

Reforming the UK  
Flood Insurance Regime

The Breakdown of a  
Gentlemen's Agreement

Michael Huber

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The support of the Economic and Social Research Council (ESRC) is gratefully acknowledged. The work was part of the programme of the ESRC Centre for Analysis of Risk and Regulation.

Published by the Centre for Analysis of Risk and Regulation at the  
London School of Economics and Political Science  
Houghton Street  
London WC2A 2AE

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ISBN 0 7530 1655 9

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Printed and bound by Printflow, January, 2004.

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## **1. Introduction**

The floods of summer 2002 in Central Europe and China, recurrent earthquakes in Turkey and Japan and frequent hurricanes in the USA and Central America challenge the economic fundamentals of the societies exposed; unexpected effects through economic, financial and political “channels” make intelligent risk management mandatory. One important element of an intelligent risk management strategy is an insurance system that is able to adapt to new situations triggered by eg, climate change.

As one consequence of climatic change and the related weather-induced risks, the current insurance regimes for natural hazards is being critically reviewed (eg, Freeman / Kunreuther 2002; Hutchin 2002; Anderson 2002; Grace, M.F. / Klein, R.L. / Kleindorfer, P.R. 2000; Grace, M.F. / Klein, R.W. 1999; Cummins / Doherty /Lo 1999). From this review, the division of responsibilities between state and insurance industry emerged as major problems. In most countries, coverage is organised by the state, while private insurance schemes play a minor role in the case of natural hazards; therefore the market penetration is low and public schemes prevail (eg, Kunreuther 1978; Meier 1988; Palm / Hodgson/ Blanchard / Lyons 1990; Palm 1995; SwissRe 1998). In the recent debate, however, a strong emphasis is laid on the greater suitability of private insurance schemes. It is expected that private insurance regimes would be able to handle the recovery more efficiently and fairly than the administrative system. If this assumption holds it is difficult to assess empirically as the arguments in favour of private insurance schemes are based on conceptual assumption rather than empirical evidence. Private insurance in most countries is only an additional, scarcely used option to cover against damages (eg, Huber 2003). One exception, however, exists: the English flood insurance scheme.

This paper investigates the English flood insurance schemes as it is one of the few countries where private insurance schemes against flooding have already existed for more than half a century. Its detailed analysis should supply first indications about the assumed advantage of private over public insurance schemes. The quality of the insurance system is not measured in terms of how to handle routine situations or being economically efficient, but mainly in terms of its ability to adapt to new situations. The insurability of natural hazards is at stake. Analysing the insurance regime and the main features of its reform, this paper illustrates the quality of

insurance and the processes establishing the insurability of flood events in England (for differences between England, Scotland and Wales see Crichton 2003).

## **2. Flood Management in England**

Unlike most industrialised countries, England developed a private flood insurance scheme about half a century ago. It emerged as a reaction to flood challenges at the time and remained largely unchanged ever since. It can be described as a ‘Gentlemen’s Agreement’ between Government and the insurance industry. It is based on a division of responsibility between the state providing flood defences and the insurance companies compensating in the case of flood damage. In 1998 and 2000, two major floods challenged the economic basis of this setting. The insured losses due to flooding sharply increased from £500 million in 1998 to £1 billion per event in 2000. All relevant actors perceived this increase as a fundamental crisis that had to be brought on the (political) agenda. Reform was considered essential, but difficult because of the specific nature of the Gentlemen’s Agreement. The Gentlemen’s Agreement is no explicit regulatory regime but an invisible set of rules governing overall flood management. Although invisible, the Gentlemen’s Agreement shapes the interpretation and implementation of English flood management.

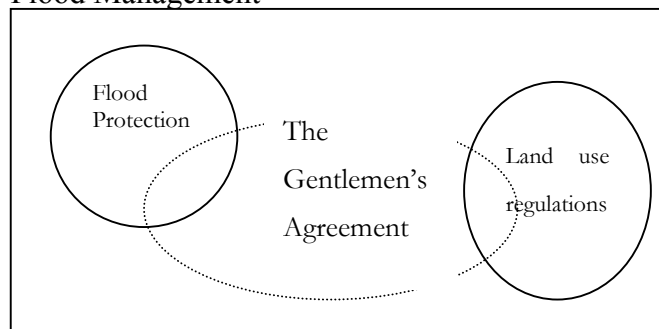
### **2.1. Formal Regulations of Flood Management in the UK**

Many areas of the UK are, and have been, regularly exposed to flooding. The regulation of flood protection is therefore a historical phenomenon that can be traced back to 1531 when the first legal regulations concerning protective measures against floods were issued (Elahi 2000, 9). Flood protection is only part of flood management and regulation. Another relevant element of flood management focuses on land-use / housing development. The regulations on flood protection and land-use issues are largely unconnected. To talk about flood management is therefore considered an assumption about *functional requirements* but “no explicit national policy statement on flood hazard management in Britain is identifiable” (Parker 1987, 36; see Table 1). Flood management is a patchwork of vaguely joined areas, but it would be premature to assess coordination to be deficient. Flood management is bound together and coordinated by the Gentlemen’s Agreement, which provides the interpretative framework<sup>1</sup>. To capture the impact of the formal flood protection and land-use planning, on insurance coverage, *co-operative structures* of these regulations and some issues of *resource distribution* are discussed briefly.

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<sup>1</sup> The main elements of the regulations can be found in the Environmental Act (1995), the Water Resource Act (1991), the Land Drainage Act (1991) and the Coastal Protection Act (1949).

## Flood Management



**Table 1: Fragmented flood management in the UK**

### **Flood protection<sup>2</sup>**

Flood protection is a task of the state carried out by delegating its main efforts to regional and local authorities. Political and administrative responsibilities are organised in a multi-layer structure. The Department for Environment, Food and Rural Affairs (DEFRA) is responsible for the overall policy and it provides most of the funding. Local authorities have the responsibility for the provision, design and construction of single projects and the maintenance of local flood protection. The Environment Agency (EA) has the responsibility of supervising all matters related to flood defence, but it is again not carrying out its policies as the implementation is delegated to regional and local authorities, ie, the Regional and Local Flood Defence Committees. (DEFRA 2001, 11). Furthermore, the Department of Transport, Local Governments and the Regions as well as the Internal Drainage Boards hold competences in flood protection. This relatively complex system of competing and complementary competences can be expected to generate friction and difficulties in articulating and implementing a coherent policy. Exactly this fragmentation has been criticised, the failure of flood warning in 1998 was considered a symptom of systemic weaknesses (EA 1998; 1996, NAO 2001).

The ambiguous structure of responsibilities is also mirrored in the way resources are collected and distributed. Three sources fund flood defence: (i) the state, (ii) the funding arrangements for operating authorities (mainly the EA) and (iii) money invested directly by local authorities. The state funds flood defence mainly through the DEFRA / National Assembly for Wales (NAW) grants. The main addressees are local authorities carrying out works for defences, warning systems and infrastructure. The DEFRA supplementary credit approval scheme provides money for investments not covered by the DEFRA / NAW grants. Rates for drainage works that is collected and used for the purpose of flood defence constitute another source of monetary flow, which also supports the work of the Environment Agency.

In 1999-2000 total expenditure in England from all sources on flood and coastal defences was about £390 million, of which it is estimated 75 per cent was spend by the EA, 15 per cent by local authorities and 10 per cent by Internal Drainage Boards (IDBs). Some £70 million (of the £390m) was provided as (then) MAFF grant aid and Supplementary Credit Approval. Non Government Funding (approximately £40

<sup>2</sup> The technological possibilities of flood protection are not discussed. Flood protection is considered a technological fix where the discussion about the allocation of resources substitutes a more critical view on resources and technological possibilities together.

million) included: drainage rates paid to IDBs by farmers and other drainage rate payers in their areas; general drainage charges paid to the EA by farmers in the Anglia Region, outside IDB areas; and business which contribute to the costs of defence necessary to facilitate future developments or which will provide significant benefits to them.

(DEFRA 2001, 13)

Resource allocation remains uncontrollable as the flood management system operates in two parallel, competing processes.

### **Land Use**

Land use planning is an original area of flood related regulation. Nonetheless, floods played only a minor role in land use planning until recently. Although an increasing number of people are exposed to the risk of flooding - currently 1.85 million houses, 185,000 commercial properties, impacting a total of 5 million people - the awareness about the economic and social consequences is hardly developed (eg, Crichton 2002, 119). Future aspects of exposure and levels of vulnerability are at stake and land use regulation seems a crucial dimension of an integrated flood management. But with new developments, public awareness for flood management issues - in the public, but also with the local authorities - decreased rather than increased (Insurance Day, 14 August 2002, 5). Only as a reaction to the floods of 2000, a *Planning Policy Guide* (PPG 25) was developed that emphasised the importance of flood-risks for planning processes.

To summarise: the threat of floods is not taken seriously. The bureaucratic background is fragmented and the coordination of the distinct areas of flood management appears insufficient. Insurance companies hardly play any role in these policies although the impact of flood protection and land use regulations on insurance coverage and the economic success of insurance, as well as future prospects, are not to be underestimated. From a practical perspective, the fragmentation of flood management has not been perceived as major an obstacle as the Gentlemen's Agreement which has exercised a coordinating and interpreting function for flood management and in particular, insurance.

## **2.2. The Insubstantial Core of Flood Management**

The Gentlemen's Agreement constitutes the insubstantial core of flood management. Its main characteristic is the absence of formal regulation but despite that, it exerts a remarkable regulatory power by shaping flood management.

It remains somewhat unclear when this Agreement was negotiated. Scholars place the beginning between the late 1950s and 1961 (Crichton 2002; Salthouse 2002). There is, however, a consistent understanding of its contents. The two main actors, industry and the state, share responsibilities. The insurance industry gave the "guarantee to government that for residential properties it would not refuse to offer flood insurance for any residential property, *no matter what the risk*. It further agreed that the additional premium rate would not exceed 0.5 percent on the sum insured" (Crichton 2002, 127; my emphasis M.H.). "No matter what the risk" interprets the availability of protection too widely as John Salthouse points out a slightly more restrictive condition for insurance coverage.

Insurers and Government agreed in the late 1950s *that only in exceptional circumstances where continual, regular flooding was unavoidable*, would insurers consider withholding cover or apply especially loaded terms to reflect the higher risk. (Salthouse 2002, 71, my emphasis, M.H.)

Regular exposure to flooding is a situation where insurance can be declined. An *escape clause* for industry was introduced. In that way, the Gentlemen's Agreement opens a certain degree of freedom for the appraisal of insurability. Insurance claims, however, that virtually all risks are covered. On the other side of this Agreement, the state is obliged to provide sufficient flood protection. No qualification about the *sufficiency* of flood protection or related financial commitments can be found. The insured house-owners – as an other stakeholder group, keenly interested in flood management and insurance coverage – play no role in this Agreement<sup>3</sup>.

The main reasons to establish such an Agreement are seen in the industrial fear for formal, restraining regulation that goes beyond immediate flood issues. John Hadmer (1990, 21) presumes that the “fear of nationalisation and other pressure from government played a major role in prompting extension to cover during the 1960s.” The advantages for the Government to refrain from regulation meant that it could externalise a highly uncertain situation to a specialised institution prepared to manage such events. It also escapes the threat of acting as insurer of last resort. But it raises the problem of accountability as none of the features of the current regime – the division or responsibility, the levels of risk coverage, and escape rules - has been subject to public debates during the last 50 years. The negotiation to establish the Agreement was protected against external control, claims of responsibility, accountability or commitment. Therefore the two actors are mutually dependent on the “correct” interpretation of this unwritten contract as in a case of conflicting interpretations of the Agreement, no automatic mechanisms can be set in motion to resolve disagreements.

### **3. The Interpretative Framework of Flood Management**

It is difficult, if not impossible, to privately insure natural hazards. The difficulties are related to the fact that the threat is considered by the potential insurance population to be too remote to invest in insurance. At the same time also, the general (public) awareness of natural hazard is low (Kunreuther 1978). Only those property-owners that are aware of their being exposed to floods frequently and with severe consequences may consider to purchase insurance. An insurance population based on these assumptions makes natural hazards a *bad risk* for insurance. Opposite to normal insurance coverage, natural hazards do not generate numerous small claims over a certain period but all claims are focused around the occurrence of one single event. If, potentially, all insured claim compensation at the same time, funds will be emptied. If another event occurs before the fund has re-accumulated the necessary means, the solvency of insurance companies is under pressure (for the US flood insurance see

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<sup>3</sup> Two reasons could be: as long as the Gentlemen's Agreement works, and the insurance costs are low, there is no reason to open the Agreement for other actors. Or the two providing actors do not want to attract too much attention due to the problem of *adverse selection*, ie, to attract disproportionately persons with high risks exposure.



Meier 1988). The re-insurer Swiss Re claims nevertheless that floods can be insured privately only if two conditions are kept:

- The state and the insurance industry promote risk awareness among the potential risk population and
- They “promote solidarity between those who are seriously at risk and those who are barely at risk” (SwissRe 1998, 49).

The level of *risk awareness* and *solidarity* determines the insurability of natural disasters. The main difficulty, however, is that these conditions cannot be obtained under market conditions. Customers do not want to subsidise the protection of others but if insurance coverage for the exposed groups is costly, the market penetration remains low and raises the price for protection even further (Kunreuther 1978, Palm 1995). At the same time, the public awareness of the hazard is high *only immediately after* the event occurred. Already two years after the occurrence the hazard is nearly forgotten; awareness vanishes with the memory of the event (for the 1998 flood see EA 1998). The Gentlemen’s Agreement was able to manage these difficulties over a long period. Its internal logic reveals the core of the successful English flood insurance.

### 3.1. The Division of Responsibilities

The historical success of the Gentlemen’s Agreement cannot be questioned. It survived half a century without trouble, it protected most of the English house owners and no severe political conflict can be linked to it. The substantial core of the Gentlemen’s Agreement is the protection of all house-owners against all flood related risks. In an official statement, the Association of British Insurers (ABI) claims “insurance against flooding is provided in virtually all homeowners’ insurance policies” (News release ABI 2002)<sup>4</sup>. The Agreement optimises the risk spreading across all property owners (hence ensures *solidarity*) and in that way establishes a sound economic basis for insurance activities without burdening the state. To reach that goal, flood insurance in England is a *bundled* and *compulsory system*. *Bundled*, as all natural hazards, including flood, are packaged to one insurance policy; *compulsory*, as all house owners are forced to purchase protection as mortgage is given only in the case of *full* insurance coverage, including coverage against natural disasters. This bundled, compulsory system works, but with declining marginal revenue as “moral hazard” *systematically* undermines protection.

Insurance is often feared to fail due to an information asymmetry between the insured, who know more about the risk and their possible reaction to it than the insurance company. This informational disadvantage requires control of the contract holders. Insurance cannot work efficiently if the insured act in a lax way or even try to exploit the insurance system, turning, for example, compensation into a source of (illegitimate) income or disregarding decent behaviour. Faced with a nearly unconditional compensation system, as in the case of flood insurance, exploitation or lax behaviour is particularly attractive and dangerous at the same time. Such behavioural effects are denominated as *moral hazard* referring to “the tendency of insurance protection to alter an individual’s motive to prevent loss” (Shavell 1979, 541, see also: Laffont 1995, 319; Banerjee / Besley 1990). Moral hazard marks the

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<sup>4</sup> There is a considerable difference between costs and insured costs. The losses are much greater than the actual compensation.

economic vulnerability of insurance and indicates precautionary measures to be taken by insurance companies. To contain this form of information asymmetry, contractual remedies should be developed (eg, Stiglitz 1983). “Exploitation” of flood insurance is not (only) based on individual misconduct but it develops in a systemic way. Normally moral hazard implies that one actor group takes advantage of an uncontrollable situation, but in the flood management, all relevant actors behave laxly or irresponsibly. Thus, flood management is based on a *systematic deviance* of all actors that flags the pathology of the entire regime. The Gentlemen’s Agreement establishes a set of rules and interpretation guidelines for all stakeholders that institutionalise lax and irresponsible behaviour. The behaviour of the insurance firms, the state as well as the insured can be characterised by withdrawal, negligence and irresponsibility.

### 3.2. The Systemic Moral Hazard

In the current setting of flood insurance regulation, the state tends to withdraw from responsibility. The main reasons can be seen in the fact that insurance firms accept a major share of financial responsibility and virtually all risks. As *The Economist* remarks: “In most rich countries, the government forks out to compensate those who suffer flood damage. That hasn’t been true in Britain since 1961 when the Government *offloaded responsibility for flood damage to the insurance industry*” (The Economist 17.11.2001, 34, my emphasis, M.H.). Knowing that all negative effects of flooding are covered, the state can act more laxly as far as its own responsibility for *flood protection* is concerned. And the UK Government has also reduced investments into flood management over the years. As a consequence, flood management is considered by all relevant actors to be underfunded (eg, NAO 2001). The unwillingness to provide financial help even in extraordinary cases reinforces the clear division of responsibilities. John Handmer (1990) exemplifies this point when he shows that the state mobilised only *minimal help* to flood victims in a poor, and under-insured area. Elahi (2000) emphasises the disengagement of the state from social aspects of flood insurance when she writes:

the policy of the Government is not to compensate for uninsurable risks.  
(...) The only exceptions are means-tested grants made to people with very limited incomes.

Elahi (2000, 13)

Not being vulnerable, the state tends to attach little importance to flood protection. The rational behaviour of the state to only get minimally involved into flood management is problematic, as the Gentleman’s Agreement has no in-built signalling mechanisms that unambiguously signal the insufficiency of investments or to make border cases visible.

In social science literature, this withdrawal of the state has taken an amazing interpretation as flood insurance is seen as *social policy* that was successfully externalised to the economy. The cost side of this agreement is interpreted - wrongly - as “free of costs”: John Hadmer writes, “(f)lood insurance is automatically included in most British household policies *at no extra premium*” (Hadmer 1990, 21, my emphasis M.H.). Contrary to this position, flood protection is not “free of cost”. Hadmer’s remark indicates another point, however, namely that the economic

conditions of flood protection are invisible for scholars, but more importantly also for the insured and probably the insurance industry itself. Not only the awareness of the flood damage but also of *solidarity* is hidden away by this Agreement (eg, Crichton 2002). If costs are hidden, the main signals of malfunctioning either cannot be sent or more often are failed to be deciphered. Furthermore, the Agreement spreads the costs of flood damage across (virtually) all UK house owners; the market penetration is estimated to be (between 75 per cent and) 95 per cent, but the exposure rate is only 10 per cent<sup>5</sup>. This extreme width of risk spreading is perceived as *solidarity*. The Concise Oxford Dictionary defines *solidarity* as *mutual dependence*. Solidarity is not made explicit. Instead of highlighting the solidary cross subsidies in order to identify changes more swiftly, in the Gentlemen's Agreement this aspect is suppressed. In the case of flood insurance, only the households exposed to floods and insurance companies depend on the solidarity from the not-exposed house owner. Their solidarity makes flood coverage affordable. However, it is *not mutual* as these house owners do not need it, they could live without flood coverage in their insurance bundle. Solidarity is actually subsidising the insurance industry and those house owners in exposed areas. Not explicating this act of solidarity implies the loss of a signalling system to utter dissent or consent. Abstracting from the moral issue of solidarity, the main problem of this form of solidarity is the effects it has on the *visibility of signals* that should steer the behaviour of insured and insurance firms. As the premiums for each individual household are reduced considerably by the compulsory system, the signalling effect of prices to avoid damage is distorted. But to blur the effects of payments means to trigger lax behaviour, both from the side of the house-owners, as their damage is paid regardless of exposure, and from the side of insurance firms, as the incentives to detect exposed areas and lax behaviour are minimal. If costs are no clear signal for the flood insurance regime and it is difficult to relate costs to individual or collective efforts or the lack of it, the system is bound to fail. Then the fundamental mechanism of a private insurance system is not in place. The insurance industry has insufficient incentives to identify weakness in flood defence, patterns of individual behaviour or their internal costs structure as they subsidise costs across natural perils and the entire insurance population. Veiling the actual costs of floods results in blinding the system for the flood risk. Apart from industry and the state, also for the insured it seems impossible to relate flood damages and premiums to their stakes, a circumstance that might result in lax behaviour. The price-signals they receive are distorted, but also the lack of control of claims suggests *moral hazard* as rational behaviour.

It can be concluded that all actors tend to behave less attentively and aware of the risks involved than necessary. Flood management becomes opaque and hardly worthy of public attention. The conditions of insurability defined by SwissRe apparently do not apply but the system is still operational. However, there is a threshold before these problems become visible. It was assumed that transgressing the systemic threshold triggers first conflict, then reform. The necessary external pressures were found in the floods of 1998 and 2000. After the floods of 2000, the insurance industry

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<sup>5</sup> "They (the leading insurers, M.H.) agreed not to penalise domestic property and small business at risk of flooding by a policy of cross subsidies from those at less risk of flooding or other natural perils. (...) The insurance industry is not heavily regulated but a gentlemen's agreement between the industry and the Government has ensured that flood insurance (as part of an all-risk policy combined with property insurance) is widely available even to low-income households" (Elahi 2000, 13 f).

claimed that a substantial reform of flood management was required. The new situation was linked to climate change. Adaptation faces two major challenges:

- *first*, to detect when changes are systematically different to the predicted variation and
- *second*, to understand the internal logic of the flood management in order to adequately reform or overcome it.

The first challenge is apparently “resolved” by the general debate on climate change and the particular role the reinsurance industry has played. The insurance industry is aware of the problems related to climate change and acts accordingly (section 4). The reformatory challenge to adapt the flood insurance to the changing conditions is described in section 5.

#### **4. External Pressures**

As long as external conditions remained unchanged, the insurance regime was able to prosper. It resolved the problems of insurability by making them invisible. When the frequency of floods and the size of their impacts started to rise, these routines of risk management were challenged. In the case of flood management the challenge is triggered by the scientific predictions about climate change (see International Panel for Climate Change website for information: [http://www.grida.no/climate/ipcc\\_tar/](http://www.grida.no/climate/ipcc_tar/)). Due to the international debate on climate change throughout the 1990s, changes in weather patterns were expected to happen and perceived as fundamental crises to flood management by both the insurance and the political system. This modified the perception of flood and has hence shed a critical light on the insurance regime outlined above.

##### **4.1. Climate Change**

With the reference to climate change, the main view on natural disasters is altered as floods and storms are no longer an unavoidable fate, but can be attributed to the unintended effects of industrial development (eg, Swiss Re 2002, CII 2001) and in some remote sense, to decisions. In this process, natural hazards are turned from dangers into risks. A higher frequency of weather-related risks, and in particular of extreme events, is to be expected in the near future. Floods, which were categorised as one in a hundred years, are now to be expected to happen once every ten years. Such profound changes have been confirmed in numerous national and international studies. The local impact has not been detailed yet. Even if predictions of local changes are highly uncertain, they all point to the direction of higher environmental stress. For the UK, for example, it is predicted that the sea level will rise in 2020 between 7 cm and 38 cm, in 2050 this figures increase to values between 21 cm and 67 cm, and in 2080 the sea level is expected to rise to between 18 cm to 99 cm. The probability of hot summers in the southern part of the UK increases from 6 per cent in 1990 to between 56 per cent and 100 per cent in 2080 (eg, Salthouse 2002). Regardless of the uncertainties related to these predictions, industry and political actors started to orient their work at a programmatic level to manage this challenge<sup>6</sup>.

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<sup>6</sup> It might be argued that it is uncertain that climatic changes causes these effects, hence it would be inappropriate to base the policy on the contested relationship between environmental changes and industrial production. From the perspective of this analysis it is only of secondary importance if these suggested relationships between climate change, weather and insurance can be verified, it is sufficient that actors act under the condition *as if* they were verified.

In practical terms this also means that flood management should be improved as better protection will be necessary. DEFRA states “that more funding was necessary to maintain the current level flood and coastal protection and possible increases in future demand influenced by external factors such as climate change” (DEFRA 2001, 15). The growing awareness of potential threats also modifies the general attitude towards flood risks when the current adaptive approach is exchanged for a more cautious, preventive attitude.

#### 4.2. New Risk Assessment

In the light of climate change, industry has taken a more active and preventative approach. In 1999, the Association of British Insurers (ABI) commissioned an assessment of flood risk (ABI 1999) which indicates that there is a considerably higher risk for extreme floods than previously realised. In that sense, insurance reconfirmed the scientific findings. But the main signal for insurance is costs. The costs pressure from natural hazards (expressed in terms of *insured losses*) grew rapidly over the last decade. While the insured loss of the UK floods of Easter 1998 was estimated at £500-700 million, the insured losses for the floods of 2000 exceeded the psychologically upper bound of £1 billion. In the meantime, the maximum loss is estimated to be £2 billion. We can observe a comparable, even more pronounced development in the USA, where until 1990 a maximum loss due to natural disasters was estimated to be below £700 million. In 1992, Hurricane Andrew cause an insured loss of £9.5 – 14 billion and in the meantime predictions expect up to £70 billion of insured losses for single events. The actual loss estimates are hundredfold the prediction of ten years ago.

These changing cost structures have to be managed by the insurance industry. Costs are the signals that make climate change a relevant threat for the insurance industry as some tightly coupled problems emerge.

- The increased costs for insurance coverage are not sufficiently reflected in premiums.
- The higher frequency of more extreme events leads to dramatic challenges of the solvency management of industry.
- The state seems unwilling to accept the role of an insurer of last resort and to invest substantially more into flood protection.

Consequently, the sheer existence of private insurance schemes against flood damage in the UK is under pressure. Kunreuther (2000) emphasises that this increased economic pressure leads to reconciliation of *preventative* measures implemented by industry, ie, industry tends to take over the role of a regulator (as a normative position see Arnell 1987). Moreover, he talks about a *public-private partnership* that should be established to contain the rocketing costs. In the UK, another position seems prevailing: the state saw no need to act while the ABI - after 2000 - emphasised the need for a more pronounced state commitment in the area of prevention, ie, higher investments.

Insurance against flooding is provided in virtually all homeowners’ insurance policies. The UK is one of only a handful of countries throughout the world where this is the case. However, climate change,

ageing flood defences and some property developments are increasing the risk and costs of flooding. *The Government needs to take action to ensure that flood cover can remain generally available.*

(News release ABI 2002, my emphasis, M.H.)

Focusing on prevention, two new problem-areas of the insurance regime were identified: (i) the ageing flood defences and (ii) property developments. Both areas of flood management are formally regulated and can be changed - given a political will to do so. Some of the effects of these changes on the Gentlemen's Agreement and the effects the Gentlemen's Agreement has on regulatory reform are assessed in the next section.

## **5. Reforming Flood Management**

Under pressure from changing environmental conditions, principal concerns about the sufficiency of flood management were uttered. Insurances wanted to exit the Gentlemen's Agreement if the state would not provide better flood protection, ie, invest more resources into embankments, dikes and other technical measures<sup>7</sup>. The state was willing to raise financial issues and issue regulations that are more stringent. Both actors are interested in the prolongation of the Gentlemen's Agreement. The industry had to find a way to control the lax behaviour of all actors - including its own - and at the same time to ensure the insubstantial core of the regime. Different strategies were put forward to achieve these - somewhat contradicting - goals. The main problem appeared to be the unintended effects such modifications and explications may have for the Gentlemen's Agreement.

### **5.1. The Publicised Debate**

Already after the disastrous floods in 1998 in the UK, first requests for reform were uttered. In reaction to the floods in spring 2000, the British insurance industry decided on a *moratorium* on flood insurance coverage until the end of 2002. In that period it would continue to accept to cover (nearly) all damages related to floods. The Government, however, needed to rethink its commitment in flood protection, establish more stringent regulations and invest considerably more resources into flood protection. At the end of this two-year period, industry would assess if the policy was compatible with private insurance coverage. In the case of "non-compliance", industry would have to rethink its guarantee to cover virtually all flood related risks. The main reasons for this policy shift were monetary pressure and large uncertainties for future developments:

The domestic household insurance market's underwriting loss of £209 million in 1999 is expected to have rocketed during 2000 in the light of the flood claims given that costs for these incidences alone almost equal the entire cost of weather related claims during 1999. *Insurers feel that they cannot continue to subsidize losses of this scale and the market*

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<sup>7</sup> The amount of resources was commonly considered a sufficient indicator of the quality of flood protection. It implies a common position on technical and allocation issues, but no agreement has been established on this issue.

*leaders have given the government two years to develop adequate flood defences before they start redlining high-risk areas.*

(Datamonitor 2001, my emphasis, M.H.)

To control the lax behaviour of the state the insurance industry established a new, more sophisticated (political) “contract” (for contracts as solution for *moral hazard* see Stiglitz 1983: for contracts see eg, Williamson 1985). Seeing floods as result of climate change implied that it would become a more costly problem in future, in particular considering the political target of building three million new homes mainly in flood prone areas until 2016<sup>8</sup>. The floods of November 2000 seemed to have substantiated all fears and predictions, and opened for changes in policy making. Although ABI restated the willingness of the insurance industry to cover weather related losses, it added conditions.

(If floods and storms become more frequent and more severe than in the past, action needs to be taken now in the affected areas to ensure the industry can continue to provide the service it currently does. That means good flood defence strategies and adequate investment in vulnerable areas. It also means that planning guidance to local authorities must guard against unprotected and irresponsible building on floodplains and that guidelines must be fully enforced. (Mary Francis, ABI Director General, 6 November 2002)

Expecting increasingly severe floods led to pressure on the state and, at the same time, a more open interpretation of the escape clause capturing *exceptional situations*. In a document on a “partnership approach”, ABI qualifies *exceptional situations* that were defined as “unavoidable, regular flooding” (Salthouse 2002, 71: see also 2.2.) in a different way

Exceptional circumstances might be where

- The residents of a flood risk area have refused a flood alleviation scheme on the grounds of amenity
- New properties have been built in a floodplain area without sustainable defences: or
- The flood risk has deteriorated to the extent where flooding is inevitable and there are no prospects of a flood defence scheme being put in place within a reasonable timescale.

(News release ABI November 2001, 4).

Exceptional situations change their nature, not only as they occur more often. Now they have less to do with “objective” risk levels based on past claims, but they refer to issues such as careless behaviour, inadequate regulatory provision or highly uncertain expectations. Broadening the escape clause put extra pressure on the state to reconsider its position, but it exposes the Gentlemen’s Agreement to public scrutiny also.

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<sup>8</sup> The level of exposure and vulnerability increases. For the political system, the new situation requires not only a more careful approach towards housing development but also a strategy to contain *political risks* of being made responsible if wrong decision are taken in the context of land use.

For the state, financial aspects of the flood defence play a pivotal role too. Although a first reformed regulatory package has been discussed in the second report of the Environment, Transport and Regional Affairs Committee on “Development on, or affecting, the flood plain” it was considered insufficient by the ABI. It was suggested to increase the financial commitment: also as a study of the National Audit Office (NAO) issued in March 2001, emphasised the inadequacy of the flood defence structure and pointed to high insurance losses due to insufficient protection of new developments in flood plain areas<sup>9</sup>. Furthermore, it also pointed to the need to increase the awareness of the risk; hence, also here more resources should be invested.

The political decisions were under pressure from industry. Already in July 2001 the *Daily Mail*, reported on the growing unwillingness of the insurance companies to further compensate for flood damage as they had before 2000. The spokesperson for ABI, Suzanne Moore, emphasised that *from now on* premiums would be differentiated according to exposure<sup>10</sup>, thus depending on the regional history of incoming claims. This would lead to a rise in premiums for some insurance product lines between 1 per cent and 4 per cent (see *Financial Times*, 4 July 2001). All press releases on financial pressure, premium differentiation and a widened escape clause should build up pressure on the Government to provide more protection for highly exposed areas. In November 2001, it was even claimed that flood insurance for entire areas was no longer feasible. In accordance with this statement, the clause of *exceptional circumstances* should refer to *a lack of sustainable defences* (*Insurance Day*, 20 Nov 2001), ie, it refers to a *state failure*. Practically this extension of the concept of “exceptional circumstances” means that the first £1000 to £5000 of every claim has to be paid by the house owners (*The Sunday Express*, 6 January 2002).

Although the need of a productive collaboration between state and industry has been emphasised, the strategic moves had the effect of shifting more responsibility towards the house owners - *without giving them a voice in this process*. But this modification of the original agreement has its limitations: if insurance puts more pressure on Government, Government can threaten industry with formal regulation. If the Gentleman’s Agreement was no longer the basis for flood insurance, a more comprehensive regulatory regime would have to be established, and it could have far-reaching negative impacts on the industry (compare Hadmer 1990). Initially, government did not seem to be committed to increase their efforts in financial terms but was looking for ways to differentiate the economic and administrative burden. As one way of resolving the underfunding of flood defences it was suggested to collect contributions from developers, simplify the administration of flood defence and differentiate costs by collecting an extra tax of exposed riverside homes. *The Times* (14 February 2002) estimated the flood-tax to be at least £60 a year per property; this should guarantee yearly revenue of £120 million from exposed properties. The other source of income is charges on developers where builders should be charged 1 per cent of the value of each new property. This source could generate an extra income of

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<sup>9</sup> Other actors repeatedly emphasised the need for better dikes and embankments (e.g. Lewis District Council, 26.9.2002).

<sup>10</sup> It was not clarified how the level of exposure is measured. Two basic strategies could be considered: either the past claims (like in a *bonus / malus* car insurance) or predictions about future exposure (see Australia) to determine the future level of premiums. There was no final decision taken.



£200 million a year for the Treasury, but challenged the bundled, compulsory insurance system. These monetary aspects are only one side of the state intervention. New administrative procedures should make the regulatory commitments more transparent and efficient. The co-ordination of projects should not be based on the current scheme-by-scheme basis but regional councils should be responsible for particular areas. Decisions on property development should prioritise environmental considerations, hence also aspects of flood management. The state suggests a regulatory package that hardly challenges the Gentlemen's Agreement but provides *some* financial and administrative improvements for the inefficient and under-financed flood management. Industry initially opposed the results of the consultation process launched in February 2002 by DEFRA on the flood defence funding and criticised most aspects of these state interventions. *Firstly and mainly*, the overall financial commitments of the Government were considered insufficient as they focused on new properties and ignored the existing and largely unprotected stock of properties. This was considered *inefficient*. The insurance industry considered it necessary to increase the flood protection funding by £145 million each year. This high number seemed to be more persuasive than a more efficient use of resources. Both actors raised issues of *fairness* too. Introducing an extra levy for exposed households seems to get a market oriented logic to work.

However, there must also be recognition of the political problems that would arise because of a better functioning market in flood damage insurance that is the impact on the incomes of those living on the flood plain.

(DEFRA in *Insurance Times*, 21 February 2002)

ABI writes that “in a limited number of localities premiums may need to raise beyond levels that are affordable by some households thereby effectively reducing the availability of cover” (News release ABI, November 2001, 9). Also the *Financial Times* (14 February 2002) said that it meant that “flood victims could be hit by taxes to pay for defences,” ie, they could be hit twice (Huber 1989). The effects on the short-term income of insurance firms could have unwanted effects on the value of property too. It was generally assumed that the flood-tax combined with the increased premiums and the difficulty to get new insurance would reduce property prices or insurance coverage. It was even suggested that property insurance should be subsidised until the house owners “get used” to paying higher premiums (*Insurance Times* 21 February 2002).

From the perspective of insurance companies, the higher prices will lead to a sorting out of high-risk properties. Excluding “bad risks” (*high exposure, low willingness / ability to improve protection, low premiums*) would only mean that the bad risk is shifted to the state that is unprepared to accept the insurance risk as social burden. Solidarity ends where insolvency starts. It will be more difficult for new house owners in exposed areas to insure their houses or to sell their property as mortgage is linked to complete insurance coverage. In the light of the lack of a state scheme to support flood victims, the shifting of (direct and indirect) economic costs to the insured is one major problem of this development that might have political consequences. Another major issue refers to liability aspects that concern the permit to construct houses in risk prone areas: to what extent are the state or local authorities liable for practically taking back permits already issued?

Only some of these issues discussed have been taken up again when a new agreement was decided upon. The main problem seemed to balance the prolongation of the Gentlemen’s Agreements and necessary changes. Pushing the adaptation too far could in the long run lead to the end of private insurance coverage, but not adapting the Agreement to the new situation, might have the same effect.

## 5.2. A New Agreement

In late autumn 2002, a new agreement between the state and insurance industry was decided. It left the Gentlemen’s Agreement untouched and envisaged reform in the areas of land use planning, administrative organisation of decision making in the field of flood protection, proposing more money for flood protection and accepting a differentiation of levels of protection. The ideas of a special levy on properties disappeared from the agenda.

Starting with the financial improvements, the state funding of flood protection was envisaged to increase. While in 1990 / 91 the total investment in flood protection was £221.4 million, it grew up to £339.8 million in the budget of 2000/ 01<sup>11</sup>. Until 2003 / 04 it is forecasted to be £411.7 million (DEFRA 9.9.2002, 5). The funding of flood protection does not fully match the expectations of the insurance industry, but there is a clear increase in commitment over the years. The increase between 2000 and 2004 is £71.9 million while a rise of total spending in England, including local authorities, of £150 million is suggested until 2006 (News release ABI 15.7.2002).

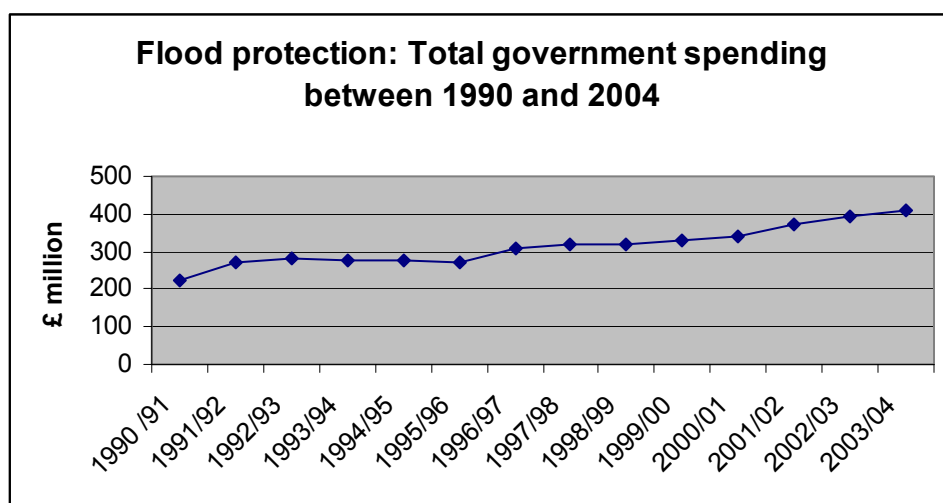


Table 2: Flood protection: total government spending between 1990 and 2004

Regulatory changes to improve the management of these additional resources have been suggested. The government focused on DEFRA to set up regional committees to implement a more comprehensive management structure and a more effective use of funds. As the state of flood defences is not equally poor (or good) across the country, a national plan to decide upon priorities was considered necessary. This could improve the efficiency of the resource allocation. First attempts of modifying land use regulations have been made and further changes are promised.

<sup>11</sup> For different, higher figures see: DEFRA 2001, 13.

The insurance industry has contributed a statement of principles that outlined its position after the end of the moratorium, December 31st, 2002. Five objectives were identified

- Full access to a competitive market for insurance for the vast majority of house owners and small businesses
- Improved security for those who live and work in high risk areas
- New provisions for those who wish to sell their home and businesses
- Better use of new solutions to make property insurable even in high risk areas where improvements to flood defence are not planned
- A clear incentive for Government and local authorities to continue to invest in flood defences.

(News release ABI 26.9.2002)

Although the “old” aims of providing flood insurance to the great majority of homes and small business was maintained, a policy shift of the insurance industry can be observed. Two decisions are important in this context:

- *Industry reduces the extent of coverage.* While the pre-2000 narrative emphasised the completeness of coverage, now coverage is turned to issues of risk levels, state commitments and willingness to accept additional regulation. Insurability first presented as unconditional, now is conditional and premiums are differentiated. The conditionality, however, is not only based on an economic calculation, but on issues of regulations, preparedness to adapt and other non-economic behaviour that is hard to assess and control.
- *Additional regulation* is the second major change. It is not the adaptation to the new regulation that is at stake, but the *insurance itself is taking on the role of a regulator* when it claims that “better use of new solutions to make property insurable (should be made) even in high risk areas where improvements to flood defence are not planned,” (News release ABI 29.9.2002). In order to be insured, the insured needs to take *more* than the regulatory precautions. Industry is in competition with the state when it assumes competence in the field of flood protection, formally a state monopoly cemented by the Gentlemen’s Agreement.

The flood management regime was altered and at the same time remained largely unchanged. Industry was able to achieve most of its requests:

We have come a long way in achieving the three improvements the industry has asked for. We asked for improvements in planning guidance and steps have been taken into that direction. We have seen more expenditure pledged by the Government on the question of flood defences. And work is now being done on how funding will be allocated in the future.

(John Parker, Head of General Insurance AB in Insurance Age, November 2002, 30)

The success can be divided into a visible and invisible component. The visible component refers to the reassurance of the state’s commitment to flood management, whereby the increased financial contribution represents the main part. To continue

with a (somewhat qualified) division of responsibility and the reinvigoration of the bundled, compulsory system of flood protection remains invisible, but is equally important to the insurance industry. For the state it is of importance that providing the public good of flood protection is still completely decoupled from compensation.

## 6. The Unintended Reform of The Gentlemen's Agreement

The adaptation of the Gentlemen's Agreement to a new situation was not frictionless but successful to the extent that it did not alter the regime. It increased the political and public awareness of flood damage and, more importantly, the public spending in this area. The robustness of the Gentlemen's Agreement to survive this significant crisis could be considered a sign of its suitability to resolve the insurance problems of natural disasters. It could be concluded that the private flood insurance works: it covers nearly all risks at reasonable price, is able to adapt to changing situations - within a brief period of time - and is almost frictionless. The Gentlemen's Agreement is a success story even if challenged and hence, a first conclusion could be to support the hypothesis about the superiority of a private flood insurance scheme. This is, however, only one side of the story.

The private insurance coverage for flood damage seems to have worked under two conditions: *first*, the awareness of the all actors and the public has to be minimal. Opposite to the conceptual claim of increasing public attention about flood damage, the functioning of the Gentlemen's Agreement was based on veiling the problems and needs of flood management. *Second*, the costs have to be shared among an artificially enlarged insurance population. Hence, it is based on invisibility and costs below a certain threshold. This contradicts the two conditions of insurability advocated by SwissRe (1998, 49). The reformed Gentlemen's Agreement differentiates premiums charging house owners in exposed areas more, and makes in that way the "burden sharing" mechanism visible, debateable and exposed to criticism. Increasing efficiency and fairness are the result at the cost of unveiling the subsidising. All these are desirable things, but they make also the systemic failures of the Gentlemen's Agreement visible: the reform could only limit the *moral hazard*, but not resolve it. The lax behaviour of the original Agreement can be expected to be repeated if the basic contractual relationship dividing responsibility and compensation between insurance and the state – intentionally excluding the insured – remains unchanged. The reform of the flood management regime has raised the guards of the insurance industry and the state, but did not modify the structural basis of the Agreement. The new Agreement is applying a once successful mechanism to repair its shortcomings – and it may be expected that this solution increases rather than decreases lax, irresponsible behaviour in the light of more frequent and stronger impacts.

The regulatory reform of the Gentlemen's Agreement not only updates the old spirit, but it also alters the system at essential points. In its attempt to mitigate and control *moral hazard*, it differentiated premiums according to levels of exposure. More thorough risk assessments of the exposed areas are carried out to identify the properties with a very regular, nearly habitual exposure. They are to be excluded from compensation. This differentiation of flood protection increases the efficiency of insurance in economic terms, but raises *political* and *legal* problems. Local authorities stand for decisions on land use. If insurance sorts out properties as *bad risks*, but the local authority allowed the development of these properties that will fall in value and

are no longer marketable due to lacking insurance coverage. In addition, liability issues will arise. As state regulation is less stringent or (in some areas) non-existent, insurance companies become what could be called *indirect regulators*: they define conditions of insurability by deciding about land use and property values. These decisions are only valid until new assessments are made. These new conditions of insurability, however, turn not only more properties into bad risks, but limit the possibilities of further housing developments considerably and may annul regulatory efforts. The direct regulators, ie, local authorities, are left with uncontrollable effects of such decisions. They are under pressure to provide some kind of protection against regulatory failure and to ensure that housing developments meet the future needs of British society. The direct regulations of flood protection adopted by the insurance industry leads to regulatory competition (eg, Heritier et al 1996). When industry takes on the role of a “regulator of last resort”, industrial standards, however difficult it might appear to develop and implement them in a coherent way, would be decisive for flood protection.

Although the Gentlemen’s Agreement survived, the roles of the state and the industry have changed. The state can be expected - eventually - to act as “insurer of last resort” for the bad risk properties, while the insurance industry turns out to be the “regulator of last resort”, both ingrate roles that both actors prefer to externalise in a new Gentlemen’s Agreement. The clear-cut division of responsibility between state and industry is blurred: their relationship should become more cooperative (or competitive). Considering the actual circumstances, the Gentlemen’s Agreement has been shifted from an agreement that was established to avoid regulation to an *emerging regulatory regime*. The Gentlemen’s Agreement developed from an *implicit* to an *explicit agreement* that not only dissolves the strict division of responsibilities but now establishes a wider actor space, including apart from state and industry (and the insured), also regulators (eg, Environment Agency), experts and local authorities. Policymaking has turned more explicit, is has to be translated into (more or less) formalised rules and procedures. It is open to more transparency and conflict - all factors that will dissolve the Gentlemen’s Agreement over time. The nature of the Agreement has changed in a fundamental way.

## 7. References

- ABI (2000) *Inland Flooding Risk – Issues Facing the Insurance Industry*. London (Research Report Nr. 10).
- Anderson, D.R. (2002) ‘Environmental Risk Management – A Critical Part of Corporate Strategy’ in: *The Geneva Papers on Risk and Insurance. Issues and Practice*. vol. 27 (2).
- Arnell, N.W. (1987) ‘Flood insurance and Floodplain Management’ in J. Handmer (ed.) *Flood Hazard Management. British and international perspective*. Norwich: Norwich Geo-Books.
- Banerjee, A. / Besley, T. (1990) ‘Moral Hazard, Limited Liability and Taxation: A Principal Agents Model’ in *Oxford Economic Papers* (42).
- CII (2001) *Climate change and insurance*. London (Research Report of The Chartered Insurance Institute).
- Crichton, D. (2003) *Flood insurance in England and Wales: are there lessons to be learned from Scotland?* London (Technical Papers 1, Benfield Greig Hazard Research Centre).
- Crichton, D. (2002) ‘UK and Global Insurance Responses to Flood Hazard’ in *Water International*, 27 (1).
- Cummins, J.D. / Doherty, N. / Lo, A. (1999) *Can insurers pay for the “big one”? Measuring the capacity of the insurance market to respond to catastrophic losses*. Philadelphia (Manuscript).
- DEFRA (2001) *National appraisal of assets at risk from flooding and coastal erosion, including the potential impact of climate change*. London (Final report July 2001, <http://www.defra.gov.uk/enviro/fcd/default.htm>).
- DEFRA (2002) *Flood and Coastal Defence. The Autumn 2000 floods*. London (<http://www.defra.gov.uk/enviro/fcd/floodingincidents/floodinf.htm>).
- EA (1996) *Policy and Practice for the Protection of Floodplains*. London.
- EA (1998) *Environment Agency Response to The independent report on the Easter 1998 floods*. London .
- Freeman, P.K. / Kunreuther H. (2002) ‘Environmental Risk Management for Developing Countries’ in: *The Geneva Papers on Risk and Insurance. Issues and Practice*. vol 27 (2).
- Grace, M.F. / Klein, R.L. / Kleindorfer, P.R. (2000) *The Demand for Homeowner Insurance with Bundled Catastrophe Coverage*. Pennsylvania, (Manuscript).

Grace, M.F. / Klein, R.W. (1999) *Efficiency Implications of Alternative Regulatory Structures for Insurances*. Paper presented at the American Enterprise Institute Conference on Optional Federal Chartering and Regulation of Insurance. Atlanta (Manuscript).

Hadmer, J.W. (1990) *Flood insurance and relief in the US and in Britain*. Canberra (Centre for Resource and Environment Studies, Australian National University).

Heimer, C.A. (1985) *Reactive Risk and Rational Action. Managing moral hazard in insurance contracts*. Berkeley.

Heritier A. / Knill, C. / Mingers, S. / Rhodes, B. (1996) *Ringing the Changes. Regulatory Competition and the Transformation of the State. Britain, France, Germany*. Berlin.

Huber, M. (1989) 'The Market Failure as a Functional economic moment' in: Segerstahl, B. / Krömer, G. (eds.) *Policy Responses to Large Accidents*. Laxenburg.

Huber, M. (2002) *Conceptualising Insurance. Risk management under conditions of solvency*. London, CARR Discussion Paper Nr.9.

Huber, M. (2003) *Variation in the insurability of floods*. London (Presentation at the Conference "Challenging Insurability" LSE, 4 and 5 December)

Hutchin, J.W. (2002) 'Environmental Conservation and the Risk Industry: A Natural Alignment of Interests' in: *The Geneva Papers on Risk and Insurance. Issues and Practice*. vol. 27 (2).

Klein, W.R. / Kleindorfer, P.R. (1999) *The Supply of Catastrophe Insurance Under Regulatory Constraints*. Pennsylvania (Paper presented at the Project Meeting of NBER on Insurance).

Kunreuther, H. (2000) *Risk Management in the Era of Global Environmental Change*. Philadelphia (Manuscript).

Kunreuther, H. (1997) *Managing Catastrophic Risk through Insurance and Mitigation*. Paper presented at the 5th Alexander Howen Conference on Financial Risk Management for Natural Catastrophes. Gold Coast (Aus).

Kunreuther, H (1978) *Disaster Insurance Protection. Public Policy lessons*. New York.

Laffont, J.-J. (1995) 'Regulation, moral hazard and insurance of environmental risks' in: *Journal of Public Economics*, 58 (1995).

Meier, K.J. (1988) *The Political Economy of Regulation. The case of Insurance*. New York.

NAO (2001) *Inland Flood Defence*. London (Report by the controller and auditor general HC 299 Session 2000-2001: 15 March 2001).

Palm, R.I. / Hodgson, M.E. / Blanchard R.D. / Lyons, D.I. (1990) *Earthquake insurance in California. Environmental Policy and Individual Decision Making*. Boulder.

Palm, R.I. (1995) *Earthquake Insurance. A Longitudinal Study of California House Owners*. Boulder

Parker, D.J. (1987) 'The Institutional and Policy Context' in J. Hadmer (ed.) *Flood Hazard Management. British and international perspective*. Norwich.

Salthouse, R. (2002) 'Lessons to be learned from the autumn 2000 flood disaster in the UK' in: *Insurance Research and Practices* vol. 17 (1).

Shavell, S. (1979) 'On Moral Hazard and Insurance' in: *The Quarterly Journal of Economics* November 1979.

Stiglitz, J.E. (1983) 'Risk, Incentives and Insurance: the pure theory of moral hazard' in: *The Geneva Papers on Risk and Insurance* 8 (26, January 1983).

SwissRe (1998) *Floods – an insurable risk?* Zurich.

SwissRe (2002) *Opportunities and risks of climate change*. Zurich.

Williamson, O.E. (1985) *The Economic Institutions of Capitalism*. New York.



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