen, interpreters etc.

The remaining sum -- the profit -- is divided between class-A shareholders.

The success and expansion of pirate militias has necessitated new organizational arrangements and practices. Although leadership of pirate networks remains anchored in Puntland and central Somalia, participation in maritime militias and investment in pirate operations is open to a broad cross-section of Somali society. The refined business model guarantees every participant in the operation, if successful, a well-defined percentage or share of the ransom money.

SOMALI PIRACY BUSINESS MODEL

There are four major pirate clans operating in Somalia, with distinct skill sets separating the northern groups from those in the south. Somali pirate operations use an organized business model consisting of specific roles and responsibilities. The roles include the Attack Team, Committee, Community, Guard Force, Negotiator, and Investors.

PIRATE CLANS. There are four discrete pirate groups operating in Somalia; the Darots, Black Tigers, White Boys, and Thunders. The Darots are the largest and most prominent operation, lead by an individual known as "Guru" who is a former Somali army general. The Thunders are predominantly based north of the Eyl area, with many currently serving on active duty in the Somali Navy or Coast Guard. Based on information dating back to the 2000 timeframe, many of these maritime personnel from the Thunder clan were charging a weekly commission from the other piracy groups that amounted to approximately five percent of the final ransom price.

NORTH VS. SOUTH. Somali pirate camps can be divided into two distinct regions, one based in the north and a second operating out of the south. Pirates in the northern regions of Somalia are considered the "seafarers", with many having been officially trained in the Somali navy or Coast Guard. They have camps in Eyl, Kalub, and Garacad. Groups in the southern regions typically have militia training and have camps in Haradheere and Hobyo. Collaboration between these two separate populations has been rapidly increasing, particularly in 2010. Pirate teams that go out to sea aboard skiffs to actively engage with merchant vessels now have at least one competent seafarer and one strong military individual.

DIVISION OF LABOR. Somali piracy operations have evolved to take on a pseudo business model, with distinct responsibilities for all the players involved in the hijacking and hostage process. The various roles include Attack Team, Committee, Community, Guard Force, Negotiator, and Investor.

ATTACK TEAM. Also known as Shareholders, the Attack Team consists of four to ten personnel that go out to sea in six to eight meter skiffs. Once they capture a merchant vessel, they automatically get an equity stake of two thirds of the final ransom price, less all associated logistical costs. Upon capture, a member of the Attack Team will make a satellite phone call that triggers the formation of a Committee. Additionally, once a merchant vessel is brought into anchorage off the coast of Somalia and secured, Attack Team members frequently choose to sell their "share" to Guard Force members at a reduced premium. This action allows them to go back out to sea for another hijacking attempt and increased wealth. Both Attack Team and Guard Force personnel are known to loot the merchant vessel, taking western style clothing, personal effects and jewelry, pocket money, etc. from the crew members.

COMMITTEE. The Committee consists of approximately five businessmen who receive one third of the overall ransom (ultimately the largest individual portions). The Committee members, who are not necessarily located in Somalia, coordinate subsequent activities behind the scenes by bringing together all the elements necessary in order to find a Community capable of supporting the merchant vessel while it is at anchor. They actively seek to remain "hidden" and are known to frequently change out their mobile phone SIM cards. Additionally, Committee members can often be involved with overseeing multiple vessel hijackings, which results in a significant influence on the pace of individual vessel negotiations as they become preoccupied with specific events in one case vice another.

COMMUNITY. Once a Committee is formed, a Community is sought that is willing and capable of handling the merchant vessel for the prolonged negotiation phase. The Community hires out its anchorage and agrees to supplying the ship with necessary provisions (food, water, khat, etc.).

GUARD FORCE. Once a merchant vessel is brought to anchorage, the Guard Force takes over control of and responsibility for the ship. They generally serve in two week shifts and receive 10,000-15,000 USD per hijacking event.

NEGOTIATOR. Once a merchant vessel is secured and a Committee formed, a Negotiator who speaks English is appointed to become the sole conduit for the lengthy ransom process. The Negotiators regularly utilize false names even when handling multiple negotiations simultaneously, but their identities are somewhat known to the wider commercial maritime industry. The Negotiator receives 10,000-15,000 USD per hijacking event.

INVESTORS. The final category of the Somali business model is that of the Investors, who rely on the Hawala monetary system. They have been known to originate from Dubai, Kenya, Yemen, Germany, the United Kingdom, and the United States.

APPENDIX F UN CONVENTION ON THE LAW OF THE SEA (EXTRACT)

Article 100

Duty to cooperate in the repression of piracy

All States shall cooperate to the fullest possible extent in the repression of piracy on the high seas or in any other place outside the jurisdiction of any State.

Article 101

Definition of piracy

Piracy consists of any of the following acts:

(a) any illegal acts of violence or detention, or any act of depredation, committed for private ends by the crew or the passengers of a private ship or a private aircraft, and directed:

(i) on the high seas, against another ship or aircraft, or against persons or property on board such ship or aircraft;

(ii) against a ship, aircraft, persons or property in a place outside the jurisdiction of any State;

(b) any act of voluntary participation in the operation of a ship or of an aircraft with knowledge of facts making it a pirate ship or aircraft;

(c) any act of inciting or of intentionally facilitating an act described in subparagraph (a) or (b).

Article 102

Piracy by a warship, government ship or government aircraft whose crew has mutinied

The acts of piracy, as defined in article 101, committed by a warship, government ship or government aircraft whose crew has mutinied and taken control of the ship or aircraft are assimilated to acts committed by a private ship or aircraft.

Article 103

Definition of a pirate ship or aircraft

A ship or aircraft is considered a pirate ship or aircraft if it is intended by the persons in dominant control to be used for the purpose of committing one of the acts referred to in article 101. The same applies if the ship or aircraft has been used to commit any such act, so long as it remains under the control of the persons guilty of that act.

Article 104

Retention or loss of the nationality of a pirate ship or aircraft

A ship or aircraft may retain its nationality although it has become a pirate ship or aircraft. The retention or loss of nationality is determined by the law of the State from which such nationality was derived.

Article 105

Seizure of a pirate ship or aircraft

On the high seas, or in any other place outside the jurisdiction of any State, every State may seize a pirate ship or aircraft, or a ship or aircraft taken by piracy and under the control of pirates, and arrest the persons and seize the property on board. The courts of the State which carried out the seizure may decide upon the penalties to be imposed, and may also determine the action to be taken with regard to the ships, aircraft or property, subject to the rights of third parties acting in good faith.

Article 106

Liability for seizure without adequate grounds

Where the seizure of a ship or aircraft on suspicion of piracy has been effected without adequate grounds, the State making the seizure shall be liable to the State the nationality of which is possessed by the ship or aircraft for any loss or damage caused by the seizure.

Article 107

Ships and aircraft which are entitled to seize on account of piracy

A seizure on account of piracy may be carried out only by warships or military aircraft, or other ships or aircraft clearly marked and identifiable as being on government service and authorized to that effect.

APPENDIX G ROME CONVENTION 1988

Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation

(Rome, 10 March 1988)

THE STATES PARTIES TO THIS CONVENTION,

HAVING IN MIND the purposes and principles of the Charter of the United Nations concerning the maintenance of international peace and security and the promotion of friendly relations and co-operation among States,

RECOGNIZING in particular that everyone has the right to life, liberty and security of person, as set out in the Universal Declaration of Human Rights and the International Covenant on Civil and Political Rights,

DEEPLY CONCERNED about the world-wide escalation of acts of terrorism in all its forms, which endanger or take innocent human lives, jeopardize fundamental freedoms and seriously impair the dignity of human beings,

CONSIDERING that unlawful acts against the safety of maritime navigation jeopardize the safety of persons and property, seriously affect the operation of maritime services, and undermine the confidence of the peoples of the world in the safety of maritime navigation,

CONSIDERING that the occurrence of such acts is a matter of grave concern to the international community as a whole,

BEING CONVINCED of the urgent need to develop international co-operation between States in devising and adopting effective and practical measures for the prevention of all unlawful acts against the safety of maritime navigation, and the prosecution and punishment of their perpetrators,

RECALLING resolution 40/61 of the General Assembly of the United Nations of 9 December 1985 which, *inter alia*, "urges all States unilaterally and in co-operation with other States, as well as relevant United Nations organs, to contribute to the progressive elimination of causes underlying international terrorism and to pay special attention to all situations, including colonialism, racism and situations involving mass

and flagrant violations of human rights and fundamental freedoms and those involving alien occupation, that may give rise to international terrorism and may endanger international peace and security",

RECALLING FURTHER that resolution 40/61 "unequivocally condemns, as criminal, all acts, methods and practices of terrorism wherever and by whomever committed, including those which jeopardize friendly relations among States and their security",

RECALLING ALSO that by resolution 40/61, the International Maritime Organization was invited to "study the problem of terrorism aboard or against ships with a view to making recommendations on appropriate measures",

HAVING IN MIND resolution A.584(14) of 20 November 1985, of the Assembly of the International Maritime Organization, which called for development of measures to prevent unlawful acts which threaten the safety of ships and the security of their passengers and crews,

NOTING that acts of the crew which are subject to normal shipboard discipline are outside the purview of this Convention,

AFFIRMING the desirability of monitoring rules and standards relating to the prevention and control of unlawful acts against ships and persons on board ships, with a view to updating them as necessary, and, to this effect, taking note with satisfaction of the Measures to Prevent Unlawful Acts against Passengers and Crews on Board Ships, recommended by the Maritime Safety Committee of the International Maritime Organization,

AFFIRMING FURTHER that matters not regulated by this Convention continue to be governed by the rules and principles of general international law,

RECOGNIZING the need for all States, in combating unlawful acts against the safety of maritime navigation, strictly to comply with rules and principles of general international law,

HAVE AGREED as follows:

Article 1

For the purposes of this Convention, "ship" means a vessel of any type whatsoever not permanently attached to the sea-bed, including dynamically supported craft, submersibles, or any other floating craft.

Article 2

1. This Convention does not apply to:

(a) a warship; or

(b) a ship owned or operated by a State when being used as a naval auxiliary or for customs or police purposes; or

(c) a ship which has been withdrawn from navigation or laid up.

2. Nothing in this Convention affects the immunities of warships and other government ships operated for non-commercial purposes.

Article 3

1. Any person commits an offence if that person unlawfully and intentionally:

(a) seizes or exercises control over a ship by force or threat thereof or any other form of intimidation; or

(b) performs an act of violence against a person on board a ship if that act is likely to endanger the safe navigation of that ship; or

(c) destroys a ship or causes damage to a ship or to its cargo which is likely to endanger the safe navigation of that ship; or

(d) places or causes to be placed on a ship, by any means whatsoever, a device or substance which is likely to destroy that ship, or cause damage to that ship or its cargo which endangers or is likely to endanger the safe navigation of that ship; or

(e) destroys or seriously damages maritime navigational facilities or seriously interferes with their operation, if any such act is likely to endanger the safe navigation of a ship; or

(f) communicates information which he knows to be false, thereby endangering the safe navigation of a ship; or

(g) injures or kills any person, in connection with the commission or the attempted commission of any of the offences set forth in subparagraphs (a) to (f).

2. Any person also commits an offence if that person:

(a) attempts to commit any of the offences set forth in paragraph 1; or

(b) abets the commission of any of the offences set forth in paragraph 1 perpetrated by any person or is otherwise an accomplice of a person who commits such an offence; or

(c) threatens, with or without a condition, as is provided for under national law, aimed at compelling a physical or juridical person to do or refrain from doing any act, to commit any of the offences set forth in paragraph 1, subparagraphs (b), (c) and (e), if that threat is likely to endanger the safe navigation of the ship in question.

Article 4

1. This Convention applies if the ship is navigating or is scheduled to navigate into, through or from waters beyond the outer limit of the territorial sea of a single State, or the lateral limits of its territorial sea with adjacent States.

2. In cases where the Convention does not apply pursuant to paragraph 1, it nevertheless applies when the offender or the alleged offender is found in the territory of a State Party other than the State referred to in paragraph 1.

Article 5

Each State Party shall make the offences set forth in article 3 punishable by appropriate penalties which take into account the grave nature of those offences.

Article 6

1. Each State Party shall take such measures as may be necessary to establish its jurisdiction over the offences set forth in article 3 when the offence is committed:

- (a) against or on board a ship flying the flag of the State at the time the offence is committed; or
- (b) in the territory of that State, including its territorial sea; or
- (c) by a national of that State.

2. A State Party may also establish its jurisdiction over any such offence when:

- (a) it is committed by a stateless person whose habitual residence is in that State; or
- (b) during its commission a national of that State is seized, threatened, injured or killed; or
- (c) it is committed in an attempt to compel that State to do or abstain from doing any act.

3. Any State Party which has established jurisdiction mentioned in paragraph 2 shall notify the Secretary-General of the International Maritime Organization (hereinafter referred to as "the Secretary-General"). If such State Party subsequently rescinds that jurisdiction, it shall notify the Secretary-General.

4. Each State Party shall take such measures as may be necessary to establish its jurisdiction over the offences set forth in article 3 in cases where the alleged offender is present in its territory and it does not extradite him to any of the States Parties which have established their jurisdiction in accordance with paragraphs 1 and 2 of this article.

5. This Convention does not exclude any criminal jurisdiction exercised in accordance with national law.

Article 7

1. Upon being satisfied that the circumstances so warrant, any State Party in the territory of which the offender or the alleged offender is present shall, in accordance with its law, take him into custody or take other measures to ensure his presence for such time as is necessary to enable any criminal or extradition proceedings to be instituted.

2. Such State shall immediately make a preliminary inquiry into the facts, in accordance with its own legislation.
3. Any person regarding whom the measures referred to in paragraph 1 are being taken shall be entitled to:
 - (a) communicate without delay with the nearest appropriate representative of the State of which he is a national or which is otherwise entitled to establish such communication or, if he is a stateless person, the State in the territory of which he has his habitual residence;
 - (b) be visited by a representative of that State.
4. The rights referred to in paragraph 3 shall be exercised in conformity with the laws and regulations of the State in the territory of which the offender or the alleged offender is present, subject to the proviso that the said laws and regulations must enable full effect to be given to the purposes for which the rights accorded under paragraph 3 are intended.
5. When a State Party, pursuant to this article, has taken a person into custody, it shall immediately notify the States which have established jurisdiction in accordance with article 6, paragraph 1 and, if it considers it advisable, any other interested States, of the fact that such person is in custody and of the circumstances which warrant his detention. The State which makes the preliminary inquiry contemplated in paragraph 2 of this article shall promptly report its findings to the said States and shall indicate whether it intends to exercise jurisdiction.

Article 8

1. The master of a ship of a State Party (the "flag State") may deliver to the authorities of any other State Party (the "receiving State") any person who he has reasonable grounds to believe has committed one of the offences set forth in article 3.
2. The flag State shall ensure that the master of its ship is obliged, whenever practicable, and if possible before entering the territorial sea of the receiving State carrying on board any person whom the master intends to deliver in accordance with paragraph 1, to give notification to the authorities of the receiving State of his intention to deliver such person and the reasons therefor.
3. The receiving State shall accept the delivery, except where it has grounds to consider that the Convention is not applicable to the acts giving rise to the delivery, and shall proceed in accordance with the provisions of article 7. Any refusal to accept a delivery shall be accompanied by a statement of the reasons for refusal.
4. The flag State shall ensure that the master of its ship is obliged to furnish the authorities of the receiving State with the evidence in the master's possession which pertains to the alleged offence.

5. A receiving State which has accepted the delivery of a person in accordance with paragraph 3 may, in turn, request the flag State to accept delivery of that person. The flag State shall consider any such request, and if it accedes to the request it shall proceed in accordance with article 7. If the flag State declines a request, it shall furnish the receiving State with a statement of the reasons therefor.

Article 9

Nothing in this Convention shall affect in any way the rules of international law pertaining to the competence of States to exercise investigative or enforcement jurisdiction on board ships not flying their flag.

Article 10

1. The State Party in the territory of which the offender or the alleged offender is found shall, in cases to which article 6 applies, if it does not extradite him, be obliged, without exception whatsoever and whether or not the offence was committed in its territory, to submit the case without delay to its competent authorities for the purpose of prosecution, through proceedings in accordance with the laws of that State. Those authorities shall take their decision in the same manner as in the case of any other offence of a grave nature under the law of that State.

2. Any person regarding whom proceedings are being carried out in connection with any of the offences set forth in article 3 shall be guaranteed fair treatment at all stages of the proceedings, including enjoyment of all the rights and guarantees provided for such proceedings by the law of the State in the territory of which he is present.

Article 11

1. The offences set forth in article 3 shall be deemed to be included as extraditable offences in any extradition treaty existing between any of the States Parties. States Parties undertake to include such offences as extraditable offences in every extradition treaty to be concluded between them.

2. If a State Party which makes extradition conditional on the existence of a treaty receives a request for extradition from another State Party with which it has no extradition treaty, the requested State Party may, at its option, consider this Convention as a legal basis for extradition in respect of the offences set forth in article 3. Extradition shall be subject to the other conditions provided by the law of the requested State Party.

3. States Parties which do not make extradition conditional on the existence of a treaty shall recognize the offences set forth in article 3 as extraditable offences between themselves, subject to the conditions provided by the law of the requested State.

4. If necessary, the offences set forth in article 3 shall be treated, for the purposes of extradition between States Parties, as if they had been committed not only in the place in which they occurred but also in a place within the jurisdiction of the State Party requesting extradition.

5. A State Party which receives more than one request for extradition from States which have established jurisdiction in accordance with article 6^[1] and which decides not to prosecute shall, in selecting the State to which the offender or alleged offender is to be extradited, pay due regard to the interests and responsibilities of the State Party whose flag the ship was flying at the time of the commission of the offence.

6. In considering a request for the extradition of an alleged offender pursuant to this Convention, the requested State shall pay due regard to whether his rights as set forth in article 7, paragraph 3, can be effected in the requesting State.

7. With respect to the offences as defined in this Convention, the provisions of all extradition treaties and arrangements applicable between States Parties are modified as between States Parties to the extent that they are incompatible with this Convention.

Article 12

1. State Parties shall afford one another the greatest measure of assistance in connection with criminal proceedings brought in respect of the offences set forth in article 3, including assistance in obtaining evidence at their disposal necessary for the proceedings.

2. States Parties shall carry out their obligations under paragraph 1 in conformity with any treaties on mutual assistance that may exist between them. In the absence of such treaties, States Parties shall afford each other assistance in accordance with their national law.

Article 13

1. States Parties shall co-operate in the prevention of the offences set forth in article 3, particularly by:

- (a) taking all practicable measures to prevent preparations in their respective territories for the commission of those offences within or outside their territories;
- (b) exchanging information in accordance with their national law, and co-ordinating administrative and other measures taken as appropriate to prevent the commission of offences set forth in article 3.

2. When, due to the commission of an offence set forth in article 3, the passage of a ship has been delayed or interrupted, any State Party in whose territory the ship or passengers or crew are present shall be bound to exercise all possible efforts to avoid a ship, its passengers, crew or cargo being unduly detained or delayed.

Article 14

Any State Party having reason to believe that an offence set forth in article 3 will be committed shall, in accordance with its national law, furnish as promptly as possible any relevant information in its possession to those States which it believes would be the States having established jurisdiction in accordance with article 6.

Article 15

1. Each State Party shall, in accordance with its national law, provide to the Secretary-General, as promptly as possible, any relevant information in its possession concerning:

(a) the circumstances of the offence;

(b) the action taken pursuant to article 13, paragraph 2;

(c) the measures taken in relation to the offender or the alleged offender and, in particular, the results of any extradition proceedings or other legal proceedings.

2. The State Party where the alleged offender is prosecuted shall, in accordance with its national law, communicate the final outcome of the proceedings to the Secretary-General.

3. The information transmitted in accordance with paragraphs 1 and 2 shall be communicated by the Secretary-General to all States Parties, to Members of the International Maritime Organization (hereinafter referred to as "the Organization"), to the other States concerned, and to the appropriate international intergovernmental organizations.

Article 16

1. Any dispute between two or more States Parties concerning the interpretation or application of this Convention which cannot be settled through negotiation within a reasonable time shall, at the request of one of them, be submitted to arbitration. If, within six months from the date of the request for arbitration, the parties are unable to agree on the organization of the arbitration any one of those parties may refer the dispute to the International Court of Justice by request in conformity with the Statute of the Court.

2. Each State may at the time of signature or ratification, acceptance or approval of this Convention or accession thereto, declare that it does not consider itself bound by any or all of the provisions of paragraph 1. The other States Parties shall not be bound by those provisions with respect to any State Party which has made such a reservation.

3. Any State which has made a reservation in accordance with paragraph 2 may, at any time, withdraw that reservation by notification to the Secretary-General.

Article 17

1. This Convention shall be open for signature at Rome on 10 March 1988 by States participating in the International Conference on the Suppression of Unlawful Acts against the Safety of Maritime Navigation and at the Headquarters of the Organization by all States from 14 March 1988 to 9 March 1989. It shall thereafter remain open for accession.
2. States may express their consent to be bound by this Convention by:
 - (a) signature without reservation as to ratification, acceptance or approval; or
 - (b) signature subject to ratification, acceptance or approval, followed by ratification, acceptance or approval; or
 - (c) accession.
3. Ratification, acceptance, approval or accession shall be effected by the deposit of an instrument to that effect with the Secretary-General.

Article 18

1. This Convention shall enter into force ninety days following the date on which fifteen States have either signed it without reservation as to ratification, acceptance or approval, or have deposited an instrument of ratification, acceptance, approval or accession in respect thereof.
2. For a State which deposits an instrument of ratification, acceptance, approval or accession in respect of this Convention after the conditions for entry into force thereof have been met, the ratification, acceptance, approval or accession shall take effect ninety days after the date of such deposit.

Article 19

1. This Convention may be denounced by any State Party at any time after the expiry of one year from the date on which this Convention enters into force for that State.
2. Denunciation shall be effected by the deposit of an instrument of denunciation with the Secretary-General.
3. A denunciation shall take effect one year, or such longer period as may be specified in the instrument of denunciation, after the receipt of the instrument of denunciation by the Secretary-General.

Article 20

1. A conference for the purpose of revising or amending this Convention may be convened by the Organization.

2. The Secretary-General shall convene a conference of the States Parties to this Convention for revising or amending the Convention, at the request of one third of the States Parties, or ten States Parties, whichever is the higher figure.

3. Any instrument of ratification, acceptance, approval or accession deposited after the date of entry into force of an amendment to this Convention shall be deemed to apply to the Convention as amended.

Article 21

1. This Convention shall be deposited with the Secretary-General.

2. The Secretary-General shall:

(a) inform all States which have signed this Convention or acceded thereto, and all Members of the Organization, of:

(i) each new signature or deposit of an instrument of ratification, acceptance, approval or accession together with the date thereof;

(ii) the date of the entry into force of this Convention;

(iii) the deposit of any instrument of denunciation of this Convention together with the date on which it is received and the date on which the denunciation takes effect;

(iv) the receipt of any declaration or notification made under this Convention;

(b) transmit certified true copies of this Convention to all States which have signed this Convention or acceded thereto.

3. As soon as this Convention enters into force, a certified true copy thereof shall be transmitted by the Depositary to the Secretary-General of the United Nations for registration and publication in accordance with Article 102 of the Charter of the United Nations.

Article 22

This Convention is established in a single original in the Arabic, Chinese, English, French, Russian and Spanish languages, each text being equally authentic.

IN WITNESS WHEREOF the undersigned being duly authorized by their respective Governments for that purpose have signed this Convention.

DONE AT ROME this tenth day of March one thousand nine hundred and eighty-eight.

[1]¹ Reads as "Article 7" in authentic text. Rectified 20 December 1989

APPENDIX H PRESIDENTIAL DECREE 12TH APRIL 2010

Presidential Documents

Federal Register /Vol. 75, No. 72 /Thursday, April 15, 2010 / Presidential Documents **19869**

Executive Order 13536 of April 12, 2010

Blocking Property of Certain Persons Contributing to the Conflict in Somalia

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the International Emergency Economic Powers Act (50 U.S.C. 1701 *et seq.*) (IEEPA), the National Emergencies Act (50 U.S.C. 1601 *et seq.*) (NEA), section 5 of the United Nations Participation Act, as amended (22 U.S.C. 287c) (UNPA), and section 301 of title 3, United States Code,

I, BARACK OBAMA, President of the United States of America, find that the deterioration of the security situation and the persistence of violence in Somalia, and acts of piracy and armed robbery at sea off the coast of Somalia, which have repeatedly been the subject of United Nations Security Council resolutions (including Resolution 1844 of November 20, 2008; Resolution 1846 of December 2, 2008; Resolution 1851 of December 16, 2008; and Resolution 1897 of November 30, 2009), and violations of the arms embargo imposed by the United Nations Security Council in Resolution 733 of January 23, 1992, and elaborated upon and amended by subsequent resolutions (including Resolution 1356 of June 19, 2001; Resolution 1725 of December 6, 2006; Resolution 1744 of February 20, 2007; Resolution 1772 of August 20, 2007; Resolution 1816 of June 2, 2008; and Resolution 1872 of May 26, 2009), constitute an unusual and extraordinary threat to the national security and foreign policy of the United States, and I hereby declare a national emergency to deal with that threat.

I hereby order:

Section 1. (a) All property and interests in property that are in the United States, that hereafter come within the United States, or that are or hereafter come within the possession or control of any United States person, including any overseas branch, of the following persons are blocked and may not be transferred, paid, exported, withdrawn, or otherwise dealt in:

- (i) the persons listed in the Annex to this order; and
- (ii) any person determined by the Secretary of the Treasury, in consultation with the Secretary of State:
 - (A) to have engaged in acts that directly or indirectly threaten the peace, security, or stability of Somalia, including but not limited to:
 - (1) acts that threaten the Djibouti Agreement of August 18, 2008, or the political process; or
 - (2) acts that threaten the Transitional Federal Institutions, the African

Union Mission in Somalia (AMISOM), or other international peacekeeping operations related to Somalia;

(B) to have obstructed the delivery of humanitarian assistance to Somalia, or access to, or distribution of, humanitarian assistance in Somalia;

(C) to have directly or indirectly supplied, sold, or transferred to Somalia, or to have been the recipient in the territory of Somalia of, arms or any related materiel, or any technical advice, training, or assistance, including financing and financial assistance, related to military activities;

(D) to have materially assisted, sponsored, or provided financial, material, logistical, or technical support for, or goods or services in support of, the activities described in subsections (a)(ii)(A), (a)(ii)(B), or (a)(ii)(C) of this section or any person whose property and interests in property are blocked pursuant to this order; or (E) to be owned or controlled by, or to have acted or purported to act for or on behalf of, directly or indirectly, any person whose property and interests in property are blocked pursuant to this order.

(b) I hereby determine that, among other threats to the peace, security, or stability of Somalia, acts of piracy or armed robbery at sea off the coast of Somalia threaten the peace, security, or stability of Somalia.

(c) I hereby determine that, to the extent section 203(b)(2) of IEEPA (50 U.S.C. 1702(b)(2)) may apply, the making of donations of the type of articles specified in such section by, to, or for the benefit of any person whose property and interests in property are blocked pursuant to subsection (a) of this section would seriously impair my ability to deal with the national emergency declared in this order, and I hereby prohibit such donations as provided by subsection (a) of this section.

(d) The prohibitions in subsection (a) of this section include but are not limited to:

(i) the making of any contribution or provision of funds, goods, or services by, to, or for the benefit of any person whose property and interests in property are blocked pursuant to this order; and

(ii) the receipt of any contribution or provision of funds, goods, or services from any such person.

(e) The prohibitions in subsection (a) of this section apply except to the extent provided by statutes, or in regulations, orders, directives, or licenses that may be issued pursuant to this order, and notwithstanding any contract entered into or any license or permit granted prior to the effective date of this order.

Sec. 2. (a) Any transaction by a United States person or within the United States that evades or avoids, has the purpose of evading or avoiding, causes a violation of, or attempts to violate any of the prohibitions set forth in this order is prohibited.

(b) Any conspiracy formed to violate any of the prohibitions set forth in this order is prohibited.

Sec. 3. For the purposes of this order:

(a) the term “person” means an individual or entity;

(b) the term “entity” means a partnership, association, trust, joint venture, corporation, group, subgroup, or other organization;

(c) the term “United States person” means any United States citizen, permanent resident alien, entity organized under the laws of the United States or any jurisdiction within the United States (including foreign branches), or any person in the United States;

(d) the term “Transitional Federal Institutions” means the Transitional Federal Charter of the Somali Republic adopted in February 2004 and the Somali federal institutions established pursuant to such charter, and includes their agencies, instrumentalities, and controlled entities; and

(e) the term “African Union Mission in Somalia” means the mission authorized by the United Nations Security Council in Resolution 1744 of February 20, 2007, and reauthorized in subsequent resolutions, and includes its agencies, instrumentalities, and controlled entities.

Sec. 4. For those persons whose property and interests in property are blocked pursuant to this order who might have a constitutional presence

in the United States, I find that because of the ability to transfer funds or other assets instantaneously, prior notice to such persons of measures to be taken pursuant to this order would render those measures ineffectual. I therefore determine that for these measures to be effective in addressing the national emergency declared in this order, there need be no prior notice of a listing or determination made pursuant to section 1(a) of this order.

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Sec. 5. The Secretary of the Treasury, in consultation with the Secretary of State, is hereby authorized to take such actions, including the promulgation of rules and regulations, and to employ all powers granted to the President by IEEPA and the UNPA, as may be necessary to carry out the purposes of this order. The Secretary of the Treasury may redelegate any of these functions to other officers and agencies of the United States Government consistent with applicable law. All agencies of the United States Government are hereby directed to take all appropriate measures within their authority to carry out the provisions of this order.

Sec. 6. The Secretary of the Treasury, in consultation with the Secretary of State, is hereby authorized to submit the recurring and final reports to the Congress on the national emergency declared in this order, consistent with section 401(c) of the NEA (50 U.S.C. 1641(c)) and section 204(c) of IEEPA (50 U.S.C. 1703(c)).

Sec. 7. The Secretary of the Treasury, in consultation with the Secretary of State, is hereby authorized to determine that circumstances no longer warrant the blocking of the property and interests in property of a person listed in the Annex to this order, and to take necessary action to give effect to that determination.

Sec. 8. This order is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the United States, its departments, agencies, or entities, its officers, employees, or agents, or any other person.

Sec. 9. This order is effective at 12:01 a.m. eastern daylight time on April 13, 2010.

THE WHITE HOUSE,
April 12, 2010.

APPENDIX I OPERATION ATALANTA – HOUSE OF LORDS REPORT

COMBATING SOMALI PIRACY: THE EU'S NAVAL OPERATION ATALANTA

Introduction

1. During 2008, the EU and the UN Security Council became increasingly concerned about piracy off the east coast of Africa and in the Gulf of Aden. A large part of the world's maritime traffic passes through this trade route and piracy was posing an increasing threat. In particular, the World Food Programme (WFP) suffered several attacks on its ships taking vital humanitarian aid to Somalia, and it called upon the international community to provide protection. Shipping companies were also concerned about the protection and safety of their vessels, cargo and crew. Concurrently the humanitarian situation in Somalia worsened considerably. UN Security Council resolution 1838 noted reports that as many as 3.5 million Somalis would be in need of food aid by the end of 2008.

2. In a series of Security Council Resolutions, the UN called on the international community to act (see Box 2) and in December 2008 the EU established Operation Atalanta (see Box 1), its first-ever naval Common Security and Defence Policy (CSDP) operation. This was also the first military CSDP operation in which the UK had taken a leading role.

3. This report examines the mandate and effectiveness of EU Operation Atalanta as well as the key challenges facing it and how to address them.

4. This report was prepared by Sub-Committee C (Foreign Affairs, Defence and Development) whose members are listed in Appendix 1. Those from whom we took evidence are listed in Appendix 2. We are grateful to them all.

5. **We make this report to the House for debate.**

BOX 1

EU Operation Atalanta

The EU agreed to set up an Operation to combat piracy at the 10 November 2008 Council^[1]. This Operation, named EUNAVFOR Somalia—Operation Atalanta, has been in operation since December 2008. It was originally set up for one year and the common costs were specified as 8.3 million euros for the initial year. On 8 December 2009, the Council of the EU decided to extend its mandate for another year (until 12 December 2010).

The EU's Council conclusions of 26 May 2008 had earlier expressed the Council's concern at the upsurge of pirate attacks off the Somali coast, which affected humanitarian efforts and international maritime traffic in the region and contributed to continued violations of the UN arms embargo.

Operation Atalanta operates in a zone comprising the south of the Red Sea, the Gulf of Aden, the Somali basin and part of the Indian Ocean, including the Seychelles. This is a vast area, comparable to that of the Mediterranean Sea.

The Political and Security Committee (PSC) exercises political control and strategic direction of the EU military operation, under the responsibility of the Council of the European Union. The EU Military Committee (EUMC) monitors the correct execution of the operation. The Operation Commander, Rear Admiral Peter Hudson RN (UK), currently commands the operation from the Operational Headquarters (OHQ) at Northwood, United Kingdom.

More than twenty vessels and aircraft take part in Atalanta. On 7 April 2010^[2], the following EU Member States were making a permanent operational contribution to the operation: the Netherlands, Spain, Germany, France, Greece, Italy, Sweden, Belgium, Luxembourg and Portugal. A number of other EU military personnel supplement the team at the Northwood Operational Headquarters. Non-EU Member States Norway, Croatia, Montenegro and Ukraine also participate in the Operation.

BOX 2

The UN Framework

Operation Atalanta was launched in support of a series of United Nations Security Council Resolutions (UNSCR) on Somalia:

- Resolution 1814 (2008) called on the international community to take action to protect shipping involved in the transport and delivery of humanitarian aid to Somalia.

- In resolution 1816 (2008), the Security Council expressed its concern at the threat that acts of piracy and armed robbery against vessels posed to the delivery of humanitarian aid to Somalia, the safety of commercial maritime routes and international navigation. The Security Council authorised the states cooperating with the Somali Transitional Federal Government (TFG) to enter the territorial waters of Somalia and to use, in a manner consistent with relevant international law, all necessary means to repress acts of piracy and armed robbery at sea.

- Resolution 1838 (2008), commended the ongoing planning process towards a possible EU naval operation.

- Resolution 1897 (2009) renewed the Security Council's call upon states and regional organisations to take part in the fight against piracy off the coast of Somalia, in particular by "deploying naval vessels, arms and military aircraft and through seizures and disposition of boats, vessels, arms and other related equipment ..."

The mandate and effectiveness of Operation Atalanta

6. EU Operation Commander Rear Admiral Peter Hudson RN told us that one of the strengths of Operation Atalanta was the clarity of its mandate:

- to support the World Food Programme (WFP) in its efforts to transport humanitarian aid into Somalia—a top priority;
- to support the African Union (AU) mission, AMISOM^[3], by protecting its ships supplying the Transitional Federal Government (TFG) of Somalia in Mogadishu;
- to protect vulnerable shipping and work with industry groups on how they should go through the high risk areas;
- to deter, disrupt and break up pirate groups (Q 94).

Recently the mandate has been extended to include the monitoring of fishing activities.

7. We heard universal praise for the way in which Operation Atalanta was run. Dr Lee Willett (Royal United Services Institute for Defence and Security Studies—RUSI) noted that the Operation had been launched in the space of only 10 weeks, which for "something of this size and significance is quite an achievement". The UK had been welcomed as the framework nation for the Operation due to the experience and credibility of the Royal Navy. Siting the headquarters at Northwood made sense; it already housed Navy and NATO operations, as well as being close to London, home of the International Maritime Organization (IMO) and a hub for the global shipping community (Q 164) (see also Kopernicki QQ 214, 216, Simmonds Q 216).

8. Witnesses expressed concern about the dangers of the possible spread of piracy, with copy-cat operations, if nothing was done. Jan Kopernicki (Shell Shipping and Oil Companies International Forum) said this had already happened on the West African coast (Q 217).

9. Our witnesses agreed that Operation Atalanta had been effective in the two main aspects of its mandate: protecting WFP and AU ships and deterring and disrupting piracy. Rear Admiral Hudson said that the EU Operation had a 100% successful record in protecting WFP vessels. In 2009 Atalanta had escorted 49 WFP ships carrying over 300,000 tonnes of food, as well as 14 African Union ships with supplies for AMISOM troops in Mogadishu. According to EU figures, the number of successful pirate attacks on larger merchant vessels had remained steady, with 46 in 2008 and 43 in 2009. He stressed that it was "quite a challenge" to identify reports of genuine but unsuccessful pirate assaults: a ship's master might see a fishing vessel or an illegal activity, such as human smuggling, and report it as an attack (QQ 95, 101-4).

10. Jason Alderwick (International Institute for Strategic Studies—IISS) said that much progress had been made in international efforts to combat piracy in the region, which had previously been unchecked. Although the number of ships taken by pirates was broadly the same over the previous 12 months, the number of attempted attacks that had been thwarted had increased by at least 70%. This was a result both of the presence of military forces in the region and of ship owners, operators and other commercial parties taking the issue seriously. Dr Willett agreed that Atalanta was addressing the piracy problem, as well as providing a presence in the region and giving greater confidence to the shipping industry (QQ 160-1, 171).

11. Piracy in the Gulf of Aden and the Indian Ocean is a serious and continuing threat to UK and EU interests. The EU acted rapidly and decisively in response to this threat by launching Operation Atalanta. This is a good example of the EU successfully conducting foreign and security policy. We welcome the lead role which the UK is playing in the Operation.

12. Operation Atalanta has proved itself a credible force in combating piracy in the Gulf of Aden and the Indian Ocean. It has been highly effective in protecting World Food Programme and AMISOM logistics vessels, none of which has so far been taken by pirates. It has also successfully deterred and disrupted pirate threats to commercial shipping.

13. Piracy is deeply rooted in Somalia and could spread to other countries in the region unless determined steps are taken to address the problem of fragile states. There is piracy elsewhere in the world and it could spread further if the EU and its international partners do not show a determination to eliminate it.

14. We believe that Atalanta's mandate should be renewed in December 2010 and that the Government should continue to make the Operational Headquarters in Northwood available for this mission.

A complex environment

15. Mr Alderwick commented that Atalanta was operating in a "very complex environment". It was the second or third busiest channel for maritime transport in the world, in addition to the "myriad" local fishing boats in the Gulf of Aden (Q 162).

16. Rear Admiral Hudson told us that about 25,000 ships transited the area every year, principally through the Gulf of Aden, representing around 25 per cent of global trade. It was a "vital strategic artery". An important energy supply route led from the Gulf of Aden into Europe and across to America. Container ships bound for the far east also regularly used that route. On average between 75 and 100 ships transited every day, depending on the season and economic cycles. In the Somali Basin, the southern part of the area of operations, the traffic density was much lower, around 600 to 1,000 ships annually (Q 96).

Pirate organisation and tactics

17. Pirates identify vulnerable ships which can more easily be attacked. Rear Admiral Hudson told us that a set of criteria had been established which were used to identify what constituted a vulnerable ship: its speed, manoeuvrability, freeboard^[4] and cargo and the number of people on board. The maritime security centre then calculated whether the ship was high, medium or low risk (Q 94).

18. Rear Admiral Hudson commented that the pirates ran "adaptive organisations. They look at the conditions, they look at where the military forces are and that is how they are able to exploit the weaknesses in our armour". Following the success of the international forces and those of Puntland^[5] authorities in the Gulf of Aden, the pirates had sought alternative criminal activity, including human smuggling. They were also moving out into the Somali Basin using long-range skiffs or "mother ships" towing attack skiffs behind them (Q 107) (see Appendix 4). Mr Alderwick said that while the pirate organisations were sophisticated, the conduct of pirate attacks was basic and the state of the pirates' weaponry was poor. However, they were becoming better at operating offshore, in particular by equipping their boats with additional or more powerful engines (Q 172). Atalanta sought to identify pirates based on the equipment they carried: in particular the quantity of fuel and presence of more powerful engines than were needed for fishing. Pirate equipment, including ladders and weaponry, was easy to detect (Rear Admiral Jones Q 8).

19. Mr Alderwick thought that one indication of the success of the operation had been the displacement "arguably" of activity by the pirates. Once the maritime forces in the Gulf of Aden "were galvanised", activity was displaced further into the Somali Basin, causing a separate tactical and operational issue (Q 160).

20. The pirates were largely based around three clans, which tended to have their own "pirate companies". They left from numerous pirate ports, including coves and harbours along the 3,000 km-long coast. They brought seized ships back to a central location, where they maintained the security of the ships and conducted ransom negotiations (Hudson Q 111). Some pirates were subject to the influence of Islamic tribes, including Al-Shabab and Al-Islamiya (Jones Q 10).

21. A significant number of Somali pirates are organised in clan-based sophisticated criminal networks. However the method of attack has remained basic. Ironically, it is a measure of the success of Atalanta and other international forces in the Gulf of Aden that pirates have been forced to operate further offshore in the Indian Ocean. This increases the risk-to-reward ratio for the pirates as they have to use mother ships which are more easily identified by surveillance. The EU's efforts to combat piracy must continue to be robust so as to increase this risk-to-reward ratio. Given the displacement of piracy further into the Indian Ocean, it is all the more important that Atalanta has the right capabilities, especially airborne surveillance.

Capability shortfalls

22. Despite praise for the Operation, our witnesses identified a number of specific shortfalls—in maritime surveillance, tankers and medical support. Rear Admiral Philip Jones, EU Operation Commander from December 2008 to June 2009, distinguished between strategic intelligence, to which Atalanta had sufficient access, and tactical "day-to-day" intelligence, which was "a constant challenge". Identifying a pirate boat presented difficulties from a legal point of view. "A pirate is only a pirate when he is committing an act of piracy ... he may be a people smuggler overnight taking [Somalis] to Yemen, ... a fisherman the next morning and then, in the afternoon, go out to do some piracy, and it is only when he commits the act of piracy that he becomes liable to arrest and prosecution by the maritime forces" (QQ 7-10).

23. Given the difficulty of identifying pirate skiffs, Rear Admiral Jones stressed the importance of airborne surveillance platforms, including maritime patrol aircraft. These aircraft were "absolutely pivotal" because they could detect the movement of pirate vessels at greater range and more effectively than was possible using surface-borne radar and visual imagery. Ship-based helicopters were also able to cover a wide area and use a range of sensors to detect the movement of pirate vessels. However, there was a gap in the Operation's knowledge of pirate activity on land in Somalia (QQ 7-10). Rear Admiral Hudson observed that maritime patrol aircraft were the asset that Atalanta, NATO and the coalition forces needed most. Those running Operation Atalanta had set a minimum threshold of three maritime patrol aircraft to enable a full daily sortie in the Gulf of Aden, but this requirement had not been met. Tankers—to allow mid-ocean refuelling—and role two^[6] medical facilities were also in short supply (QQ 135-136).

24. Mr Alderwick agreed that aviation assets were a "great force multiplier", but that some states contributing to the EU Operation had at times been unable to supply a helicopter, although not in the UK's case (Q 164). Dr Willett pointed out that capability shortfalls were best addressed on an international basis. The UK had limited military assets, and other nations should be encouraged to contribute. Luxembourg had offered a maritime patrol aircraft, which was operating in the Seychelles area. Saudi Arabia and Japan had each provided a tanker to support international naval operations in the region (Q 193).

25. Mr Kopernicki (Shell Shipping and Oil Companies International Forum) suggested that commercial tankers could be chartered for refuelling purposes. Many tankers were already fitted out with NATO-compatible connections. These tankers could augment the international naval forces' fleet (Q 218). However, FCO Minister Baroness Kinnock of Holyhead stated that the use of commercial tankers was not currently assessed to be the best means of meeting requirements "either operationally or in particular most cost-effectively". Charter costs for a medium ocean tanker were in the region of £11,000 per day and the tanker could itself become a potential target for pirates (p 83).

26. Admiral Hudson commented that the EU mission had no unmanned aerial vehicles (UAVs) of the type deployed in Afghanistan, but the US operated them from the Seychelles. Asked whether Atalanta should have UAVs, he commented that they were in scarce supply and other operational theatres had a higher demand for them (QQ 137-140). Atalanta had a good relationship with the EU Satellite Centre and used "a variety of sources to keep an eye on activity" (Q 116).

27. We are concerned that Atalanta's capability shortfalls are preventing it from being even more effective in tackling piracy. Airborne surveillance capabilities—including maritime patrol aircraft and helicopters—are crucial force multipliers for Operation Atalanta, as they facilitate the identification of suspected pirates. We welcome the support currently provided by Luxembourg operating out of the Seychelles, but regret that Atalanta still does not have access to sufficient surveillance assets. Unmanned aerial vehicles directly serving Atalanta would, in particular, be useful, but we recognise that they are needed as a higher priority in combat zones.

28. Tanker support is needed to enable ships participating in Atalanta and the NATO and coalition forces to refuel in mid-ocean in order to maximise the time they spend at sea combating piracy, rather than refuelling in port. Cover is currently insufficient. The Government and the EU should continue actively to encourage international partners to provide tankers so that continuous cover can be provided.

29. The EU should also explore with Member States how to increase access to medical facilities for surgical and non-surgical interventions where there is also a shortage.

The World Food Programme

30. Mr Kopernicki told us that the WFP chartered small, old, very slow ships, requiring Atalanta to deploy large numbers of personnel and ships for long periods to steward them. If the WFP could be persuaded or financially assisted to use larger, more modern and faster ships, they would require far fewer troops and ships to patrol, releasing resources to carry out anti-piracy activity (Q 217). Chris Holtby (Deputy Head of Security Policy, FCO) told us that, where possible, armed vessel protection detachments (VPDs) were placed on WFP and other ships^[7]. However, some flag states had not agreed to this, increasing their vulnerability to attack. Baroness Kinnock of Holyhead said that discussions were taking place between the WFP and the military on ways to improve the situation and the Government had raised the problem with the shipping industry (QQ 330-4).

31. Protecting World Food Programme vessels delivering vital supplies to Somalia is an essential part of Atalanta's mandate, which we fully support. However, the WFP's use of small, slow ships requires greater military protection resources. The Government and the EU should strongly encourage the WFP to charter faster, larger and more modern vessels.

32. In addition shipping companies have a vested interest in such measures as they would free up Atalanta's ships to protect their vessels transiting the area. The Government should consider establishing a partnership in which interested companies would make a voluntary financial or in-kind contribution to the WFP for chartering or purchasing satisfactory vessels. A "friend of the WFP label" could be established under the auspices of the EU or the IMO to recognise the contribution of shipping companies. This would serve as an indication of their commitment to corporate citizenship.

33. The WFP should also make it a condition of tender that, when requested, the flag state allow military personnel on board all WFP vessels used to supply Somalia. The Government should pursue this objective with the WFP and other donors, including the US as the primary donor.

Rules of engagement: detention and prosecution of suspected pirates

34. Atalanta military personnel can arrest, detain and transfer persons who are suspected of having committed or who have committed acts of piracy or armed robbery in the areas where they are present. They can seize the vessels of the pirates or vessels captured following an act of piracy or an armed robbery and which are in the hands of the pirates, as well as the goods on board. The suspects can be prosecuted by an EU Member State or by Kenya under an agreement signed with the EU on 6 March 2009 giving the Kenyan authorities the right to prosecute. An exchange of letters concluded on 30 October 2009 between the EU and the Republic of Seychelles allows the transfer of suspected pirates and armed robbers apprehended by Atalanta in the operation area. This arrangement constitutes an important new contribution to the counter-piracy efforts[8]. On 22 March 2010 the Council of the EU authorised High Representative Baroness Ashton of Upholland to open negotiations with Mauritius, Mozambique, South Africa, Tanzania and Uganda with a view to concluding further transfer agreements[9].

35. Commander Clive Dow RN told us that Atalanta was a law enforcement operation rather than a war against pirates or an armed conflict. It abided by the law of the sea, under customary international law, the United Nations Convention on the Law of the Sea (UNCLOS) and the Suppression of Unlawful Acts Convention. The principle of "reasonable force" applied[10]. Lethal force could only be employed where there was a threat to life (QQ 112-3). On the rules of engagement, Rear Admiral Hudson assured us that Atalanta had the necessary flexibility to disrupt, deter and arrest pirates (Q 112).

36. Commander Dow said that Atalanta restricted its prosecutions of suspects to pirates who were caught in the act rather than those who looked suspicious on the basis of their equipment. This was due to the arrangements for prosecution, generally in Kenya and the Seychelles. Cases were selected to maximise the chances of conviction, based on witness evidence of an act of piracy. There was a comprehensive approach when it came to prosecutions across the military operations as well as in the political arena. The EU mission worked closely with the UN Office on Drugs and Crime, which was charged with assisting capacity building, not only in Kenya and the Seychelles, but in any other regional area where prosecutions might take place. However it focused its efforts on building capacity in Somalia, Somaliland[11] and Puntland. This ensured that prosecutions were efficiently managed and that human rights standards were met. However, this could not be done "in isolation" for pirates. Capacity building in regional jurisdictions had to apply to the whole system (QQ 113, 148).

37. We asked our witnesses whether human rights standards were being met for the transfer, prosecution and detention of suspected and convicted pirates. Lord Malloch-Brown (then FCO Minister) assured us that Government policy was not to allow transfer to third states of suspected pirates for prosecution unless the Government were satisfied that they would not be subject to cruel treatment, the death penalty or face a trial which was grossly unfair. The UK had signed a Memorandum of Understanding (MoU) with Kenya in December 2008, and the Government's legal advisers were completely satisfied that suitable guarantees were in place on the sentencing of pirates and their conditions of detention. The EU had since then agreed a similar MoU with Kenya as well as an exchange of letters with the Seychelles authorities for the transfer of suspected pirates (Q 62, p87).

38. Baroness Kinnock of Holyhead said that there were 117 pirates in Kenyan prisons, 75 of whom were transferred by Atalanta for prosecution. A further 11 pirate suspects would be transferred to the Seychelles by Atalanta for prosecution (Q 283; p 83).

39. Speaking of the different organisations operating to counter piracy in the area, Mr Alderwick said that the advantage of the EU was that it had a variety of political instruments; it could enter into political agreements with states in the region, both as a collective entity and through its Member States. By contrast, NATO was seen as a military organisation. The EU has put in place status of forces agreements with states in the region. These acted as a "force multiplier", as Atalanta could operate out of Djibouti and Oman. The EU had also negotiated legal frameworks for the prosecution of pirates, such as that with Kenya. Atalanta had adopted a comprehensive and inter-agency approach, by engaging ship-owners, operators, the British Chamber of Shipping and the International Maritime Organisation (IMO). This approach was key to addressing the piracy issue (QQ 160-1).

40. We welcome the fact that the rules of engagement of Operation Atalanta are sufficiently robust to allow it to carry out its mandate.

41. **We welcome the agreements that the EU has signed with Kenya and the Seychelles for the transfer and prosecution of suspected pirates, and the Government's assurance that these agreements safeguard the human rights of those detained. We commend Kenya and the Seychelles for showing leadership in addressing a regional problem, although we are concerned by recent reports that Kenya is considering no longer accepting suspected pirates from international naval forces. The Government and the EU should continue to assist both states in building the capacity of their judicial and penal systems to cope with the increased demand.**

42. **We also welcome the Council of the EU's agreement to open negotiations on similar arrangements with other countries in the region.**

Coordination with NATO and other maritime forces

43. The EU Operation is part of a wider international effort to combat piracy in the Gulf of Aden, off the coast of Somalia and in the Indian Ocean. Two multinational forces operate in this zone in close coordination with the EU: US-led coalition CTF-151 and NATO. Russian, Indian, Japanese, Malaysian, South Korean and Chinese vessels are also present in varying degrees. Atalanta is in permanent liaison with all these forces. Mr Alderwick pointed out that the effectiveness of international cooperation had to be assessed bearing in mind that it had only been active for just over a year (Q 160).

44. Rear Admiral Hudson said that coordination in the region between the EU, NATO and coalition forces was working well (Q 127). Jan Kopernicki agreed that cooperation with other nations worked well, reflecting the broader engagement of Atalanta with the US Fifth Fleet base in Bahrain (where the combined task forces are based) and NATO deployments (Q 216).

45. **The EU's in-theatre coordination with NATO, the US-led coalition and other navies is working well. We welcome the important role that other countries are playing in combating piracy. Coordination with the Chinese navy in particular is encouraging.**

The shipping industry

46. Dr Willett emphasised the role that navies played in advising the shipping industry on best practice prior to and during transit in the region in order to mitigate the risk of pirate attacks. Mr Kopernicki told us that best practice guidance had been produced by the Oil Companies International Marine Forum (OCIMF)^[12]. It includes guidance on how the ship is sailed and manoeuvred, including its speed, the use of defensive measures such as water hoses and razor wire and means of preventing grappling hooks gripping the vessel, and the use of low radars to detect the approach of small boats. Dr Willett emphasised how well the Internationally Recommended Transit Corridor (IRTC) through the Gulf of Aden is considered to be operating, with only two ships attacked since it was established. He highlighted that the owners of 25 per cent of ships still chose not to use the IRTC and that these ships included a high proportion of the vessels which were ultimately attacked (QQ 174-7, 226). Mr Kopernicki added that the owners of this substantial minority of ships tended to be small independent, often family-owned firms with one or two ships who decided not to use the IRTC but to take a chance (Q 228).

47. **We welcome the best practice guidance which has been produced and circulated by the Oil Companies International Marine Forum and other organisations. We believe that the benefits of adopting recommended best practice in mitigating the risk of piracy attacks need to be more actively promoted among the shipping industry. The Government, the EU and the shipping industry should work on this collaboratively.**

Armed guards on commercial shipping

48. Some ships carry personnel from private security companies. Our witnesses agreed that these individuals should not be armed, in line with industry best practice, as this would increase the risks to which individuals and ships would be subjected (Q 60). In contrast to their position regarding the use of VPDs on WFP chartered ships (see paragraph 30 above), Mr Holtby stated that the Government's clear position regarding the other ships transiting the region was that private guards should not take arms on board vessels. He considered that vulnerable ships could be supported by other means such as through military co-operation (Q 299).

49. Mr Alderwick said that Atalanta had adopted a comprehensive and inter-agency approach, by engaging ship owners, operators, Chambers of Shipping and the IMO, unlike other international forces in the region. This approach was key to addressing the piracy issue (see paragraph 39 above) (QQ 160-1). Mr Kopernicki thought that military-civilian cooperation had been significant as the problem went beyond normal military boundaries (Q 216).

50. We endorse the view of the shipping industry, the IMO and the Government that private security guards should not be placed on commercial shipping as this would increase the risks to which the ships and crew were subject. However, military personnel from national armed forces are occasionally placed on commercial shipping on a case-by-case basis, and we believe this should continue. The Government and the EU should ensure that any such personnel receive prior specialised training to a high standard for this role.

The insurance industry

51. Rear Admiral Hudson expressed regret that little progress had been made in persuading insurance companies to offer a discount in respect of ships that adhered to best practice and self-protective measures (Q 105). Mr Alderwick suggested that, in order to encourage the shipping industry to conform to best practice, compliance with International Ship and Port Facility Security Code (ISPS) guidelines, IMO Best Management Practices or IRTC recommendations should be made a condition of being underwritten by the insurance industry (Q 202). David Croom-Johnson (Aegis Managing Agency) and Andrew Voke (LMA Marine Committee and Chaucer Underwriting) made clear their support for the promotion of best practice among the shipping industry in order to reduce risk but stated that the insurance industry was reluctant to mandate such an approach, and instead could only give advice, due to their obligations under competition law (QQ 258-261, 268). Mr Kopernicki agreed that the insurance industry would face difficulties in adopting such an approach but also suggested that the Protection and Indemnity (P&I) arm of the insurance industry could potentially be more amenable in this respect^[13] (QQ 233-234).

52. The insurance industry must accept a greater degree of responsibility for promoting adherence to best practice on deterring piracy by shipping companies. We strongly urge that the terms and conditions of insurance effectively reflect the need to discourage shipping companies from failing to follow recognised best practice.

Hostage taking and ransoms

53. Rear Admiral Hudson said that the piracy of ships for ransom had generated around \$80 million in 2009. Generally, hostages had been well treated notwithstanding the psychological impact. Tracing where the money went was a key part of the overall assault on piracy but he did not believe there were any direct links between terrorist organisations such as Al-Qaeda and piracy (Q 108). We understand that it is very difficult to ascertain the ultimate destination of proceeds of piracy. Although the Government have so far found no evidence of any operational or organisational link between piracy and terrorism,^[14] there must be a danger of such links.

54. Lord Malloch-Brown (then FCO Minister) acknowledged the reality that ransom payments were made by ship owners to save the life of their crews, and confirmed that such payments were not illegal under international law. However, the Government would not endorse, condone or participate in such a transaction, in line with the common EU position (QQ 79-80).

55. Baroness Kinnock of Holyhead confirmed that the payment of ransoms was not a criminal offence under UK law; the Government's position was that such payments should be discouraged as they would only exacerbate the piracy problem^[15]. Mr Holtby stated that once a ransom was received by pirates it became criminal proceeds which could then technically be recovered (Q 340).

56. The insurance industry confirmed that the payment of a ransom was insurable and it was not illegal to insure such a payment^[16] (Croom-Johnson Q 278). The FCO told us that the US had recently suggested that pirate individuals should be designated under the UN anti-terror sanctions regime, which could require States to freeze funds and financial assets associated with an individual. They noted the reported concerns of the shipping industry that such a move might render the payment of ransoms more complicated and thus potentially endanger the lives of crews (Q 340).

57. We support the status quo whereby the payment of ransom to pirates is not a criminal offence under United Kingdom law. We recommend that the Government continue to monitor the potential risks of monies reaching terrorists.

58. We understand that skilled ransom negotiators can help to keep risk to life and vessels, as well as ransom payments, to a minimum. Where ship owners intend to pay a ransom to recover their vessel and crew, we recommend that they use experienced and effective ransom negotiators. Where insurance policies do not already insist on experienced negotiators, they should do so.

Addressing the root causes: the EU's comprehensive approach

59. Baroness Kinnock of Holyhead confirmed that the EU was pursuing a "very comprehensive strategy" to tackle Somali piracy and its root causes, which were instability and lack of rule of law. The EU, the UK and other international partners were members of the Contact Group on Somalia which supported the efforts of the fledgling Transitional Federal Government, the UN Political Office on Somalia and the African Union military mission, AMISOM, towards the establishment of a peaceful environment. The EU was considering how it could increase its commitment to Somalia, including support for a general reinforcement of Somali capacity to meet security challenges. In the north of Somalia, in Somaliland and in Puntland, the UK, EU and UN were supporting programmes to deliver rule of law projects, and DfID was providing funding for alternative livelihoods. The EU had proposed a military training mission that would contribute to strengthening the Somali security forces (Q 295). The EU Foreign Affairs Council in Brussels adopted a Council Decision on 25 January 2010 to launch this mission. We were also told that the European Commission was funding the salaries of a 5,000-strong police service in Mogadishu (p 83).

60. Rear Admiral Hudson said that capacity building was a "big issue" in the Horn of Africa. Somali institutions and regional coastguard capabilities needed improvement. Initiatives included the IMO's Djibouti Code of Conduct, information sharing centres, and a coastguard training centre in Djibouti. The EU's major initiative was to build security assurance in Somalia and help the TFG in the transition to a proper federal government in Somalia. In the 2009 revision to the EU mandate Atalanta had taken on some modest capacity building in Kenya and Djibouti. It was working with the Yemeni coastguard to build the capacity of coastguards in Puntland and Somaliland, without detriment to Atalanta's main operations (Q 106)[17].

61. It is clear that without addressing the root causes of the conflict in Somalia, piracy will continue to flourish. The EU is rightly taking a comprehensive approach, seeking to address political, economic and security aspects of the crisis in a holistic way. However, the causes of fighting and insecurity in Somalia are deep-rooted and complex. Progress on peace and security will largely depend on the Somalis themselves, including the actions of the fledgling Transitional Federal Government (TFG).

62. We fully support the EU's efforts to build up the security sector in Somalia, in particular the training of Somali police, in line with democratic norms, while providing funding for vital humanitarian assistance. The EU's actions are part of a joint effort by the UN and international partners. It will be important that the international community makes a long-term commitment to stabilising the country.

63. The UK and EU should also work with the autonomous authorities in Somaliland and Puntland to build up their coastguards and provide sources of legitimate employment for their people.

1 Council Joint Action 2008/851/CFSP. [Back](#)

2 Information from the EU Council website, www.consilium.europa.eu [Back](#)

3 AMISOM is the African Union's Mission in Somalia, created in 2007 to implement a national security plan for Somalia, train Somali forces and assist in creating a secure environment for the delivery of humanitarian aid. [Back](#)

4 The distance from the waterline to the deck of a fully loaded ship. [Back](#)

5 Puntland is a semi-autonomous region in the north east of Somalia. [Back](#)

6 Role two medical facilities offer a range of clinical capabilities. For most NATO nations, surgical capability is their defining feature, whereas for the UK (and the US), their defining feature is "consultant-led resuscitation", both surgical and non-surgical (MOD information). [Back](#)

7 The Ukraine has recently offered special forces units to be deployed on WFP ships. The EU has warmly welcomed this offer and is urgently considering ways of responding positively. [Back](#)

8 EU Factsheet on Operation Atalanta, February 2010. Available at: http://www.consilium.europa.eu/uedocs/cms_data/docs/missionPress/files/100201%20Factsheet%20EU%20NAVFOR%20Somalia%20-%20version%2014_EN04.pdf [Back](#)

9 Foreign Affairs Council conclusions 22 March 2010 [Back](#)

10 The minimum force necessary to impose one's rights under the relevant provisions: whether to board, search, seize, arrest, or detain (Commander Dow Q 113). [Back](#)

11 Somaliland is an autonomous region in the north of Somalia. [Back](#)

12 Piracy-The East Africa/Somalia Situation: Practical Measures to Avoid, Deter or Delay Piracy Attacks (OCIMF, 2009); see also Best Management Practices to Deter Piracy in the Gulf of Aden and off the Coast of Somalia (Version 2-August 2009) produced by a number of organisations. [Back](#)

13 Protection and indemnity insurance (P&I) is a form of marine insurance against third party liabilities and expenses arising from owning ships or operating ships as principals. It is distinct from other forms of marine insurance such as hull and war risk insurance. Cover is provided by an insurance mutual, called a P&I Club, which is owned by its members who are the insured ship-owners. [Back](#)

14 House of Lords Hansard 12 December 2009 cols 977-978 [Back](#)

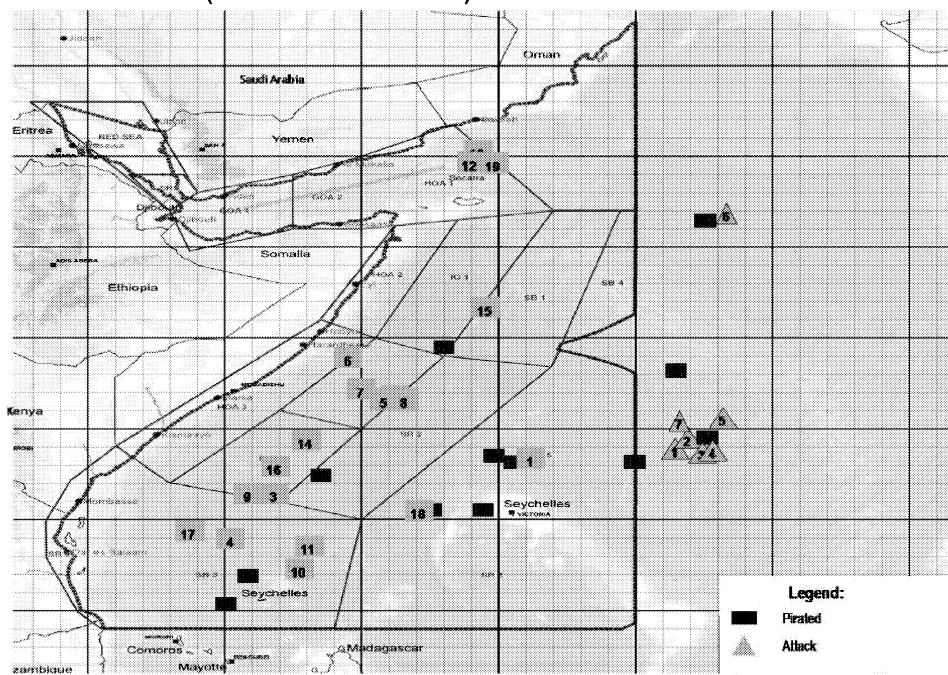
15 See also: *Money laundering and the financing of terrorism* (19th Report of Session 2008-09, HL Paper 132), paragraph 170. [Back](#)

16 *Masefield AG v Amlin Corporate Member Ltd* [2010] EWHC 280 (Comm), 18 February 2010. [Back](#)

17 The FCO has recently allocated £400,000 to improve the Somaliland Coast Guard's ability to provide for the safety of the coastal population of Somaliland. Information provided by the FCO. [Back](#)

APPENDIX 4: MAPS

FIGURE 1
Incidents in the Somali Basin (2 Oct 2009-2 Mar 2010)



Source: Map provided by EUNAVFOR (European Union Naval Force)

Report of the **Understanding the Business Better Working Party**

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1. OVERVIEW

1.1 Background

Our working party was commissioned by the Reserving Oversight Committee (ROC) – the successor body of the General insurance Reserving Issues Task Force (GRIT) – to explore the issues around understanding the business better for actuarial claim liability reserving. One of the conclusions from the GRIT report “A Change Agenda for Reserving” presented to the Institute of Actuaries on 27 March 2006, is that “considerable improvements can be readily made to the reserve estimation process through actuaries understanding better the constitution and commercial issues surrounding the business making up each reserving class.”

The focus of our research was not only on how better understanding of the business can assist the reserving actuary but also that this is a two way process and effective interactions with various functions within and external to the organisation will also add value for the business.

This paper is intended to aid newly and recently qualified actuaries who are beginning to have significant interactions with the wider business.

This paper documents the collective thoughts of the working party with input from other actuaries in the profession. Whilst we hope it will provide some ideas for consideration during the reserving process it does not constitute formal guidance. The views in this paper do not necessarily represent the views of our employers.

1.2 Outline of Paper

The paper is split into a number of sections:

1. **Case studies.** This first part of the paper documents a number of case studies where certain features of the business made actuarial claims reserving considerably more difficult and the reserve estimates more uncertain. We look at some of the issues faced from these experiences and lessons learned.
2. **Interaction with the business for more effective claims reserving.** The next section explores interactions with the business to facilitate more effective claims reserving and the consequences and impact to the business.
3. **Practical ideas to take forward.** We consider some best practice approach and ideas for challenge and feedback loops and ways to gain buy-in from the business.
4. **International considerations.** We make some observations on the implications for working across international territories in understanding the business better.

1.3 Acknowledgements

We would like to thank those other members of the profession who have participated in the work of this working party for some of its life, and to those who were interviewed for the case studies and provided other useful insights. We would like to give special thanks to Adrian Ericsson, Liz Prior, Andrew Binns, Catherine Barton, Richard Doman, Matthew Harris, David Hart, Ian Hilder, Alex Lee and Simon Sheaf.

2. INTRODUCTION

The importance of understanding the business better for reserving is well recognised by actuaries, especially following the GRIT report recommendations. It was commented during our research that the issues and difficulties raised are not new to the actuarial profession or the companies. We did, however, find the understanding or awareness of what could make reserving more effective was often taken for granted.

Our aim is to document and share the experiences of the past (it's always easier to see with hindsight!) and to explore aspects of the two way relationship with the business.

In practice, actuaries work in teams and they may have established relationships with the business already. Those that don't are at risk of missing key reserving information that is known elsewhere in the business – this paper is aimed at providing an introduction to those interactions which could be crucial along with some food for thought.

Our study has not considered specific IT systems or related issues.

2.1 What is meant by effective reserving in this paper?

We believe effective reserving can be seen in a dual context.

The first usually is the way in which information (quantitative and qualitative) is considered to improve the actuaries' understanding of the business and to adapt the reserving assumptions and methodology to the issues in order to obtain a reserve estimate – whether it be a best estimate or for other purposes such as at a specified percentile.

The GRIT report explored this aspect of understanding the business better and noted that “traditionally the actuary will seek to identify changes in the business that are important to the reserving methodology by discussion with the underwriter, claims staff etc. However GRIT's view is that the role of the actuary in General Insurance may now be sufficiently mature that a more structured process of understanding the business should form an integral part of the actuarial methodology.”

In this paper, we present some thoughts on how to interact with the business to achieve this aim but we also feel it is important to understand how to make the most effective use of the reserve estimates – we see this as the second context in which “effective reserving” should be considered.

Reserving can be considered effective when, in addition to the points above, the business places credibility on the reserves, and they are actively used as a tool to steer and manage risk of the business. An example of this would be to create the interactions that allow the reserving process to act as an early warning system for things going wrong. This is another facet that we attempt to draw out - the interactions with the business to create credibility, confidence and a benefit to the business.

3. CASE STUDIES: LEARNING FROM THE PAST

We selected six reserving case studies to document in this paper with the purpose to learn from the past experiences of other actuaries. Some of these cases are well known in the industry while others are more associated with particular businesses. We interviewed a number of different general insurance actuaries in the profession and have summarised the general background, key issues and lessons learnt of each case study below. This is done in an anonymous fashion to ensure confidentiality.

The case studies covered are:

- ▶ North American Extended Warranty – Byas Mosley
- ▶ Legal expenses
- ▶ Reinsurance market spiral – LMX
- ▶ Market wide large losses
- ▶ US liability
- ▶ Cashback policies

3.1 Case Study 1: North American Extended Warranty – Byas Mosley

3.1.1 *Background*

Extended warranty business was written throughout much of the London Market and Lloyd's of London in the late 1980s. Most policies were for motor extended warranty, but other electrical products such as white goods were also insured. Typically, the cover starts at the expiry of the manufacturer's warranty and can continue for several years thereafter.

In the late 1980's there were some large line-slip schemes reinsuring the direct extended warranty business. Many of these reinsurance contracts or line-slips were written by a third party administrator that did not take part in the risk. Whilst some of these schemes performed quite well, there were schemes which were loss making and caused significant concern within the market.

The Byas Mosley line slip was one of these loss making schemes. During the 1990's, the insurance broker Byas Mosley had brokered a book of extended warranty business that covered private motor vehicles, white goods and computers. We have based our discussion around the Byas Mosley line slip in our case study.

3.1.2 *Issues & Implication to Reserving*

The claims experience had been good during the first few years but it became apparent that the business had actually performed much worse than expected as losses started to come in after a few years (typically after the manufacturer's guarantee expired). In some cases, the problem of deteriorating results were compounded by falling premium rates, an over-reaction to the early false impression of favourable claims experience.

Not only did the underlying exposures earn over a long period - typically seven years - many of the contracts in the lineslip were written on an excess of loss basis. This meant that losses took a long time to reach the layers, and when they did, they led to very high loss ratios, sometimes in the thousands, due to the non-proportional gearing nature of the aggregate stop-loss coverage.

The most significant factor impacting the performance of the business was that often the way that the business was administrated and sold offered little or no protection against moral hazard. For example, it wasn't uncommon for administrators to remind policyholders of their soon-to-expire coverage, with the result being a surge in claims towards the end of the contract period. This was the result of the administrators having no vested interest in the risks sold (they did not take part in the risk), and that they were often remunerated solely based on volumes sold.

There was an additional issue for companies who did not split out extended warranty as a class on its own (but have included it within other classes of business). For these companies, their claims experience on the reserving classes containing extended warranty business would be distorted by the features of the extended warranty business (usually only paid amounts and no outstanding amounts). The hidden extended warranty business within larger reserving classes had typically led to underestimation of reserves for these reserving classes.

3.1.3 What happened next

In the mid-1990s a market wide consultative committee was set up to facilitate information flows to and from participants involved in the Byas Mosley business. Initially, the consultative committee consisted of underwriting and legal representatives. Actuaries were recognised for their skills during this process and started to become involved in the consultative committee at a later stage. We note that prior to this, there had been little actuarial involvement in the reserving of this business.

Actuaries soon realised that standard actuarial reserving techniques were not applicable for this type of business as the eventual outcomes can be dependent on individual court cases. To estimate the ultimate cost of the involved reinsurers and syndicates, the actuaries started by building a model using ground up losses as key inputs. Actuaries were able to obtain ground up data from several sources, however, the different data sources did not always reconcile, sometimes with material differences. In light of data issues, it was felt that a more pragmatic approach was required to estimate the ultimate losses.

The UK actuaries encouraged the involvement of specialists in the US, particularly US actuaries, and became heavily involved in the facilitation of discussions between the various parties and participants. The aim was to consolidate and incorporate all available information and different views to arrive at a reasonable set of data and assumptions to use for the model. Stress testing and scenario testing were also performed to assist participants with understanding the level of uncertainty and the sensitivity to the assumptions and data used. Actual against expected analyses were regularly performed using claims data from US administrators of each scheme to validate the ground-up ultimate claims estimates. A Microsoft Excel report was then issued to market participants every quarter to show their share of the latest estimated reserves.

3.1.4 Lessons

The lessons from this experience are:

- ▶ The way that the business was administrated and sold provided little protection against moral hazard. In this case study, moral hazard could have been avoided to some extent if the administrators had some vested interest in the performance of the business. The following arrangements are commonly used to align the interest of the business and administrators:
 - ▶ Requiring the administrators to retain some part of the risk

- ▶ To have a remuneration arrangement with the administrators that is linked to the performance of the business (rather than being purely volumes based). However, reserving for profit commission can be tricky along with building in feedback loops and use of exposure methods.
- ▶ It is important to understand the drivers of claims when estimating reserves. In this case study, the expected timing of the losses was probably not well understood. The early favourable loss experience of the business had led to more loss making business being written.
- ▶ Care needs to be taken when grouping business into classes for reserving purposes. There needs to be a balance between having too many reserving classes (statistically less reliable with smaller volumes) and too few reserving classes (the reserving classes would not be very homogenous and features of different business could distort the reserving analysis, as seen in this case study).
- ▶ Actuaries need to have access to timely, relevant and accurate data in order to monitor and understand the performance of the business. Frequent monitoring would allow early detection of performance issues; this will give the business more time to take corrective actions and hence reduce financial damage. Performance monitoring is more important for longer tailed or longer term business where issues would only become apparent after a period of time, as illustrated in our case study.
- ▶ It is important to recognise the value of bringing in specialist opinion in underwriting, pricing and reserving, especially in new areas of business.
- ▶ The early establishment of a market steering committee for problem accounts can help coordinate the participants' response, accelerate remedial action and share any costs.

3.2 Case Study 2: Legal Expenses

3.2.1 Background

In the late nineties, a new type of liability product emerged in the UK insurance market covering after the event (ATE) legal expenses. The policy indemnified claimants, who were often individuals making their claim on a no-win no-fee basis, for the defendant's legal costs and expenses, and often also the ATE policy premium, in the event that the claim was unsuccessful.

Although dealing with a specific case study, the principles are likely to be valid for any new product.

3.2.2 Issues & Implication to Reserving

Reserving was initially based on underwriting assumptions, but the actuary was brought in to provide an external reserve opinion.

As this was a new line of business, there was very little data available to the actuary for reserving purposes. Underwriters did not have a great deal of experience in the product, although were confident in the profitability of their underwriting, and claims teams did not have experience of dealing with these types of claims. Discussions with underwriting and claims, although useful, could not give the full picture and reserving based on this would rely on the quality of underwriting rather than providing an independent view.

3.2.3 What happened next

The key thought process was to identify who would understand these types of claims, namely the lawyers conducting these cases.

The actuary then performed a survey of the leading legal firms, to understand the claim process and form the assumptions of a cost/probability model.

This came out with higher projected losses compared to those based on underwriting assumptions but also showed a wide range of uncertainty. As a result, the communication with management became crucial, both informing them of the profitability concerns but also the great uncertainty associated with the product.

3.2.4 Lessons

The lessons the actuary took from this experience were:

- ▶ To always challenge data and information supplied by the business.
- ▶ To understand the business better, consider who is best placed to inform the actuaries and whether an external non traditional source may have more objective or insightful viewpoint.
- ▶ Where understanding is limited, e.g. in the absence of data, the actuary should communicate this to management so that the company can consider holding a margin for uncertainty.

3.3 Case Study 3: Reinsurance Market Spiral - LMX

3.3.1 Background

A reinsurance spiral occurs when reinsurers operating in the same market provide each other's excess of loss covers, with very little coverage being provided by reinsurers outside the market. This results in the transfer of exposures between the reinsurers in the same market. When a large catastrophe occurs, it is possible that the total claim cost or a large part of the reinsured risk is "trapped" in the market and will return to the participants. The losses are passed through reinsurers like a "musical chairs" game and the music stops when the net capacities of all of the reinsurers are exhausted in the loop. The reinsurer who ran out of capacity will be left "without a chair" and will be the one to pick up the losses.

The London Market Excess-of-loss (LMX) spiral arose during the 1980s when a number of Lloyd's of London syndicates and other London Market companies each wrote multiple layers of reinsurance cover reinsuring each other. The information available about the underlying risks was inadequate and the reinsurers accepted further exposure for risks they had already covered. The companies and syndicates were effectively reinsuring their own losses after they had passed through their reinsurers' own reinsurance programmes.

During the late 1980s there were a number of large market losses including UK Storm "87J" (Lloyd's catastrophe codes), Hurricane Hugo and Piper Alpha. The problems caused by the LMX spiral became acute when these large market losses started to go through the London Market.

3.3.2 Issues & Implication to Reserving

There was far less actuarial involvement in general insurance reserving at the time that the issues associated with the LMX spiral became apparent. However, there were two major issues with reserving for the large market events:

- ▶ The size of the loss to the market was uncertain, particularly initially.
- ▶ The share of the loss to be borne by each company or syndicate was almost impossible to predict.

Each reinsurer's share of a loss was very sensitive to its reinsurance programme and that of its cedents and reinsurers. The loss would pass through the spiral of reinsurance covers until one of the participants ran out of reinsurance protection, in which case one of the following could happen:

- ▶ One company would retain all the remaining losses; or
- ▶ Insolvency of one or more of the participants would act to break the spiral. (This would be better news for the insolvent participant's reinsurer than the cedent!)

A further complication to the reserving is the impact of commutations made between participants in the spiral. Once a contract has been commuted no more recoveries can be made against it. In addition, recoveries may not be made on the outwards reinsurance contract when the inwards policy has been commuted, thus breaking the spiral.

3.3.3 What happened next

The LMX spiral is still ongoing, with a number of London Market reinsurers still holding reserves against the associated losses. This highlights how difficult the issues have been to resolve.

There have been collaborative efforts made by some participants to estimate their share of the spiral. This involved information sharing on programme structures and in some cases led to successful settlement of liabilities between companies after reaching agreement on sharing arrangements. However, the process was complicated and long due to the sensitivity of business information. A number of commercial issues needed careful considerations and this may have prevented more participants from sharing information.

Different methods are used to estimate the reserves, including the following:

- ▶ Fitting curves to the notified claims: This involves estimation of the parameters of a chosen statistical distribution based on the actual claims experience. Expected future losses can be extrapolated from the chosen distribution once the parameters are estimated. Statistical distributions frequently used for modelling claims include the Lognormal and Gamma.
- ▶ Survival ratios: These are used to estimate how many years it would take for claims to exhaust the current level of loss reserves. It is calculated on the level of claims payments, for instance averaged over the last five years ("five-year survival ratio"). A five-year survival ratio of 20 indicates that it would take 20 years to exhaust reserves if annual claims payments remained the same as the average in the last five years. This method is frequently used for the estimation of very long tailed liabilities or latent claims such as asbestos.

- ▶ These methods may lead to appropriate best estimates for the claims but will not illustrate the associated uncertainty and the risk carrier could possibly end up with a much higher share of the loss than expected.

3.3.4 Lessons

The London Market has learnt lessons from the LMX spiral and the way business is written has changed as a result. There is more information available on the risks written to allow a reinsurer to monitor its exposure and prevent it from unwittingly reinsuring itself. Alongside this, insurers and reinsurers are much more aware of aggregations of risk than in the past. However, there may be still some differences in interpretation of information; for example, actuaries may consider a “retro” policy to be an excess of loss on and excess of loss layer, while many underwriters may not see it as a “retro”.

Internal data systems have improved dramatically over the past 20 years and much more comprehensive policy and claims information is collected. In addition, external data systems have also improved, for example the centralisation of information at Lloyd’s of London.

Despite all the improvements in data gathering and understanding exposures, there are situations where the underlying exposures are still unclear e.g. when no original insurer information is available in bordereau notifications or where there is no fixed location on the insured so it is difficult to know where the exposure lies (like in cargo where the assets are not fixed).

3.4 Case Study 4: Market wide large losses

3.4.1 Background

There are a number of historical events that have resulted in very large insured losses across the global insurance industry. These market-wide losses are generally categorised into man-made or natural perils and tends to affect more than one class of business. In the last ten years, man-made events affecting insurance include the 2001 US terrorist attacks (“WTC”), Enron, Worldcom, Laddering and more recently sub-prime; and for natural catastrophes there are North Atlantic hurricanes, European windstorm, UK floods, Asia Pacific tropical storms and various earthquakes around the world.

Our discussion will give a brief overview of the reserving issues on WTC and the 2005 hurricanes Katrina, Rita and Wilma (“KRW”). These two market wide losses have a number of interesting factors:

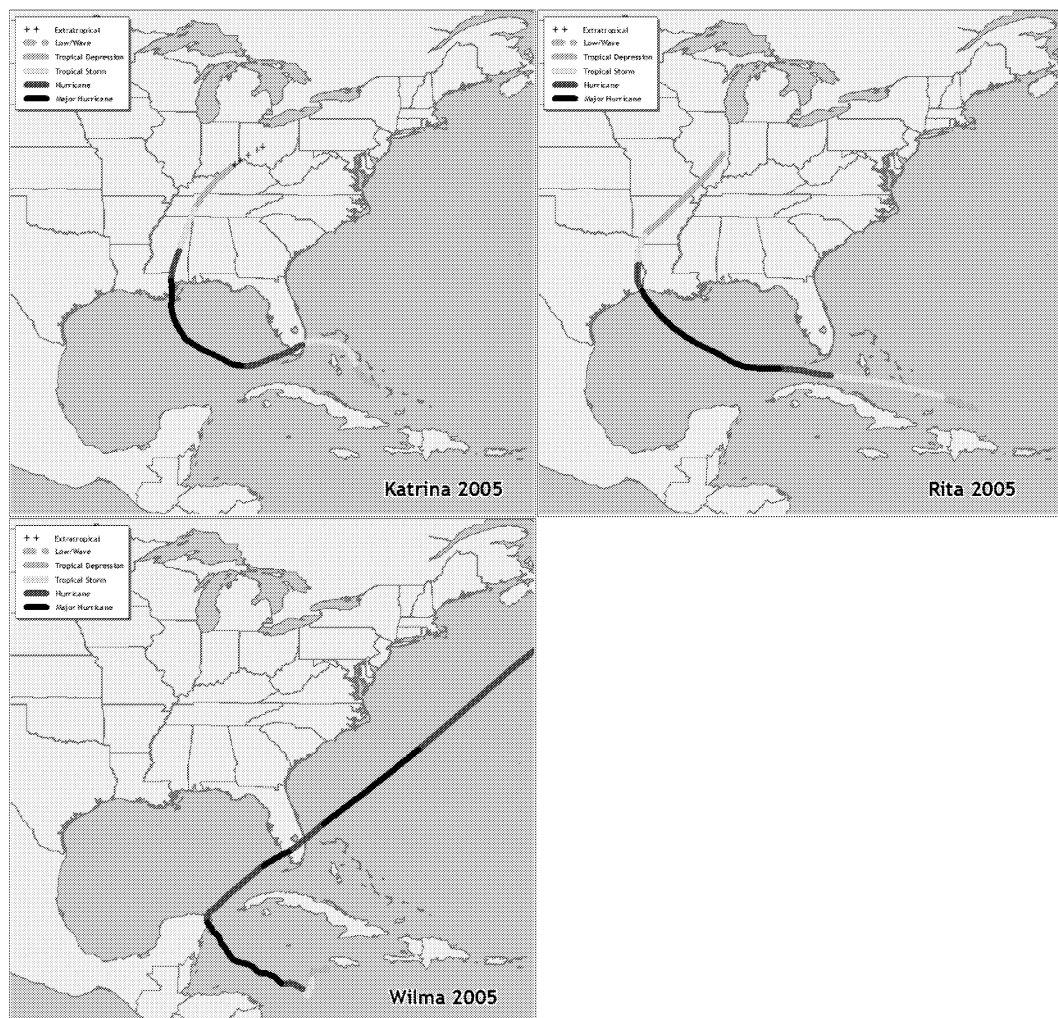
- ▶ Unique features of the loss
- ▶ Timing in the insurance cycle
- ▶ Financial impact
- ▶ How the actuarial profession sought to quantify the size of the loss for reserving

We have only considered the impact of the insured losses for this case study.

WTC – On September 11, 2001 terrorists hijacked four planes on the East coast of the United States and two of these planes, both Boeing 767’s, were flown into the World Trade Center twin towers in New York. This caused over 2,500 deaths from casualties

in the towers, the surrounding area and passengers onboard the planes. Both the North and South towers collapsed within two hours of the impact followed later by the collapse of No. 7 World Trade Center and subsequently a number of further buildings around the area had to be demolished.

KRW – On August 23, 2005 Hurricane Katrina swept in from the Atlantic ocean over Florida, strengthening as it progressed over the Gulf of Mexico before making second landfall across Texas and Louisiana. In New Orleans, the worst affected area, the hurricane caused the levee system to fail, flooding significant portions of the city and causing the greatest loss of life since the 1928 Okeechobee Hurricane¹. Hurricane Katrina was followed closely in September 2005 by Hurricane Rita and then in October 2005 by Hurricane Wilma, both also hitting the Gulf of Mexico. KRW also caused extensive damage to onshore and offshore oil and energy operations. The paths and intensity of the three hurricanes are illustrated below.



Source: <http://www.nhc.noaa.gov/HAW2/english/history.shtml>

¹ Source: http://en.wikipedia.org/wiki/Hurricane_katrina extracted 1 July 2009

3.4.2 Issues & Implication to Reserving

The claims development pattern of large market losses do not conform to the patterns normally observed in other claims and hence, standard actuarial reserving techniques are often not appropriate. In fact, the claims development is invariably unique from large loss to large loss. There are a number of challenges for the reserving actuary in estimating reserves which include but are not limited to:

- ▶ Understanding the nature of the losses and exposure to the insurer
- ▶ Ascertain the size of the market loss
- ▶ Selection of estimation approach – “top down” (allocating share of market loss) and “bottom up” (policy exposure and limits)
- ▶ Understanding, quantifying and communicating the uncertainty around any loss estimates. This was a particular concern for Lloyd’s signing actuaries at the immediate year end that followed the large market loss.

Whilst both the WTC and the 2005 hurricanes KRW constitute large loss events the reserving implications for both differed substantially.

The World Trade Center attacks were an unprecedented event, particularly the total collapse of the buildings. By contrast Gulf of Mexico hurricanes are common, the issues for KRW arose from the size and combination of the losses, and also other specific details discussed below (eg, flooding, levees etc).

The timing of these losses within the insurance cycle also had a key impact. WTC was a smaller financial loss in comparison to KRW but had a far more significant impact on the number of insurance entities that went into run-off as a result.

WTC

The WTC attacks were unprecedented and the insurance industry was uncertain of the immediate next steps. Defining what had happened, assessing the extent of the damage and understanding the insurance contracts written added to the complexity. In the immediate aftermath it was difficult to assess the extent of the damage to infrastructure like the underground shopping centre and the metro collapse. Later there was the dispute over how many losses had been sustained – were each of the four hijacked planes one loss, were each of the two twin towers separate losses or was the single objective and coordination of the terrorists sufficient to define it all as a single event.

The different insurers were more or less prepared to accept the overall scale of the loss but it was difficult for a market wide view of the losses to form. This led to a range of initial loss estimates, exacerbated because these were a small number of large, volatile and uncertain losses. At the Institute and Faculty of Actuaries general insurance conference (GIRO) in 2001 there was a wider market discussion about the possible surprises that could arise from the claims. Given this and the short period to the end of third quarter of that year it is understandable that the market estimates were very uncertain.

WTC affected mainly aviation and property classes but many other classes of business also had exposure. The ultimate claim estimates for the direct aviation losses and the direct property losses have been fairly stable (excluding the one loss or two debate) over time, although a significant portion remains unpaid. The bodily injury liability claims

on property policies took time to establish causing delays and arguments amongst the various parties. However, by the end of the third quarter 2001, most insurers had to have accounted for the loss, forcing the market to form an opinion of the size of WTC at a very early stage in its development.

The reinsurance losses were more complicated due to a number of factors. There were wording issues with many reinsurance contracts written on a “follow the fortune” basis. The reinsurance of Lloyd’s and London market cedents was generally on a consistent reserving basis but outside of London there was wide disparity in approaches to producing case estimates.

KRW

The issues that have made Hurricane Katrina difficult from a reserving standpoint were generally not hurricane related. It was the overall unexpected size of the flooded area, and also issues around whether the loss damage was caused by a flood or by a hurricane (leading to coverage disputes). This subsequently demonstrated that whilst many of the natural catastrophe proprietary models had been useful in estimating the extent of insured losses for a large number of small risks, their capabilities were limited at the time where the damage was to large commercial risks.

There was additional uncertainty arising from legal disputes around the failure of the levee system, which in many cases occurred many hours after the storm had moved inland. Levees in New Orleans breached in over 50 different places submerging 80 percent of the city. These legal disputes caused delays and uncertainties in quantifying the true cost of the loss.

Reinsurance exhaustion was also a problem within the Lloyd’s and London Market, with the three large insured hurricanes occurring close together within one year and insurers started to run out of cover.

3.4.3 What happened next

WTC

There were significant interactions within the business at the time in estimating and reviewing the reserves. It is likely that the focus was initially driven at least in part by not only the size of the loss but also its high profile nature. Many companies set up multi disciplinary internal working parties to review the claims including underwriters, claims, actuarial, finance and reinsurance. This meant that actuarial and claims could quickly understand what the issues were. The significant developments which came through in January 2002 were then quickly reflected in the year end Statement of Actuarial Opinion (SAO) for Lloyd’s syndicates because the multi disciplinary working parties encouraged quick information flows. This methodology, adapted and refined during KRW, has now become market practice for large or unusual losses.

There were collaborative efforts and healthy debates on the treatment of the binary event from the profession with a wide number of groups involved. The General Insurance Board of the Faculty & Institute of Actuaries issued a paper and supplementary guidance note in December 2001 (with addendum December 2002) to assist actuaries on the “practical and technical considerations for their year end work arising from the WTC event and to suggest possible wordings for reports and opinions produced”.

The suggested wordings helped actuaries signing the annual SAOs for Lloyd’s syndicates communicate the level of materiality and uncertainty in the reserves and also

inform external auditors considering whether the accounts required a fundamental uncertainty wording.

There are four suggested wording options which were subsequently revised and reissued to be used for future large losses:

- ▶ Wording 1 – I am satisfied that the company/syndicate has no material exposure to the Large Loss.
- ▶ Wording 2 – The company/syndicate has material exposure to the Large Loss. However, this exposure does not lead to a material increase in the uncertainty of the company/syndicate's total reserves [in an adverse direction].
- ▶ Wording 3 – The company/syndicate has material exposure to the Large Loss. This increases the uncertainty of the company/syndicate's total reserves, but does not increase that uncertainty [in an adverse direction] significantly beyond the normal range of uncertainty for insurance liabilities at this stage of development.
- ▶ Wording 4 – The company/syndicate has material exposure to the Large Loss. The ultimate amounts of these claims are subject to a great deal of uncertainty which, combined with their total size, increases the level of uncertainty for the total reserves of the company/syndicate significantly beyond the normal range of uncertainty for insurance liabilities at this stage of development.

At the time of WTC (unlike KRW) the market was not performing well and companies had been releasing reserves on under performing business. As such, the large capital strain which occurred because of WTC was difficult for some companies to bear and ultimately led to many leaving the market. KRW was a far larger insured loss than WTC but its effect on companies was reduced since when the losses occurred in 2005 insurers were better capitalised at that point of the insurance cycle.

KRW

Many companies made use of complex catastrophe models to assess the impact of KRW. However, these models at the time were did not include secondary effects that affect (and normally increase) the loss beyond what would have been expected. The best known of these for KRW is the demand surge which occurred in the Gulf of Mexico and New Orleans. Demand surge can be defined in an insurance context as the temporary increase in repair/mitigation costs above the standard level of costs, resulting from the secondary impacts of the natural catastrophe itself. In the Gulf of Mexico, there was a skill and supply shortage for even assessing which oil rigs had been damaged before they could be repaired.

For Katrina, there was also the issue of coverage inflation where existing insurance exclusions or limits proved politically and legally very difficult to apply. For example the Mississippi Attorney General filed a suit asking courts to clarify that insurance companies must cover the water damage following the breach of the New Orleans levees, and that they could not enforce the water damage/flood exclusions in hurricane protection policies. These disputes took a long time to resolve.

3.4.4 Lessons

Some of the lessons learnt from WTC and KRW include (but not limited to):

- ▶ Understanding that the timing of the market large losses in the insurance cycle can have a widely different impact on the insurance industry and individual re/insurers.

When the loss occurs at the bottom of a cycle as for WTC, the consequences on the insurance industry is larger as the capital buffers have not been built up to absorb the loss.

- ▶ The approaches taken to reserving in the market during WTC were later used for other large loss events, such as KRW. There are now more market consistent ways to estimate large losses and determine wordings of uncertainty.
- ▶ The lessons learned from Hurricane Katrina in particular have led to modelling firms reviewing their treatment of demand surge and other secondary events in their proprietary models thus improving the assessment of impact of major catastrophe events. It has also raised awareness of the importance of understanding the catastrophe models used, the effect and need for the model variables and how these vary by software.
- ▶ KRW occurred when the UK Individual Capital Adequacy Standard (ICAS) regime was in place and hence became a useful benchmark for the level of underwriting and subsequent reserving risk.
- ▶ Actuaries to consider classes unexpectedly giving rise to losses when reserving for large loss events e.g. the World Trade Center caused significant Specie losses, while Hurricane Katrina gave rise to Financial Institution crime losses arising from thefts from cashpoint machines.

3.5 Case Study 5: US Liability

3.5.1 Background

In 1995, the Private Securities Reform Act was brought into force in the United States. This was designed to reduce the number of lawsuits by reducing the number of class actions. The advice given at the time was that it would be beneficial to insurers and it led to insurers increasing their exposures to US liabilities.

At the time, many insurers were distracted by the potential fallout from the millennium bug, as well as the dot com bust. These factors pre-occupied insurers and market conditions deteriorated over the next few years. The result tended to be weaker terms and conditions and rates softened considerably. At the same time, a number of companies and syndicates wrote long term contracts that had to be honoured when the experience turned out to be much worse than expected.

3.5.2 Issues & Implication to Reserving

Insurance companies started to recognise this issue in mid 2001. This was as the notified claims deteriorated beyond expectations due to a higher than expected frequency of claims. At this point the action taken was generally to strengthen reserves. The drivers of the experience were not always fully recognised at this point, so at this time it was not known how big the issue would be.

Insurers writing direct business were able to identify multi year contracts and gain an understanding of their exposure. However, reinsurance accounts added a further layer of complexity as cedents were able to attach multi year contracts to treaties. Information for the reinsurers was poor at this time and so it was difficult to find out which contracts were multi year and how many years were covered. Where information on the number of years covered was available it tended to be incomplete. For example,

at best for a reinsurance contract it may have been possible to find out the average term of the underlying policies.

Another issue was that at the time direct insurers were attempting to maintain premium by offering lower deductibles and higher limits. This resulted in the severity of claims increasing alongside the frequency.

3.5.3 What happened next

Setting reserves at this time was largely subjective as there was limited data available in relation to underlying contract lengths. Over time, when more data was available, actuaries started to use an accident year profile combined with a benchmark to calibrate to an underwriting year reserve. This was only possible when the contracts were more mature.

The other added complication was the increased exposure per policy – the underwriting limits allowed were fully exposed more frequently. Standard actuarial reserving methods like the Bornhuetter-Ferguson typically used premium as an exposure measure but for these policies, exposure per policy would have been far more effective and possibly have led to less “dampening” of the emerging experience than using methods that relies on a prior expectation of ultimate losses. Alternatively, adjusting the premium used in the Bornhuetter-Ferguson method for explicit rate changes and underlying exposure would also have been useful.

Due to the late emergence of data on this issue, the portfolios deteriorated from initial reserve estimates.

3.5.4 Lessons

The lessons the actuary took from this experience were:

- ▶ The problems were particularly exacerbated by poor data on the underlying exposure.
- ▶ In order to identify the issues sooner and prevent the deteriorating portfolios, a more detailed level of information would be required. For example, a policy download from cedents with full exposure information by changing underwriting year would enable multi year contracts to be identified.
- ▶ More attention was needed to understand if the data within years are homogeneous. It may not be enough to simply look at underwriting guidelines.
- ▶ In general, the lack of data was a concern for the market as a whole. The wider implications on the business have been to increase controls and create more accountability for underwriters. In some cases, the issue increased the recognition of actuaries within a company and highlighted the different areas they could be utilised.
- ▶ Actuaries have become more aware of issues such as multi year contracts arising and therefore, especially within the treaty casualty market, the reserving has been influenced by this.
- ▶ When applying standard actuarial reserving methodologies, actuaries should consider whether typical exposure methods are appropriate and if other methods not usually considered in early development years for long tail classes (eg chain ladder) may still be useful and provide additional insights to the experience.

3.6 Case Study 5: Cashback Policies

3.6.1 Background

Cash back policies have been widely written on extended warranty products for a number of years. Although terms and conditions vary the broad operation works as follows: an extended warranty is sold with a 'cash back' bonus, often used as a marketing device. If the policy remains claims free throughout the warranty period then the policy holder is able to claim back the original premium amount after a fixed number of years, say five, and usually within a defined period, say six months.

3.6.2 Issues & Implication to Reserving

Despite returning the premiums to policyholders, the policy can be profitable where a significant number of policyholders fail to submit the appropriate forms to claim back their premium subject to investment performance and pricing assumptions. Due to the long policy period and the time lag receiving cash-back claim form, reserving for such claims is dependent on a number of assumptions and benchmarks in order to assess the likely proportion of claimants that will make a cash-back claim. These assumptions are difficult to verify at the onset of the policy until the warranty period expires – as such any errors in the assumptions will be compounded for each accident year period until the experience on the first year can be observed.

There is a risk in the way these policies were marketed that there was unfair representation by the insurer or unfair policy terms resulting in mis-selling of policies. This would lead to closer scrutiny by the regulator with political implications.

Furthermore as the number of these policies was small and so in some cases did not appear to be material to the insurer, they were often hidden in a grouping with other business.

3.6.3 What happened next

A number of these policies in the UK were reserved based on benchmarks which later proved inappropriate. In particular cultural differences between the countries where the benchmarks were obtained and the countries where the benchmarks were applied dramatically affected how well the policy forms were safeguarded and returned at the correct moment. For example, the claim rate in Germany was much higher than the available historic UK rates.

Publicity around the cash-back policies over the period when policyholders could claim prompted a larger number of policyholders to claim. For instance, bad publicity around the fairness of short periods to claim the cash back and refusals to pay claims to those who were only slightly outside of the period led to wider awareness of the policy terms and conditions. In some instances the policies were sold through a retailer who kept details of the purchasers and contacted them during the claim period as a reminder and to market upgrade products.

As the policies entered the period for cash back claims the experience deteriorated in comparison with the benchmarks used for pricing and reserving.

Some of the policies were written through a captive insurer and reinsured into the London market and Lloyd's through a stop loss policy. As such there was a gearing effect of the poor performance and much of the deterioration flowed straight into Lloyd's

where the three year accounting rules had concentrated the original cash back policy years into a single open year.

3.6.4 Lessons

The lessons that can be taken away from this case study are:

- ▶ Always seek to understand the policies by discussing with those with front line experience – in this instance the retailers understood more of the product than the insurer because they were involved in the sale.
- ▶ To always critically review the relevance of benchmarks and consider the level of uncertainty that they introduce. Consider the impact of the realisation of this uncertainty.
- ▶ Where classes or subclasses are considered too small to warrant detailed attention ensure that the risks in the class are well understood and consider conducted in-depth reviews on a rotation basis.
- ▶ Avoid being wedded to triangle-based reserving methods where the claims development profile doesn't meet the assumptions or has a far longer tail than the historic development.
- ▶ Consider the level of prudence required where there is a significant gap between the date of policy issue and the date at which a claim may arise as this always amplifies any errors in the original assumptions.
- ▶ In some cases such as a Part VII transfer, insurers are required to write to the insured with a reminder of the policy conditions and to consider the communication plan in reserving for these accounts. This would have an impact to the re-claim rates and behaviour of policyholders.

4. Interaction with the business for more effective claims reserving

This section explores the interaction between the actuarial reserving function (referred below as “reserving function” or “reserving actuary”) and the following key business areas:

1. Claims and specialist areas
2. Underwriting (including Sales and Marketing)
3. Pricing and Catastrophe Management
4. Finance and Management
5. Reinsurance
6. Other parties – Group, auditors, consultants, regulators
7. Capital and Risk Management

The interactions explored can be broadly summarised into three forms:

- ▶ Communication – reserve estimates (what they represent, exclude or include), associated uncertainty, discussion of assumption setting.
- ▶ Feedback – emerging issues observed in the reserving process to aid other areas of the business, implications for business planning, reinsurance purchase, capital modelling.
- ▶ Data & Information – the interactions in collecting inputs and outputs, management information and reporting.

As discussed in section 2, effective claims reserving is about how information is used to improve the diagnostics and application of actuarial methodologies as well as making better business use of the estimates and reserving process.

4.1 Claims and specialist areas

Effective claims reserving lies at the very core of a successful (re)insurance company.

Frequent interaction between the reserving team and claims and specialist areas such as legal, medical, engineering etc. teams can ensure that the reserving actuaries are able to incorporate as much relevant information (qualitative and quantitative) in their estimate of claims liabilities as possible. Often there are claims issues that require input and discussion from both the claims and reserving actuarial teams to form a common view and approach across the organisation. These may be material individual claims or large market-wide issues like North Atlantic hurricanes, sub-prime, asbestos or UK motor bodily injury periodic payments.

Communication with claims and other specialist functions can help the reserving actuaries develop a better and deeper understanding of the underlying issues regarding the claims. There are a number of benefits to a collaborative relationship between the claims and specialists. The three key areas we discuss below are:

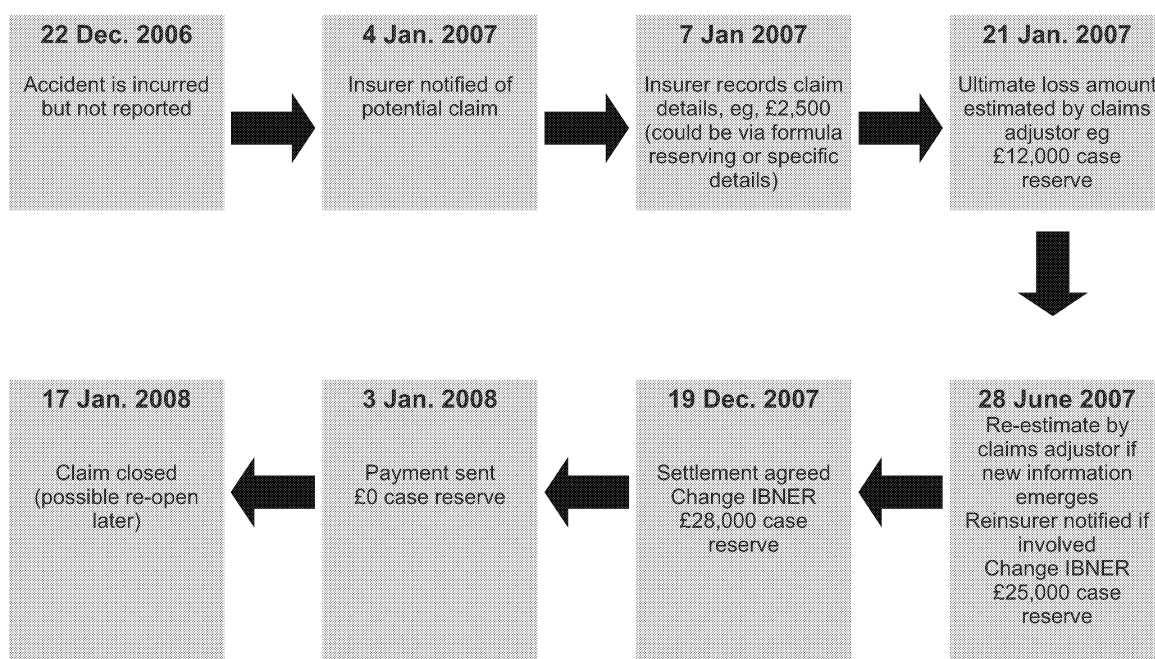
- ▶ Claims handling procedures and the life cycle of a claim

- ▶ Large market loss and catastrophe reserving
- ▶ Key performance indicators and other management information

4.1.1 Claims handling procedures and the life cycle of a claim

The reserving actuary should understand the life cycle of a claim and how a particular life cycle is captured on their data system in order to fully interpret claims development data.

Understanding the life cycle of a claim requires knowledge of the claims handling process, often at an individual claim level. A close working relationship with the claims team can help the reserving actuary understand the implications of the life cycle of a claim and the effects of any changes to the overall reserving process. An example of the life cycle of a claim is shown in the diagram below:



The actuary will benefit from discussing with claims and specialists in detail the treatment of claims by their company's claims handling teams and how they flow through to data systems. This may differ by class of business.

The more knowledge that the actuary can gain about the treatment of claims, the better they can allow for any changes in processes or limitations in the claims data captured on IT systems.

Consequences and impact to business and reserving

Communication is the key to effective interaction between claims management and the reserving process within an organisation.

If reserving actuaries and claims managers do not interact, actuaries may miss important information or misinterpret things within the data used. By not understanding the life cycle of a claim, actuaries may make allowances for future development that may not be necessary if the claims data is better understood.

If claims teams do not understand the inputs to an actuary's work they may not know which changes in claims handling practices are likely to affect an actuary's work and hence may not notify them of these in a timely manner.

4.1.2 Large market loss and catastrophe reserving

When a large market loss or catastrophe occurs there may be many views and opinions regarding the size and financial impact of the event within the company, ranging from management, claims, legal advisors, underwriters, actuaries and so on. Often the clamour for an "early number" can lead to many opinions being presented by many different teams, often on differing bases. As seen in several of the case studies documented in section 2, the claims team and the actuaries need to coordinate at an early stage to ensure that a consistent view is being presented to management. This will reduce contradicting assumptions being used in the reserving analysis and any nasty surprises when results are released. Often the actuaries can add insight on reinsurance or requirements for IBNR/IBNER that may be missed out from initial estimates.

"Normal" large losses often require less intervention from actuaries in that there is little substitute for the expert knowledge of a particular large claim that will be possessed by specialists. The actuary needs to focus on the likely strength of the case reserving, perhaps by reference to the past performance of the large loss triangle, assuming the same case reserving philosophy has been in place over a reasonable amount of time. In many cases a good knowledge of internal claims reserving rules can help interpret the (changing) strength of case reserves.

Consequences and impact to business and reserving

The actuary's view of the ultimate cost of an event could be very different from that calculated by other internal parties. Allowance for true IBNR, IBN(E)R or reinsurance could change a portfolio from being profitable to being unprofitable. Management need to be informed of all financial variables related to large losses or catastrophes at an early stage in the process in order to understand the true underlying profitability of an account and give guidance on the likely current financial year result.

Where management are receiving mixed messages from claims, underwriting and actuarial, it can reflect poorly on all parties and solutions will tend to be imposed rather than developed from a best-practice standpoint.

4.1.3 Key performance indicators and other management information

In many large (re)insurance companies management information are being produced to monitor the performance of claims or special claim projects or initiatives. The actions from special claims projects are likely to change the development data and influence the key performance indicators (KPIs) being monitored.

Where major claims initiatives have been embarked upon it is important that actuaries understand the potential effect that these initiatives may have on their data, be it actual average costs or changes in the speed of settlement. Being pro-active in claims settlement may reduce claims settlement periods, but may causes claims to be settled that may have "gone away" before pro-active settlement was introduced.

In addition to understanding the possible impact of any claims initiatives to the reserving process, the reserving actuary can also provide useful insights and assistance to the claims team. It is important for management and claims to also be aware of the consequences to any changes to the claims process and find ways to measure the effectiveness of any actions.

Consequences and impact to business and reserving

It is understandable that if management information provided by the claims team is giving a different and conflicting message to that presented by the reserving team, it would create confusion and possibly incorrect decisions made by stakeholders.

Lack of understanding or appropriate allowance for any changes to the claims process may lead to ultimate costs for certain classes being under or over-stated. This can particularly cause an issue where profitability of a class is borderline and thus the performance of the book is highly sensitive to the reserve estimates. Management also need to understand the extent in which the impact of any initiative is already incorporated in the reserving actuary's work and avoid double counting potential benefits.

4.2 Underwriting (including Sales and Marketing)

Underwriters can have a varying degree of influence depending on whether we are referring to personal lines or the London Market. In personal lines, underwriters may get involved in overall strategy and difficult/unusual risks however in the London Market they will look at and price each individual risk.

Areas we will discuss below are:

- ▶ Understanding business written
- ▶ Understanding changes
- ▶ Terms and conditions
- ▶ The rumour mill
- ▶ Buy-in for reserving

4.2.1 Understanding business written

Underwriters are the people closest to the business and hence can provide detailed information at an individual risk or portfolio level.

The information requested from underwriters may vary depending on IT systems and the information already captured there, however it is always worth having the discussion to ensure that the systems are being used as you had assumed.

Some of the things which an actuary should usually ask (but the list is not exhaustive) are:

- ▶ Intended loss ratio – although this should generally be tested and validated, it provides a useful starting point, especially for new business.
- ▶ Mix of business between geographical locations, subclasses of business
- ▶ Limits or excesses
- ▶ Line sizes
- ▶ Any multiyear contracts
- ▶ Any delegated authority business

Consequences and impact to business and reserving

Fundamental to proper reserving is understanding the underlying business; lack of understanding can lead to incorrect conclusions.

When applying benchmarks, in order to find the most appropriate match you must understand exactly what is within your own book of business. An inappropriate benchmark can result in under or over reserving.

Multiyear contracts would also lead to longer exposure periods and hence longer development patterns.

4.2.2 Understanding changes

As well as understanding the business, it is important to understand where the business changes. This can be obvious changes such as a different mix of business, or more subtle such as limits and excesses remaining constant but line sizes increasing.

Consequences and impact to business and reserving

Of equal importance to initially understanding the business being written is understanding when and how the business changes. Often the key assumption in reserving is that the historical data is representative of the current mix of business. If the mix of business has changed over time then reserving assumptions for example, development patterns and starting loss ratios may no longer be appropriate and lead to incorrect reserves being posted.

It is generally useful to set up a feedback loop with underwriters so there is a process by which the actuarial team are informed of significant changes in the business.

4.2.3 Terms and conditions

Quoting from the GRIT paper, *“The Terms And Conditions of the business are important for understanding what has been written. But keeping track of changes in Terms and Conditions is always difficult.”*

Terms and conditions are the areas of contracts which can often slip during a soft market leading to more risk accepted with no change in premium. Capturing these is extremely difficult as they are often small changes which are individual to each risk.

The only people who are going to know whether terms and conditions are changing above what can be recorded on IT systems are the underwriters. They will generally have a view on the overall marketplace and their book of business.

Consequences and impact to business and reserving

It is very difficult to allow for changes in terms and conditions however the reserving actuary should generally have an idea about which direction the changes are going. Incorrect views on changes in terms and conditions can essentially mean exposure bases are underestimated or a likely increase in claim frequency/severity is not incorporated into the reserves.

4.2.4 The rumour mill

Within the London Market underwriters will become aware of issues, often before they become claims. This is especially true in reinsurance, where cedents may not formally notify reinsurers of a potential problem but instead have an “off the record” discussion.

Using this information can enable reserving actuaries to begin allowing for potential losses before they are notified, hence better understanding the true IBNR provision.

Consequences and impact to business and reserving

The difference between using this information source and not may be minimal in many cases, however it is a question of proactivity. In some cases making provision for these types of loss may be inappropriate; however making management aware of the potential for adverse reserve movement is a valuable part of the reserving process.

4.2.5 Buy-in for reserving

Although reserving must remain independent of the underwriters, having their support is extremely helpful for gaining the buy-in of the wider business.

A good relationship with the underwriters can generally be built by investing the time in explaining the reserving process and decision making. This allows underwriters to focus on areas where they believe the assumptions to be incorrect and provide evidence of this.

It is important to remember that the underwriters will generally have a particular view either to increase or decrease the loss provision, hence the arguments presented will often be one sided. Actuaries should always bear this in mind when discussing changes to the reserving assumptions with underwriters.

Consequences and impact to business and reserving

There may be very good reasons why actuaries and underwriters disagree about the appropriate level of reserves for their account. However, where possible, agreement will make the process of agreeing reserve with management a smoother, more efficient process.

Taking the time to try and agree reserves is also a key step in building relationships with the underwriters. This will also ensure that the feedback loop between underwriters and the reserving team remains intact facilitating the passage of information regarding new business and changes in mix of business.

4.3 Pricing

In many companies the pricing and reserving teams work separately and as such need to interact to ensure more effective reserving and pricing. The work completed by each team has many overlapping aspects, often requiring assumptions for the same parameters yet both teams may be exposed to differing data sets. We do note that for some companies there is an explicit separation of reporting lines to ensure some independence between the reserving and pricing areas.

Interaction of pricing information for reserving assumptions as describe in further detailed below, including:

- ▶ Initial expected loss ratios
- ▶ Development patterns

- ▶ Inflation etc
- ▶ Feedback loop for emerging issues
- ▶ Data consistency checks

4.3.1 Interaction of pricing information for reserving assumptions

There are many assumptions that are used in both pricing and reserving. The pricing team will often be able to inform the reserving team of useful information, for instance, changes in the mix of business and terms and conditions.

A key assumption used in reserving is the prior loss ratio (BF Prior/IELR) that feeds into the BF estimate. The loss ratios produced by the pricing team can be a good starting point for this estimate especially if a given class of business does not have enough relevant historical data.

Other assumptions that the pricing team will have information on which may be of use to the reserving team include development patterns, rate changes, claims size distribution and inflation assumptions.

Consequences and impact to business and reserving

Assumptions used in pricing will inevitably be on a different basis to those required for reserving, i.e. pricing assumptions may target best estimate whereas reserving assumptions may demand more prudence. This therefore should be taken into consideration.

The reserving and pricing team may also use different sub sets or segmentation of the data (eg mapping of classes of business) and as such produce differing assumptions which cannot easily be shared across teams.

The interaction between the pricing and reserving team will ensure consistency in the assumptions used albeit on different bases.

4.3.2 Feedback loop for emerging issues

The pricing team should be able to inform the reserving team of various issues that arise whilst undertaking the pricing of key risks. They will potentially be able to gather more information from the underwriters and/or other parties (i.e. brokers) than the reserving team. This would include items such as changes to terms and conditions, line sizes and limit profiles.

The reserving team should be able to inform the pricing team of various issues that arise whilst undertaking the reserving of each line of business. The reserving team should be able to identify issues such as changes to claim frequencies, claim severities and new types of claims emerging etc.

Consequences and impact to business and reserving

The information exchanged from the pricing team to the reserving team will enable the reserving team to be better informed on how the book is changing and will affect their assumptions used in reserving, it could affect the most recent year of account materially.

The information exchanged from the reserving team to the pricing team may lead to the pricing team amending their assumptions on certain risks. This may then provide an

additional feedback loop to the reserving team where the reserving team are using information from the pricing team to set prior loss ratios.

The feedback loops between the teams will ensure that both teams are producing more informed assumptions and this will help maintain credibility to other areas of the business.

4.3.3 Data consistency checks

The reserving and pricing team can essentially be using the same data. If this is the case then any errors can be identified more easily (as more scrutiny of the data) and eliminated.

One team may have access to more data which may be of use to the other team. Interaction between both teams will ensure more informed decisions can be made and more independent scrutiny of the data.

Consequences and impact to business and reserving

Data consistency checks will ensure more robust pricing and reserving from a data credibility view point. Key assumptions are often based on historical data and as such both teams will benefit from the knowledge that the data is likely to contain fewer errors if it can be reconciled with another data source.

4.4 Management and Finance

Two key stakeholders for the reserving function are management and the finance area.

A strong relationship between the reserving team and management and finance will allow all parties to have the most appropriate information for inclusion in their decision making processes. It is vital effective two-way communication occurs between these parties.

Management and Finance often utilise the technical expertise, knowledge of the business and judgements of the reserving actuaries. Similarly, input from Management and Finance are important contributions to the reserving process. By developing these relationships, Management and actuaries can share knowledge and understanding of business/industry issues. We believe this pooling of knowledge and expertise should be to the benefit of the company.

The interactions we explore are:

- ▶ Management
- ▶ Finance
- ▶ Business and Operational Planning

4.4.1 Management

Management of the company are ultimately responsible for the held reserves, and will have final sign-off on any variation above or below the recommended actuarial best estimate. The reserving actuaries should communicate the basis of the “best estimate” reserves ie what the estimate allows for and the uncertainty and risk attached.

In some cases implicit margins exist within the actuarial assumptions (eg undiscounted reserves), although post-Solvency II this should no longer be an issue. Reserving actuaries may currently be asked to separate these out between a “true” best estimate and risk margins. In practice this can be difficult.

When setting the held reserves of the company Management may have other considerations in addition to the reserves recommended by the reserving actuaries. These may include risk appetite regarding the volatility of the reserves, knowledge of possible commutations, a desire to stabilise results over time and targeting of a particular combined operating ratio for the business in line with business plans.

The “target” results may have previously been communicated to investors and the wider investment community and therefore Management are under pressure to deliver this. Therefore there may be a desire to manage the reserves volatility.

Management sometimes (although certainly not always) focus on the “big picture” as they tend to be most interested in the company or group result. Therefore they may only wish to see the reserves split into the significant businesses for their company. This may be high level product e.g. motor, property, and liability or by country depending how the business is structured.

Consequences and impact to business and reserving

Actuaries need to be commercially aware of the impact of their recommendations and influence in the business, and not take a ‘black box’ approach based solely on statistical results. We believe judgement should be exercised – do the results feel right? Actuaries should be able to explain why their views have changed since the last reserving exercise (including but not limited to data and model change effects and other external influences), particularly when the actuarial projection is moving out of line with management expectation. Management may lose faith with the actuarial reserving process if it perceives does not really understand the underlying business or the volatility from that changes in their assumptions.

Reserving actuaries should seek to understand the reasons and sentiments behind any management adjustments applied to the best estimate result when booking the reserves. The actuary would generally have input to this process, and should also have feedback from management on the reasons behind any decisions. Margins may be needed to make greater allowance for risk factors and uncertainties deemed too extreme to be fully included in the best estimate reserves. Actuaries can assist management in attempting to quantify these factors and the additional reserves which should be held for them.

When setting their reserve recommendation the reserving actuary will often have external pressures. If their recommendation does not align with the Management’s target result there may be pressure placed on the actuary, and a conflict of interest may arise with the actuary’s professional standards and any statutory role they have. In these cases it is important that dialogue(s) with management takes place as early as possible, and that these are clearly documented. It is important to maintain independence and transparency in the process.

Ultimately the final decision on the level of held reserves lies with management; however the responsibility of communicating the overall result can fall to the reserving actuary.

When considering the risk factors and their potential impact the actuary needs to ensure that each factor is appropriately discussed with management and documented. There is

a risk that only factors which give the result desired will be selected, or the financial impact will be assessed at a lower level.

When supplying information to management the actuary needs to provide the information at an appropriate level of detail for their needs. This may be at a more aggregated level than is used for the reserving analysis, which will be meeting other business needs and so may be more granular. Proportionality and materiality should be considered, although care needs to be taken to ensure that one do not miss a lot of small issues which together become significant.

4.4.2 Finance

A key interaction between reserving actuaries and finance often relates to how reserves are booked in the company's accounts, once a decision on level has been agreed by management. This may be more frequent with a monthly reserve booking but a quarterly reserve committee process with management. The reserve booking will also tend to be at a lower level of detail than used for reporting in the company, so may be split by product, sub product and operating company or business.

Given the short reporting deadlines often in place, a roll forward from the last completed actuarial analysis may be used. This can be performed by the reserving actuaries or the finance team. If not calculated by the actuaries it is important they provide sufficient information to allow the booked reserves to be calculated, discussing any factors used or assumptions with finance and appropriate reconciliations and checks on the results are preformed.

Actuarial reserving exercises will often feed directly into finance, and so any delays in producing these figures may reduce the time available to finance. Again, communication of potential delays to the finance department is important as early as possible.

Finance may also provide key performance indicators and other statistics to the business to aid with their management and operation, e.g. to underwriting looking at sales and profitability. Reserves form a part of this so the actuaries may be asked to provide input to the commentary accompanying the data.

Consequences and impact to business and reserving

The Finance department's chief concern is often the accuracy of the reserves booked to the company's accounts, and that these reserves are at the expected level. The company may also have Sarbanes-Oxley or Financial Control Framework requirements in place.

Actuaries often need to ensure appropriate documentation and audit control is maintained, to allow reconciliation of the booked reserves back to the reserves set by the reserve committee. When discussing the reserves with finance it is worthwhile for the actuaries to consider the appropriate level of materiality and detail required.

Any commentary provided to support the management reports produced by finance should be at an appropriate level of detail and content for the target audience. More detailed questions on the result are often best taken off-line and discussed on a one to one basis, so addressing directly the needs of the individual concerned.

The commentary should be designed to support the figures so should detailed any issues the audience should be aware of that may impact how they manage their business and any decisions they may make.

4.4.2 Business and Operational Planning

Reserves and future claims levels (claims ratios) form a key part of the business planning for the company. This is both for current reserving levels and how they are expected to change over time based upon company and market actions.

Although the final plan may be at a high level it will usually be built up from individual product or operating company level plans, so the level of detail and input provided by the actuaries will need to be appropriate to these needs. There may also be a need to transform the reserves from the standard reserving classes to those used for planning such as if a product is reserved in totality but split by broker and direct sales for planning purposes.

Consequences and impact to business and reserving

Business and operational planning is a key business tool both for internal management and for external discussions with regulators and rating agencies etc. Therefore it is important that the reserving input is fit for purpose.

The company will often base its ongoing strategy and business operations using this plan, so the reserving inputs need to be appropriate and clearly understood by all stakeholders.

The starting point of current reserve levels and claims ratios will have been discussed at recent reserve committees and reserve review meetings with the business, so there should be a consensus of views. Subjectivity then comes into the projection of the claims ratio for future years in the plan. This is when discussion with the business (Pricing, Underwriting and Claims departments) is required to debate and agree the assumptions for premium rate changes, claims inflation and risk mix changes as these will all impact the claims ratio. The ratio may also be impacted by any expected prior year reserve releases or strengthening which will impact future year claims ratios.

4.5 Reinsurance

For some companies, the reserving function is only responsible for the estimation of the gross reserves and the reinsurance estimates are provided by another business area. Where the gross and net reserves are the responsibility of the reserving function, the Reserving Actuary needs to fully understand the underlying reinsurance programmes and key issues relating to the expected recoveries.

The three main areas we explore are:

- ▶ Understanding the reinsurance structure
- ▶ Differentiating and communicating gross and net uncertainty
- ▶ Feedback to the reinsurance managers

4.5.1 Understanding the reinsurance structure

For consistency it often makes operational sense for the reserving function to calculate both the gross and net of reinsurance claims reserves. However, in some cases, it will be another team that performs the administration (purchase and maintenance) of reinsurance covers. For the purpose of this discussion, we will assume a separate

“reinsurance team” are responsible for the reinsurance administration, although the same principals will apply if this is not the case.

Although it is sometimes possible to project reinsurance or net claims using aggregate triangulated data and conventional actuarial techniques, the reserving actuary will need to consider whether this is appropriate. For some portfolios, a lower level of granularity is required and the reserving actuaries will need to fully understand the reinsurance structure to accurately reflect this in their analysis and calculation of net reserves. The information needed will include, but is not limited to:

- ▶ Classes/policies covered
- ▶ Exclusions of cover
- ▶ Inception/Expiry dates
- ▶ Basis of cover (e.g. claims made, risks attaching during)
- ▶ Type of cover (e.g. proportional, excess of loss)
- ▶ Specifics of the contract e.g. cede percentages, excesses, limits
- ▶ Reinstatements of cover and corresponding reinstatement premiums

This level of detail will not always be available or practical for use in estimating the net reserves. In any case, a high level appreciation of the reinsurance programme is crucial to ensure consistency of the assumptions between policy or claim cohorts and to the gross reserves. The reserving actuary will need to consider how best to gather and use the information available. At a minimum, data split between proportional and non-proportional programmes may enable a different methodology to be used for proportional and non-proportional (ie excess of loss) reinsurance.

Consequences and impact to business and reserving

Reinsurance recoveries are an offsetting asset to claim liabilities and can be a material item on the balance sheet. Inaccurate or inconsistent reinsurance estimations can lead to misstatement of results and inaccurate profit figures. These in turn can lead to inappropriate business decisions made over underwriting, cashflow management, purchase of future reinsurance protection and commutations of policies or contracts.

The impact on future reinsurance purchasing can be significant leading to inappropriate reinsurance protection with either excessive cost for relatively little benefit, or inadequate cover exposing the business to risk which it did not intend to take.

Similarly, inaccurate calculations of recoveries could lead to commutations being suggested/agreed which prove to be a poor deal for the business or expose the business to risk which it is not intending to take.

There is also the potential financial cost to the business from reinsurance recovery leakage, where valid recoveries are missed.

All of these items help to build credibility with the business when done accurately.

4.5.2 Differentiating and communicating gross and net uncertainty

There are many stakeholders who are interested not only in the absolute value of the reserves, but also the potential for future deterioration (or improvement). This is usually

quantified by a combination of explicit stochastic reserving and individual claim analysis.

Using an example where a significant loss to the company has been quantified between £10m to £20m. If reinsurance protection exists on a £20m xs £10m reinsurance contract, while there is considerable gross uncertainty, the net uncertainty will be greatly reduced and possibly insignificant.

Although it is important to communicate to management the gross uncertainty, it is also key that they are aware of where reinsurance protection negates/mitigates this and where substantial net uncertainty exists. Where reinsurance protection is being utilised it is important to remember offsetting factors such as reinstatement premiums and reinsurance bad debt when communicating the net position.

Consequences and impact to business and reserving

An understanding of net and gross uncertainty allows reserving and management to focus appropriately on the issues which could impact the financial results and the reserving actuaries can help facilitate this in their role.

4.5.3 Feedback to the reinsurance managers

The reinsurance managers will need to fulfil reporting requirements to their reinsurers.

Different companies will have different data systems, so the level of reporting from actuarial to the reinsurance department will differ. Where the reserving function is responsible for preparing the gross claims data in some way, they will either need to provide this to the reinsurance managers or provide details of incurred reinsurance recoveries after processing themselves. In other circumstances, the data will be available from IT systems, so the actuaries will just need to provide gross IBNR.

The reinsurance managers may also need to notify reinsurers of any potential large claims. There is usually an agreed threshold for any IBNR claims to be reported to the reinsurer.

Consequences and impact to business and reserving

Incorrect reporting to reinsurers can damage relationships and ultimately could lead to coverage being denied such as under non-disclosure clauses. It is essential that accurate figures are provided in a timely manner to enable the reinsurance managers to fulfil their obligations.

As with all interactions, providing the requested information in an accurate and timely manner is conducive to a better working relationship.

4.6 Other parties – Group, auditors, consultants, regulators

Companies are required to provide quantitative and qualitative information to external parties such as, but not limited to rating agencies, regulators, consultants, the media and the auditors of the organisation. It is often necessary for the reserving function to manage the dialogue with these parties. A major part of the quantitative information often relate to claims and reserving, which tend to be the largest liability item in the balance sheet. The reserving function is usually involved in the communication of this information due to their knowledge and expertise in the area.

The ways we can ensure good interaction and communication with 'other parties' include:

- ▶ Submission of information to external parties
- ▶ Demonstrating and receiving feedback on reserving processes to Auditors
- ▶ Internal Reporting and communications with head office/group and other entities or business units

4.6.1 Submission of information to external parties

The reserving function is often responsible for gathering and preparing information to be submitted to external parties on a periodic basis such as regulators (in the form of insurance returns), external auditors (for data and documentation) and rating agencies (input into presentations or other documents). Their in-depth knowledge regarding the company's reserves means they may also be involved in meeting with these external parties to discuss the information provided and answer any queries. These meetings with external parties generally have a significant influence on their view of the company and in particular the held reserves.

Consequences and impact to business and reserving

Actuaries can assist to positively manage relationships with external parties by ensuring that information on reserves communicated by them is both correct and provided in context. This includes making sure that the information is clearly understood by the people that will be directly communicating with these external parties, if it is not themselves.

Actuaries need to understand and manage the expectations of external parties. For example, the company risks reputational damage and a penalty for late submissions to the regulators if returns are incomplete or late. In the case of an external actuary performing the valuation or providing an actuarial opinion on the company's reserves, the company needs to understand the reasons behind any concerns and where applicable, provide further quantitative or qualitative information to resolve the issues.

Companies benefit from effective communication with regulators, external consultants and rating agencies. Feedback from external parties also allows actuaries to gain industry knowledge and understand areas of differences with competitors.

4.6.2 Demonstrating and receiving feedback on the reserving process to auditors

An insurance company's claims reserve is typically the largest liability item on the balance sheet. As such, the Reserving Actuary is required to help external auditors build confidence in the company's reserving processes and controls. This involves the actuary providing information and documentation to the auditors, attending meetings to discuss the reserving processes and controls and receiving feedback from the auditors on a periodic basis. Ultimately, the auditor may have a different opinion on the company's held reserves (within materiality limits) but the auditor has to have opinion of the company's reserves.

Consequences and impact to business and reserving

Actuaries need to fully understand the expectations from the auditors and the regulators of its reserving processes and controls. As the company receives external opinion of its reserving processes and controls, its reserving processes should become more

rigorous and become closer to best practice as it addresses the shortcomings from the auditor's or regulator's feedback. Timely communications and actions taken early can prevent potential audit sign off issues and hence avoid penalties from the regulator and reputation damage to the company.

The actuaries will also gain knowledge on key market issues and benchmark information from the auditors (and consultants), the robustness of the company's reserves will improve by reflecting this additional market information.

4.6.3 Internal Reporting and Communications with head office/group and other entities or business units

Companies that manage their business via business units, divisions, branches or subsidiaries will usually require results to be reported to head office or the group management functions periodically. These results are usually consolidated and used for strategic and monitoring purposes and allow the analysis of the 'big picture', which will flow back down to individual business units.

For claims reserves, the reserving function would normally provide information according to reporting instructions. This requires understanding of timelines for reporting, structure and contents of information required. Some insurance companies are also required to perform reserving work under guidelines or certain standards which apply across all entities within the same group. Typically, actuaries would need to discuss with the head office and other business units to seek clarification on matters, and to achieve consistency of reporting amongst entities.

Consequences and impact to business and reserving

The Actuary's choice of reserving assumptions could be different to the recommended guidelines from head office. The Actuary should consider the appropriateness of the head office guidelines to their portfolio and communicate any differences and justifications of the Actuary's own assumptions to the head office. The reserving guidelines are likely to be fine tuned over time through iterations of feedback from business units to the head office.

The aggregated results for the group could give a misleading picture if business units do not report the results correctly in a timely and consistent manner. This will increase the risk of setting inappropriate strategies that will have negative long term effects.

4.7 Capital and Risk Management

In many companies the reserving and capital teams are structured together as part of an Actuarial Finance function. Even within a common management structure improving the interaction between the teams will lead to more effective reserving and capital modelling. The capital team rely on many inputs from the reserving process in their capital modelling.

The risk management team should also work closely with the reserving team to reduce and mitigate risks in the reserving process.

Key interactions with the business should include:

- ▶ Exchange of information and feedback for capital modelling
- ▶ Processes and controls around reserving

- ▶ Signoff of reserves by reserving and management
- ▶ Peer review

4.7.1 Exchange of information and feedback for capital modelling

There are many common assumptions used for both reserving and capital modelling. Using the same reconciled data will ensure consistency and aid in reconciliation and validation of the data and the outputs from the modelling.

Consequences and impact to business and reserving

Reserves form a key component of the liabilities in the capital model. It is important for the reserving actuary to share the basis of the reserves supplied, as both best estimate and booked reserves which may include a risk margin are used. The assumptions used in calculating these reserves will allow the capital actuary to determine if any adjustments are required for their modelling. For example, to determine whether any risk allowances can be offset when calculating diversification benefits between portfolios or regions.

Reserving and capital actuaries may both require the base data triangles. Using just one set will ensure consistency and make reconciliation easier. There may however be a need to consolidate the data if the capital modelling is performed at a more aggregated level than the reserving team operate at. It may also be required if capital modelling is based upon a regulatory or company entity structure whilst reserving is on a management reporting structure, which may then require transformation, to get the required basis.

The capital team also require future cash flows of how the reserves will be paid out in future. Current market reserving process is often focused on estimating the level of total reserves and not necessarily concern with on pattern of the future payments. It is therefore important that appropriate understanding and rigor is applied by the reserving actuary when setting the payment pattern as they are aware that it will also be used in the capital models.

The capital team will use these payment patterns in their models. They can therefore provide a valuable feedback loop to the reserving actuaries, providing information on how actual payments in the year compare to those assumed in the patterns.

4.7.2 Processes and controls around reserving

Risk can work closely with the reserving team to develop a best practice approach to the reserving process and methodology. This will include:

- ▶ Validation of data throughout the reserving flow starting from the extract of the data from the insurers' claims and policy data, through the reserving triangles and calculations to the final reserves booked in the companies' accounts.
- ▶ Validation and testing of models and spreadsheets to minimise the risk of coding or other errors.
- ▶ Ensure clear and detailed documentation of the reserving process is produced and updated whenever changes are made.
- ▶ Ensure that there is ongoing discussion, challenge and debate with the business including underwriting, pricing and claims.

Consequences and impact to business and reserving

- ▶ In addition to confirming the correct data has been used in the reserving process, it will aid the external audit as it provides a full end to end picture of the reconciliation of the data.
- ▶ By testing models the risk of errors is minimised so ensuring the calculations used to calculate the reserves are operating as expected and coded by the reserving actuary. This will provide confidence in the reserves presented to the management and used elsewhere in the business, whilst assisting with external audit signoff.
- ▶ Detailed and up to date documentation will aid the reserving team especially new members joining, whilst providing a reference for those more experienced. This will help to ensure processes are operated and planned so reducing the risk of reserving error.
- ▶ Risk can act as a facilitator to these discussions with the business, to ensure they happen regularly and that the appropriate people attend and participate effectively. This will help to reduce the risk of missed information which should have been considering in the reserving decision making process.
- ▶ We note that the extent to which the internal audit function is involved will vary by company.

4.7.3 Signoff of reserves by reserving and management

A formal signoff process with its supporting documentation will benefit both reserving and management. It allows the key features and assumptions made when setting the reserves to be captured. In addition details of those factors related to risk factors and how these input to the selected risk margin should be documented along with rationale for change since the previous period.

Risk can act as facilitators and auditors of this process to ensure it is working effectively. They can ensure that the reserves booked in the accounts are those expected by the reserving actuary and management.

Consequences and impact to business and reserving

By not have a robust process there is a risk of errors in the reserves set in the company accounts, or not having sufficient information or rationale for why the decision was made. This may also be required for external parties including auditors and regulators.

4.7.4 Peer Review

Internal or external peer reviews could be used to constructively challenge the assumptions and judgments made by the reserving actuaries. For the reserving actuary, it is worth checking if there is sufficient and appropriate evidence on which to base a conclusion, referring to both the quantity and quality of evidence.

This review can be performed or facilitated by Risk depending upon their actuarial knowledge and skills. They may therefore just oversee the work which is performed by another part of the business.

Consequences and impact to business and reserving

Performing peer reviews will allow an independent view of the reserving and may identify areas for future development for the reserving actuary to allow them to be more effective in future.

It may also identify any areas which may need to be investigated or reviewed in future.

5. Ideas for best practice

There are a number of overriding principles which will be valid for any relationship. These include timely response to queries, proactivity and regular two-way contact.

In this section we will review the interactions discussed in the previous section and suggest ideas for best practice to help build, maintain and get the most out of these relationships. Where appropriate we will consider some questions which may be useful to include in conversations with the relevant parties.

5.1 Claims and specialist

Claims Handling Procedures and the Life Cycle of a claim

It is generally considered best practice for the reserving team to build relationships with the claims teams at the earliest opportunity. Both sides can usually benefit from an understanding of the processes of the other. Reserving actuaries should understand the key performance indicators (KPI's) on claims reserving effectiveness, the structures of their claims teams and the reasons for this structure. The claims teams should be aware of the benefits and limitations of the actuarial analysis. This will include understanding the requirements of the actuaries for consistent case reserving practice and keeping actuaries up to date with any changes as these can significantly affect development patterns and hence actuarial estimates.

There is no set way to establish this working relationship, but good interaction will usually consist of regular formal meetings between claims and actuaries (of which minutes to the meeting should generally be kept for an audit trail). This will also usually be combined with more regular informal catch-ups between key stakeholders. Both teams may also benefit from spending time sitting in the other department.

The types of questions which may be helpful in discussions with claims teams will depend on whether the business is personal lines or London market, direct or reinsurance. The following questions could be asked of a personal lines claims team:

- ▶ Notification of claim
 - ▶ When the First Notification of Loss occurs – how does this claim get recorded?
 - ▶ Incident Date – how is this allocated, particularly on a late reported claim?
 - ▶ How is the peril or claim type determined and can/does this change in the future?
 - ▶ How is the initial reserve set up?
 - ▶ How is it checked if a claim is valid?
 - ▶ What happens if it looks like it will be a large claim?
 - ▶ What are the heads of damage – windscreen, escape of water, freeze etc
- ▶ Case Reserving
 - ▶ How and when will a true case reserve be moved to?
 - ▶ How often will this get revised?
 - ▶ What would trigger a revision?
 - ▶ What happens if a recovery is anticipated?
 - ▶ What is exactly included in the case reserve?
- ▶ Payments
 - ▶ How do payments occur and how are these recorded?
 - ▶ How does co-insurance/Reinsurance get recorded?

- ▶ Settlement
 - ▶ What happens when the claim is settled?
 - ▶ How is this recorded?
- ▶ Overall
 - ▶ What happens if any of the above changes?

Large Loss and Catastrophe Reserving

A good model for interaction on catastrophes involves requests for information on estimates going to a single point of contact. Often this is a senior member of the claims or actuarial team. It is important that before the information goes back up to senior management that consultation occurs with all concerned parties to ensure that the information presented will take into account everything that will make up the cost of these claims. Interaction with Finance will then occur to ensure that attempts to “book” an estimate have been passed by both claims and actuaries

Often, an estimate will be required soon after a catastrophe. Although all parties should generally be consulted, the level of data available for the actuary and the key parties who should be involved will depend on the type of business. In the personal lines market, raw data is usually available relatively quickly from an IT system. The claims team should be consulted for any backlogs but the data is often fed back at an early point. The actuary should be aware of the significant drift which could occur in the next month as late reported claims trickle in and mis-coded claims get re-aligned to the correct causation.

In the London Market and especially reinsurance and retrocession, the underwriters will usually contact cedents/insureds to get the latest estimates of likely insured losses. The claims team will begin handling the claims later as they become formally notified. So the actuary will rely largely on the information gathered by the underwriters and may only be responsible for collating. In order to set an IBNR load, the actuary should consult the underwriters and claims team to try and establish how accurate these estimates provided by clients will be, especially where the underwriters may have qualitative information. Management may also require an estimate before this information is available, in which case the actuary will usually need to consult with the catastrophe risk modelling team who can use their models to establish an initial estimate. The actuary may be able to use actual experience of prior events to estimate the loss.

Claims Key Performance Indicators and other Management Information

Interaction between claims and actuaries can be improved if a common language can be agreed upon. For example, care should be taken that where average claims costs are quoted by either team, it should always be stated if these average costs allow for IBNR. Similar rules may apply to quoted claims frequency, particularly when pricing teams also become involved. Claims frequency could be stated including or excluding nil claims on notified or settled basis and may easily be misinterpreted. Finally, the inclusion of (notional) Loss Adjuster Fees may be required in data for external consumption and pricing needs.

One way of improving communication between claims and actuarial could be to have exchange visits between the two teams. Many actuarial graduate schemes include placement in claims handling teams for a short period and this can only be a positive development. Actuarial teams could actively encourage claims specialists to explore the actuarial work being done in their company. A recent claims away day at a major

insurer asked if the claims teams had “hugged an Actuary” today. Whilst this may be taking things a little far, a simple coffee from time to time between claims specialists and actuaries can bear fruit.

5.2 Underwriting

Building a relationship with the underwriting team where both teams can openly communicate issues and findings to each other will be invaluable to the reserving process. Key lines of communication will cover:

- ▶ Explanation of roles – in order to promote a good working relationship with the underwriting team it is necessary for the reserving team to communicate how the reserving process works and its effect on the underwriters. Often the underwriters will have a stronger relationship with the pricing team as they are a direct recipient of the pricing team’s analysis. It is important for the underwriting team to understand how the reserves feedback into the business.
- ▶ Results & Findings – feedback sessions to the relevant underwriting team of reserving results and observations made in the reserving process (i.e. trends in certain types of claims etc) will be of use to the underwriters and will hopefully encourage a feedback loop for underwriters to inform the reserving team of any arising issues they observe.
- ▶ Transparency – it is important to explain how changes in underwriting can affect reserves, i.e. changes in terms and conditions, perhaps by performing sensitivity analysis to present to the underwriters. This should enable the underwriters to appreciate how changes in business will affect the reserves both in a positive and negative direction.

5.3 Pricing

Clear communication is the key to ensuring an effective relationship between the pricing and reserving teams, which will promote a better understanding of the issues affecting the business for both teams.

Communication of the following issues is useful to aid the development of a successful working relationship:

- ▶ Data – it is important to understand where and why differences arise between pricing and reserving data. This will enable the reserving team to more easily recognise weaknesses in the data and rectify any issues that may not have previously been highlighted.
- ▶ Assumptions – it is also important to understand the reasoning behind assumptions used by the pricing team eg disease loads in liability, that will also be used by the reserving team. By investigating any differences in opinion, new information may come to light which should enable a more informed decision.
- ▶ Results & Findings – communication of results from the reserving team to the pricing team and vice versa will enable both teams to take into consideration the other teams' findings. Either team may identify a change in the underlying data i.e. an increase in claim frequency for claims in excess of a certain threshold; which may not have been picked up in the other team's analysis.
- ▶ Rest of the business – the reserving and pricing team should communicate to ensure a clear message is being delivered to the rest of the business. It will not be beneficial to either team if "mixed messages" are being delivered to other business users as this could reduce the credibility of both teams and have a knock on effect on relationships with other areas of the business.

5.4 Management and Finance

The Reserving Actuary is responsible for providing a best estimate of reserves to management. However in a good relationship, the actuaries will not be providing purely this. GN12 provides a summary of what should generally be included in an actuarial report and this gives indications of what should be communicated to management in the course of normal reserving.

Some of the things their communication of the reserves may include are:

- ▶ Best estimate reserve
 - ▶ What basis the reserve has been calculated on e.g. statutory, local or group reporting, tax authority
 - ▶ At what level the reserving is done – product (and possibly sub product), distribution channel, gross or net of reinsurance
 - ▶ Whether any implicit loadings or adjustments been applied
 - ▶ What the key assumptions are which could materially impact the reserve level.
- ▶ Analysis of movement since previous reporting period
 - ▶ Identify changes in underlying data and claims changes
 - ▶ Specify methodology changes in how the actuary has calculated the reserve
 - ▶ Quantification of currency restatement impact
 - ▶ Any other one off impacts – may be from legislation or other "shock" to the reserve level
- ▶ Uncertainty

- ▶ At times, it is useful to illustrate the degree of uncertainty surrounding the estimates and sensitivities to changes in key assumptions by use of ranges or scenario testing. This may not necessarily be needed every quarter, however it may be useful with “reverse scenario testing” (ie combinations of scenarios that would make up a “bad” result) to demonstrate to management.
- ▶ At other times a scenario type analysis may be more useful on certain issues/claims. Here the actuary would normally identify and explain any potential risk factors and quantify the financial impact of each scenario.
- ▶ The actuary should also highlight where the uncertainty has materially changed between reviews.
- ▶ Booked reserves
 - ▶ What is the split between Actuarial Indication (best estimate) and Risk Margin
 - ▶ What is the movement amount since the previous reporting period
 - ▶ What is the cause of this movement
- ▶ Business and Operational Planning
 - ▶ What is the starting point reserves and claims ratios for the business and operational planning
 - ▶ What material assumptions have been made when setting the reserve level
 - ▶ Are there any implicit margins in the reserves. If so, are they quantifiable and if so what is their amount
 - ▶ How does the reserve reconcile to the assumptions made by Pricing and Underwriting on current claims ratios

The relationship should also be both ways. Management should tell the actuaries what information they would like to see and what will help them make their decisions.

With finance, actuarial should work to provide information in the most convenient way. Also, finance deadlines are generally “hard” deadlines, so it is important to make sure any delays are communicated to the finance team as soon as possible.

5.5 Reinsurance

The relationship between the reinsurance team and the actuarial team is generally based on data provision. The simplest way of building this relationship is likely to be in doing a timely and accurate job in providing information requested. As with all relationships, this should help reciprocate similar standards.

The provision of accurate data will also build credibility with the wider business, but the provision of inaccurate data could result in the actuaries quickly losing credibility. If the business loses money due to recovery leakage or reporting clauses in contracts not being fulfilled which is owing to inaccurate information provided by the actuaries, the financial cost will be quickly evident.

Conversely, the involvement of actuarial in commutations and reinsurance purchasing can provide financial added value to the business.

5.6 Other parties

As a general rule, actuaries need to understand their audiences' interest and prepare information and adjust style of communications to a suitable level. For example, the regulators are typically focused on the overall level of reserves, much more than the adequacy or the statistical aspects of the reserves by class of business. Actuaries also need to understand the consequences of their communications to other parties. Understanding the significance of the communications will help the actuary with the preparation and the presentation of information.

With auditors, the actuaries should try to have discussions on a periodical basis and be open to discuss weaknesses of the reserving process and adequacy of reserves. They should also try to make the relationship two-way and draw on the market knowledge of the auditors.

They should actively participate in feedback loops in which they are involved and not be afraid to discuss or raise concerns when appropriate.

5.7 Capital & Risk Management

When communicating the result of the reserving analysis with capital and risk management, the actuary should consider the following items. It should be noted however that this is not an exhaustive list and the actuary should use their judgement in deciding what should be shared.

Capital

- ▶ Best estimate reserves and booked reserves – should use consistent basis when discussing with Finance and Management
- ▶ Future payment patterns:
 - ▶ The level of detail required e.g. product (and possibly sub product), distribution channel, gross or net of reinsurance
 - ▶ Has total future payment been scaled to the best estimate reserve? You will need to know this as the selected best estimate reserve may not have been calculated using a paid method
 - ▶ Is the pattern appropriate for both new business and runoff? If not, consider supplying separate patterns.
- ▶ Reserve uncertainty and sensitivities
 - ▶ Provide details of any reserve ranges calculated and basis used. These may have been calculated by deterministic or stochastic methods
 - ▶ What has been excluded from the calculation e.g. shocks, latent claims and legislation changes. How have these effects been added back in?

Risk Management

- ▶ Risk factors identified during reserving process
 - ▶ What is the risk and source
 - ▶ Financial impact on reserves of these risks

- ▶ Type of risk e.g. insurance, investment or operational risk
- ▶ Indication of likelihood of risk materialising
- ▶ Recommendations and suggestions on how risk could be mitigated
 - ▶ Impact of risk on the Business
 - ▶ Which function does it impact e.g. reserving, claims or underwriting and pricing
 - ▶ Process and business operation changes
 - ▶ Controls to identify, monitor and mitigate the risk

6. Implications for reserving across international territories

Often working across international territories in reserving creates further complications – it may be due to differences in language, cultural, regulation, accounting, professional requirements or even just idiosyncrasies within each company.

Below are some observations and additional factors the reserving actuary should consider when performing or communicating reserving across international territories.

6.1 *Reserving basis*

Reserving basis can vary by country and by local or group reporting depending on the valuation purpose. The difference may be due to accounting and regulatory requirements or management may require reserves on a number of different bases for local and group level reporting. The reserving actuary needs to clearly indicate when communicating reserving information the valuation basis of the reserves or what it actually represents. These can be for both internal purposes and external e.g. to regulators and tax authorities. Different reserving bases include:

- ▶ A best estimate with an explicit risk margin added to form the booked reserve. The best estimate is usually defined as the mean (expected value) of the aggregate distribution of the unpaid claims and contains no margins for prudence or optimism. For Solvency II purposes, the reserves will be calculated as the sum of a best estimate and a risk margin.
- ▶ Reserves that include an implicit risk margin ie it is not a “true” best estimate. This can cause problems when used for pricing if the input required for their premium rate setting should be without a margin or any other prudence loadings. Inclusion of a margin will also make it difficult when assessing ongoing reserve adequacy and runoff experience.
- ▶ Local accounting and regulatory requirements may specify a particular reserving basis to be used. This can include adding a specified, possibly formulaic, risk margin or discounting the reserves.

Reconciliation between the reserves on various different bases may also be required.

6.2 *Regulation and legislation*

There may be large differences in the legislation relating to a particular product between countries, which can in turn impact the reserving. For example, in the UK, Personal Accident is an accident only product with clearly defined benefit amounts based upon specific accidental injuries to the insured. In Sweden however, the majority of policies sold include specified health benefits in addition to accident benefits. Claim amount can vary depending upon disability percentage assessed by the state social security and health bodies. If these bodies admit disability then the insurer has to follow. The majority of the claims cost can relate to these health benefits. This Swedish PA product is closer to a Total and Permanent Disability or Critical Illness product in the UK than Personal Accident.

The reserving actuary needs to be aware of these differences and should be discussed with the business, typically pricing, claims, underwriting and management, to understand the particular rules relating to the product in the specific country. As reserving tends to be based upon historic trends and development factors of the claims

data, this information needs to be historic and not just the current position. A timeline can then be developed indicating dates of historical changes with details of what was changed at those points.

6.3 *Product*

When reserving in a different country the reserving actuary may not be familiar with the product. As noted in a number of the case studies in section 2, there could be specific product features which would impact the approach and assumptions used in the reserving. The coverage and terms and conditions may be very different and the reserving actuary should take care not to make assumptions regarding the product even if it has the same name as another product in the UK or another jurisdiction.

It is critical that the reserving actuary discusses the product features with the business, specifically the claims, pricing and underwriting teams prior to estimating the reserves.

6.4 *Role of the actuary*

In some countries the role of the actuary is not recognised or does not exist in the same way as in the UK or US. This may create challenges when dealing with the business as there is not the existing relationship or involvement in the estimating the reserves. The business may be more used to simple formulaic approaches or using of standard actuarial techniques without applying judgement to the assumptions in estimating the reserve. In these instances, the actuary would need to educate or raise awareness of the reserving process (and the related uncertainty) when discussing reserves with the business. There may also be support available from the Group or Head Office level if the local operation is part of a multi-national (re)insurer.

6.5 *Communication*

When sharing the reserving results with the business the actuary needs to be aware of local customs in terms of communication. There may not be a culture of challenge by the business during discussion of the results. Although setting the level of best estimate reserves is the responsibility of the reserving actuary it is important they receive critical feedback and challenge from pricing, claims, underwriting and management. They may provide insights to the process the actuary has not included in their assumption and decision making process.

Another challenge may be language, especially if the local language is different to for example, the group level where the business language is commonly English. This may not create a challenge in business interactions with management where English is the common business language but can cause problems and miscommunication when dealing with other local areas critical to inputting into the reserving process including pricing, claims and underwriting.



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