



## **Limits of insurance as risk governance**

Market failures and disaster  
politics in German and British  
private flood insurance

**Kristian Krieger and David Demeritt**

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# Limits of insurance as risk governance

Market failures and disaster politics in  
German and British private flood insurance\*

Kristian Krieger<sup>1</sup> & David Demeritt<sup>2</sup>

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## Abstract

Insurance is a key mechanism through which societies have been managing risks for centuries. For some, insurance is an efficient mechanism for risk management providing both regulation of risk-increasing behaviours and compensation for material damages. Others, in particular Ulrich Beck, have pointed to limits to insurability on the basis of the scale of damages and the complexity of contemporary risk. This paper engages with the question about the role of insurance in governing complex risks by describing and explaining the variable performance of flood insurance schemes in Germany and the UK against key risk governance objectives, namely, financial recovery and risk reduction. Drawing on in-depth empirical research, the paper argues that the mixed performance of flood insurance against governance objectives is shaped by the specific political, institutional and politico-economic context in which flood insurance schemes are embedded. Specifically, relations and interactions between state and private flood insurers, as well as past and present market conditions, shape how private insurance evolves, is organized, and facilitates or impedes financial recovery and risk reduction. The findings of this research provide important insights as to the limit, variety and implications of insurance as a governance mechanism for addressing contemporary risks.

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## Introduction

This paper analyses the role of private insurance in the governance of risks. It explores, using the case study of flood management, the broad questions of: What role can insurance play in governing risk? What limitations does insurance in risk governance face? What factors shape concretely the role of insurance in governance?

At first glimpse, private insurance is a long established sector within modern service economies and welfare states populated by profit-seeking corporations. The corporations provide a wide range of financial products and services to their clients, from motor and health to home insurance. At a closer look, a more fundamental role emerges for insurance. Modern capitalist societies cannot function without insurance, whether privately or state-provided, because insurance enables individual risk taking and provides a financial safety net in the face of uncertainty. Partly as a result of this foundational role of insurance for capitalist societies, scholars have increasingly taken an interest in the role insurance does and can play in governing modern societies, in particular through the provision of financial incentives and compensation.

Broadly framed, this paper distinguishes between optimistic and pessimistic scholarly accounts of private insurance in governance. Pessimistic scholars, often associated with the ideas of Ulrich Beck (1992, 1999), question whether insurance has a role at all in governing increasingly complex, potentially catastrophic risks in a ‘world risk society’. Optimists, for instance drawing on work from international political economy concerning the privatization of governance, in contrast, describe insurers as key actors in the international political economy due to their investment capital and international risk assessment and management expertise (Jagers and Strippel 2003; Strange 1996). Other optimists, with an interest in economic incentives and losses, present insurance as a key risk governance mechanism in contemporary societies, referring to their ability to regulate risks via economic incentives and facilitate economic recovery through their fast processing of claims and access to capital (Ericson, et al. 2003; Kunreuther 1996). In contrast to pessimists, optimists therefore suggest that insurance can provide and strengthen risk reduction efforts, facilitate financial recovery from disasters, and increase the efficiency of both risk regulation and financial recovery from disasters. The optimists’ claims resonate with broader debates about the rise and benefits of market-based mechanisms of regulation (Jordan et al. 2005) or – from a more critical perspective – the emergence of neo-liberal forms of governance and insurance (Ewald 1991; O’Malley 2004).

This paper aims at providing a nuanced, empirically informed picture of the role of insurance in the governance of complex risks. To this end, it disentangles different governance objectives pursued through insurance (financial recovery and risk reduction), studies how the objectives interact, as well as examines and explains the extent to which insurance has been effective in their pursuit. As a result, the paper allows us to learn lessons about whether and why there is cause for either optimism or pessimism for insurance-based governance of complex risk with regard to governance objectives.

Concretely, the paper studies the case of flooding, the financing and reduction of the economic damages it causes, and the particular role of insurance in this context. Economic losses from flooding have become a major policy concern in recent years, as the proliferation of policy documents over the past decade demonstrates (e.g. at EU level, EC 2007 2008; EC n.d.). Flood losses have multiplied over the past 60 years, and are expected to rise even further as a result of a changing climate (Barredo 2007). Private insurers – with their financial capital and risk assessment and mitigation expertise – are seen as offering important instruments and resources for coping with the *financial* consequences<sup>3</sup> of flooding (Kunreuther 1996; EC 2013). Insurance has therefore been increasingly referred to among policymakers (EC 2013) as a governance mechanism to complement and reinforce state-provided instruments, such as the regulation of land-use and construction; the installation of flood forecasting and warning systems; the construction of protective and water retention infrastructure; and others.

However, flood insurance also increasingly balances along the limits of insurability, facing the climate-induced threat of catastrophic losses and the difficulty in predicting how precipitation and other flood-inducing factors will evolve and change flood risk over the next decades (Charpentier 2008). This balancing act may be reflected in the fact that private insurance is available in some countries but not in others, at some point in time but not another (EEA 2012; Pretenthaler and Vettors 2004), as well as the pressures for reform under which different flood damage financing mechanisms and insurance schemes found themselves in recent years (Keskitalo et al. 2014; Krieger and Demeritt 2014). Flood insurance – on the one hand imbued with high governance hopes by governments, for instance, but on the other associated with concerns about insurability – provides a promising case study to learn more about the factors influencing, barriers and drivers of insurance-based risk governance.

This paper specifically asks whether, how and why private insurers can or cannot efficiently and sustainably provide risk reduction and financial compensation in flood risk governance. It argues that private insurance does not effectively pursue all governance objectives ascribed to them. This is because flood insurance schemes, even commercial ones, are embedded in particular political, politico-economic, and institutional contexts that compel insurers (and governments involved in disaster financing) to prioritize compensation, solidarity and affordability over risk reduction. This in turn raises questions about the sustainability of the insurers' contributions to flood risk governance. In fact, this paper suggests that disaster financing mechanisms carry the risk of working against the objective of risk reduction. Embedding insurance into the wider institutional, political and societal context leads the authors of this paper to assume a more comprehensively argued pessimist's stance on the role of insurance in governing complex risks.

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<sup>3</sup> The emphasis on financial consequences is important because flooding also causes other forms of harm, including effects on mental and physical wellbeing.

Two case studies empirically illustrate these difficulties, namely Germany and the UK. In both countries, flooding is a major policy challenge, with one in six houses at risk in the UK and an expected three-fold rise of flood damages over the next 100 years in Germany (ABI 2010a; GDV 2011). Purely private insurance for flooding is – exceptionally in the European context – available in both countries, and explicitly promoted by government and insurers. Yet, performance against the governance objective is mixed, illustrating how the particular challenges of organizing insurance-based risk governance play out in the varied institutional, political and politico-economic settings of Germany and the UK, and how these settings result – though in different ways – in the particular form of disaster politics that prioritizes compensation and solidarity over risk reduction.

The paper draws on a review of scholarly literature, key documents published by insurers and government in Germany and the UK, as well as insights from a number of empirical studies that provide data from semi-structured interviews taken between 2008 and 2014 with representatives of insurance industry, governments and other stakeholders in Germany and England by a number of recent studies (Keskitalo et al. 2014; Krieger 2012; Penning-Rowsell et al. 2014; Stegbauer 2014).

The sections that follow (a) provides a brief overview of the academic literature about insurance as governance, in particular flood risk governance, with a view to elaborating on the particular governance objectives to which insurance may contribute. As the discussion will demonstrate, there are arguments in the literature that support the positions of both pessimists and optimists; (b) shows how flood insurance is organized in Germany and the UK and how it has evolved over time. It argues that in both cases government and insurers favour such schemes in order to manage flood risks, implying the assumption of an optimistic viewpoint about the role of insurance in flood management by the two key stakeholders; (c) raises the questions about this optimistic viewpoint by presenting the performance of flood insurance schemes in Germany and the UK against key governance objectives; (d) provides the foundations of this article's *more comprehensive* pessimist's view by explaining the variable performance of insurers in relation to the governance objectives through the examination of the political, institutional, economic and societal context in which private flood insurers operate in the two countries and how it affects the governance performance of insurance; (e) discusses the implications of our analysis for the role of insurance in risk governance.

### **Private insurance in governance: risk regulation and financial recovery**

Insurance is a mechanism where risks or parts of a risk are transferred from one party (the insured) to another (the insurer) in exchange for a payment (the premium). At its most basic, insurance therefore constitutes a transaction between two individual entities. Beyond the individual transaction, insurance has a distinctively social dimension. This is because insurers aggregate individual risks into collective risk pools. The establishment of such pools enables insurers to distribute individual risks over time and space, and draw on, among other sources such as reinsurance and

investment income, the collective premium revenue to provide compensation to groups of insurance holders affected by a hazard.

### *Compensation and financial recovery*

From a governance perspective, insurance can play an important role in reducing the negative consequences of an adverse event after its occurrence. One of the key objectives of insurance is therefore to facilitate damage recovery via financial compensation. Damages from major hazards can exceed the financial capacities of individual households. Insurance can assume an important function in shouldering the financial risk from hazards by distributing the financial burden over time and space.

From an optimists' viewpoint, private insurers are seen as particularly well suited for taking on this role efficiently as a result of its financial reserves and its expertise in risk assessment. Risk assessment helps insurers to calculate their total and annual average loss exposure. This in turn enables insurers to generate adequate reserves from collecting premiums across time and space, through investing premium incomes on capital markets, and – if necessary – draw on reinsurance to provide financial compensation swiftly after a flood occurs. Governments – as an alternative disaster financing mechanism – may have to mobilize financial resources at short notice at relatively higher costs.

However, scholars have raised questions as to whether insurers, in particular private ones, have sufficient reserves to deal with large scale, often spatially and temporally concentrated disasters (Froot 1999; Gardette 1997). This is an important question given the pessimists' arguments about the catastrophic potential of many hazards produced by industrial society (Beck 1992) or, for instance, the effects of global warming on flood risk (Bronstert 2003; EC 2008). An illustration of the challenges of compensating damages from natural disaster are the record-breaking economic losses caused by floods in central Europe in 2002, 2013, or England in 2007 (for economic loss figures, see Figure 1 below).

Still, the capital reserves of insurers and reinsurers are substantial, and new forms of disaster financing (cat bonds) have emerged on capital markets to deal with major disasters (Bougen 2003). Moreover, the sustainability of flood insurance schemes is also linked to the promise that private insurance can reduce economic losses via pricing risk.

### *Risk mitigation and regulation*

One way of addressing the financial risks to insurers is their capability of reducing risk even before the adverse event occurs, the second key governance objective associated with involving private insurers. Insurance is generally credited with the ability to put a price tag on risk through various mechanisms, such as risk-based



premium levels and deductibles, as well as conditionality that requires insurance takers to undertake certain risk reducing activities. Once priced, engaging in risky activities or private risk reductions can, in theory, be economically sanctioned or rewarded, steering individual behaviour away from assuming or increasing risk. In order to remain profitable and solvent, insurers need to base their risk pricing on assessments of risk levels to avoid the problem of adverse selection, i.e. the accumulation of bad risks in their risk pool because inaccurate risk pricing encourages good risks to leave the insurance pool (Akerlof 1970). Adequate risk pricing also counters moral hazard (Arrow 1963), i.e. the problem that once financial risk is transferred to another party such as insurers, individuals are less inclined to avoid or mitigate risks (such as building houses in a higher risk area).

From an optimists' perspective, insurers are often seen as a more efficient regulatory mechanism than other actors, such as government (Harrington 2000; Priest 1996). This is, on the one hand, because of the insurers' strong risk assessment capacities. On the other hand, governments, as actors held accountable by the electorate, may perceive discriminatory, risk-based regulation as politically risky (Priest 1996). In addition, using pricing to regulate behaviour may be argued to allow for a more fine grained, flexible regulation than traditional public regulation, potentially reducing the costs of over-regulation (e.g. too rigid rules for land-use near rivers preventing economic activity) (Pottier et al. 2005).

From a pessimist's perspective, it is important to note that while insurers may be able to discriminate among risks, risk-based insurance faces substantial transaction costs. For instance, in order to be able to discriminate between risks, an insurance company needs to have access to risk information. While information gathering concerning the spatial distribution of flood risk has improved thanks to advanced flood modelling (Nobert et al. 2015), there are questions about access and the usefulness of available data, in particular on household level. Commentators also queried whether it is possible to accurately financially evaluate flood risk reduction measures on a household level as a basis for reducing the premium level (Balls et al. 2013).

In short, private insurance in theory is able to provide economic incentives for risk avoiding and mitigating behaviour and to mobilize financial resources at short notice and may, in line with an optimistic viewpoint, offer more efficient and sustainable alternatives to and/or complement the government's regulatory and financial efforts. At the same time, confirming a more pessimistic viewpoint there are a number of challenges, including but not limited to questions of adequate risk assessment capacities and the growing climate risk, that seem to confirm the conventional pessimists' view. As noted earlier, it is important to bear in mind that insurance while being in theory able to contribute to both flood management before and after events complements and reinforces a wide range of measures that are undertaken mostly by public authorities to reduce flood risks, including the construction of embankments or the installation of flood warning systems. The sections below explore to what extent have insurers in practice contributed to risk reduction and financial recovery? How

important and in what form if so, were the particular challenges to insurance-based governance overcome in the case of flood insurance in Germany and the UK?

### Flood insurance in Germany and the UK: products, evolution, and the role of the state

Flood insurance provided by commercial insurance companies is seen as a key element of flood risk management in both Germany and the UK. As illustrated here, governments in the two countries – in line with optimists’ views – see insurance as an important vehicle for reducing flood risk and providing financial security to its citizens. However, the evolution and type of private insurance systems that emerged from this generic endorsement of insurance varied in the two countries (see Table 1). That notwithstanding, both countries share exclusive formal reliance on private insurance systems, as the insurance markets are *not* formally regulated in ways that determines price, supply, and demand for flood insurance, and private insurers cannot draw on state-provided reinsurance (Prettenthaler and Vettters 2004). As a consequence, they offer unique insights into the functions private insurance can assume in flood management and the barriers it faces in fulfilling the role ascribed to it by its advocates.

**Table 1:** Flood insurance in Germany and the UK

	Germany	UK
<b>Emergence/origin</b>	Early 1990s: Deregulation of markets in Germany and across the EU	Early 1920s: First wave of flood insurance with limited market penetration; Early 1960s: Broadening of insurance market as a result of the insurers' commitment to provide cover
<b>Product</b>	Bundled product covering several types of natural disasters; optional add-on to standard property and home context insurance	Since 1970s: Part of all-risk standard coverage for property and content insurance
<b>Market penetration</b>	~30%	>90%
<b>State-insurance relations</b>	Coordination limited to information exchanges	Close coordination through joint working groups resulting in increasingly formalized agreements
<b>State interventions in disaster financing</b>	Substantial ad-hoc disaster financing for some but not all flood events	One instance of limited state aid in the aftermath of flood

Source: Own composition

### *Germany's flood insurance scheme: young market with limited market penetration*

Private flood insurance is in general seen as a key plank in Germany's political drive for greater individual responsibility and risk ownership of the population in relation to the risk of flooding, as implied in the most recent 2009 Federal water laws' introduction of a general civic 'duty of care' for individuals Government of the Federal Republic of Germany 2009: Para5[2]). Both representatives of governments at Federal and state level emphasized the importance of private flood insurance for improving Germany's flood risk management. For instance, Germany's LAWA, a key joint state-Federal body to develop flood management guidelines, remarked as early as in the mid 1990s that:

Without the protection offered by [flood insurance], all investments in structural flood protection and the promotion of individual precaution remain incoherent (LAWA 1995:18).

Flood insurance is not only promoted by government bodies but also by insurers themselves. German insurers – hoping for new business opportunities – endorse the relatively young product. One case in point is that insurers and six German states have joined forces and have been running campaigns to promote natural disaster insurance in Germany in recent years. The campaign slogans emphasized the prudence, importance and availability of private insurance cover, as well as discourage reliance on the government for financial compensation (Stegbauer 2014).

Germany's flood insurance, in its current, widely available and commercially provided form, is a relatively young product on the household insurance market, having only been permitted by Germany's insurance regulator in the early 1990s following the deregulation of the market by the German and European regulators. Prior to this, flood insurance was only available in the state of Baden-Württemberg and the former GDR in both cases as products of monopoly insurers (Hauer 2004). Disaster financing outside the former GDR and Baden-Württemberg – if funds were made available to victims at all – was limited to local and state level disaster aid (e.g. 1988 Rhine floods) and even private donations to victims (e.g. tidal flooding in Hamburg in 1962).

Flood insurance is offered to German households in the form of the optional *Elementarschutzzusatzversicherung* which bundles flood cover with that for earthquake, snow storms and volcano eruptions. Initially, insurers only reluctantly offered this natural hazard cover to households partly as a result of the insurers' difficulties in assessing their loss exposure. This challenge was addressed by the development of the risk zoning instrument ZUERS by the insurers' trade association GDV (*Gesamtverband der deutschen Versicherungswirtschaft*) made available to all German insurers since the early 2000s (Falkenhagen 2005). While the availability of insurance varied over the years, the GDV recently noted that 99 per cent of all buildings in Germany are insurable against natural disasters from the desk (i.e. without *in situ* assessment) and for on average about €100 per annum (GDV 2013a).

Insurance penetration has been increasing, from a reported 5 per cent of Germany's building stock in the early 2000 (Hauner 2004) to 30 per cent in recent years (Keskitalo et al. 2014). These national averages conceal large variations between areas. For instance, 95 per cent of buildings in the state of Baden-Wurttemberg are covered in contrast to only 11 per cent in the city state of Bremen (GDV 2013b).

Following the Elbe 2002 floods, with its major losses and the substantial financial relief interventions provided by German governments at the Federal and state level (amounting to about €6.5bn), the policy debate revolved around introducing mandatory insurance (forcing households by law to purchase flood cover for their home), to address the challenge of limited insurance penetration and the necessity of significant state involvement in dealing with the damages from 2002. However, the negotiations between federal and state level governments concerning such a scheme were discontinued in 2004, leaving the private flood insurance market unregulated in terms of prices, demand, and supply of flood insurance.

The systematic involvement of the government in flood management, or more precisely, mostly the state governments, can predominantly be found in a regulatory and investment role, such land-use regulation, building codes, and investing in structural flood defenses (Krieger 2013). There is no formal involvement of the state in disaster financing beyond the abstract constitutional welfare norm. The welfare principle basically requires the state to help only those who cannot help themselves (Schwarze and Wagner 2004).

#### *UK flood insurance: mature market shaped by state-insurer interaction*

As in Germany, both government and insurers in the UK strongly endorse a private flood insurance scheme. One illustrative example for this support is a joint statement from the government and the Association of British Insurers (ABI) a year after the major summer 2007 floods.

Both want that flood insurance remains as affordable and widely available as possible so that consumers and small businesses continue to be able to protect themselves from the financial costs of flooding.  
(ABI and Government 2008)

The government has also recently published a set of principles of flood insurance (DEFRA 2011) in which it highlights the role of insurance in risk reduction. For instance, one principle (#2) stresses that flood insurance premiums and deductibles should reflect the risk of flood damage to the property insured, taking into account any resistance or resilience measures; another one (#7) suggests that investment in flood risk management activity should be encouraged through the insurance mechanism (ibid.: 5).

The current provision of flood insurance in the UK cannot be understood without looking back to its almost century-long history. Flood cover was initially (from the

1920s on) offered reluctantly and it took more than 40 years for the scheme that continues to crucially shape contemporary flood insurance to appear. In the early 1960s, following devastating floods in parts of England which revealed that insurance cover had been limited, calls for government intervention and the installation of a disaster assistance fund were voiced in public and Parliament (Arnell et al. 1984). This debate was quelled by an informal gentlemen's agreement between the government and the insurance industry in 1961 (Penning-Rowsell et al. 2014). Through this agreement, the insurance industry committed to offer flood cover at an affordable, standard premium rate regardless of the risk level. In return, the government was obliged to provide 'sufficient' investment into flood protection though the terms of sufficiency remained unspecified (Huber 2004). Even after this agreement, insurers were publicly criticized for not promoting the product sufficiently and for offering opt-outs. In response, insurers struck an agreement with the Building Society Association that flood cover should be required for home loans and mortgages. Moreover, during the 1970s, flood cover was included into their standard all-risk household content and property insurance policies (Arnell et al. 1984). As a result of these informal agreements, flood cover became widely available at affordable prices, and the vast majority of households were covered against flood risk.

This arrangement continued to operate throughout the 1980s and 1990s. However, in the 1990s, insurers grew increasingly concerned about their exposure to flood risk. These concerns were driven by, and in turn, promoted increasing investment in risk assessment capabilities, e.g. through a number of risk modelling and mapping projects often led by individual insurance companies (Crighton 2005). Finally, the floods of Easter 1998 and autumn 2000, causing major losses to the insurers, confirmed the concerns held by the industry, and led insurers to reconsider the gentlemen's agreement with the government.

In response to industry concerns about economic losses and exposure, the informal gentlemen's agreement from 1961 was replaced by of the so-called Statement of Principles (SOP) in late 2002 (ABI 2002). In the SOP from 2002 and subsequent revisions in 2005 and 2008, the ABI lays out its commitment to continue providing insurance and the conditions for the insurability of flooding, including risk-based insurability guarantee threshold (only homes protected from floods with a 1.3 per cent or less annual chance of being flooded are guaranteed to obtain cover), the option of charging risk reflective premiums, the exclusion of homes built after 2009 from the SOP agreement, and demands concerning the government's flood management measures (such as effective land-use management, expected capital investments in flood defences, and more) (ABI 2003, 2005a; ABI and Government 2008) . In other words, insurers removed some of the informal regulation that interfered with price-setting and insurance supply for future and high risk homes, as well as specified the insurers' expectations regarding the government's flood risk management.

However, the SOP has always been understood as a temporary arrangement despite to some extent freeing the insurers' hands in terms of pricing and supply of cover . It will be replaced by the so-called FloodRe scheme. Since 2008, this new scheme has been under development, through a multi-stakeholder process dominated by the government and insurance industry (Keskitalo et al. 2014; Penning-Rowsell et al. 2014). The outcome of FloodRe has yet to be formalized in legislation. It is a system to keep properties in high risk areas insurable at affordable rates. FloodRe, organized in a private entity, acts as an insurer exclusively for high risk properties. To this end, it is funded through a levy charged on *all* insureds of on average £10.50, not only the high –risk properties. The premiums (along with deductibles) offered to high risk households are capped, with some variation according to property value. FloodRe is to serve as a transitional agreement lasting for about 20 years until fully risk-reflective pricing is to be introduced. FloodRe is accompanied by a so-called 'letter of comfort' spelling out the government's commitment to investing in flood risk management and improving planning policy (Surminski and Eldridge 2015). In other words, FloodRe, a purely private scheme whose installation, however, was established via government-insurance negotiations, reintroduces a price cap and supply regulation for a particular segment of the market while marginalizing the role of insurer demands vis-à-vis government in the agreement.

The UK government itself has no formal role in disaster financing. It is, however, engaged in flood management via land-use regulation and development control, flood defense investments, and further measures (Krieger 2013).

While Germany and the UK's flood insurance schemes share many characteristics, they also show variations in evolution and nature that raise questions as to their ability to make the desired contributions to flood risk management (financial recovery; risk reduction). The performance against these objectives will be discussed in the section below followed by an analysis of the forces that shaped the nature and evolution of the scheme and their varied and poor performance against the objectives.

### **Performance of flood insurance against governance objectives**

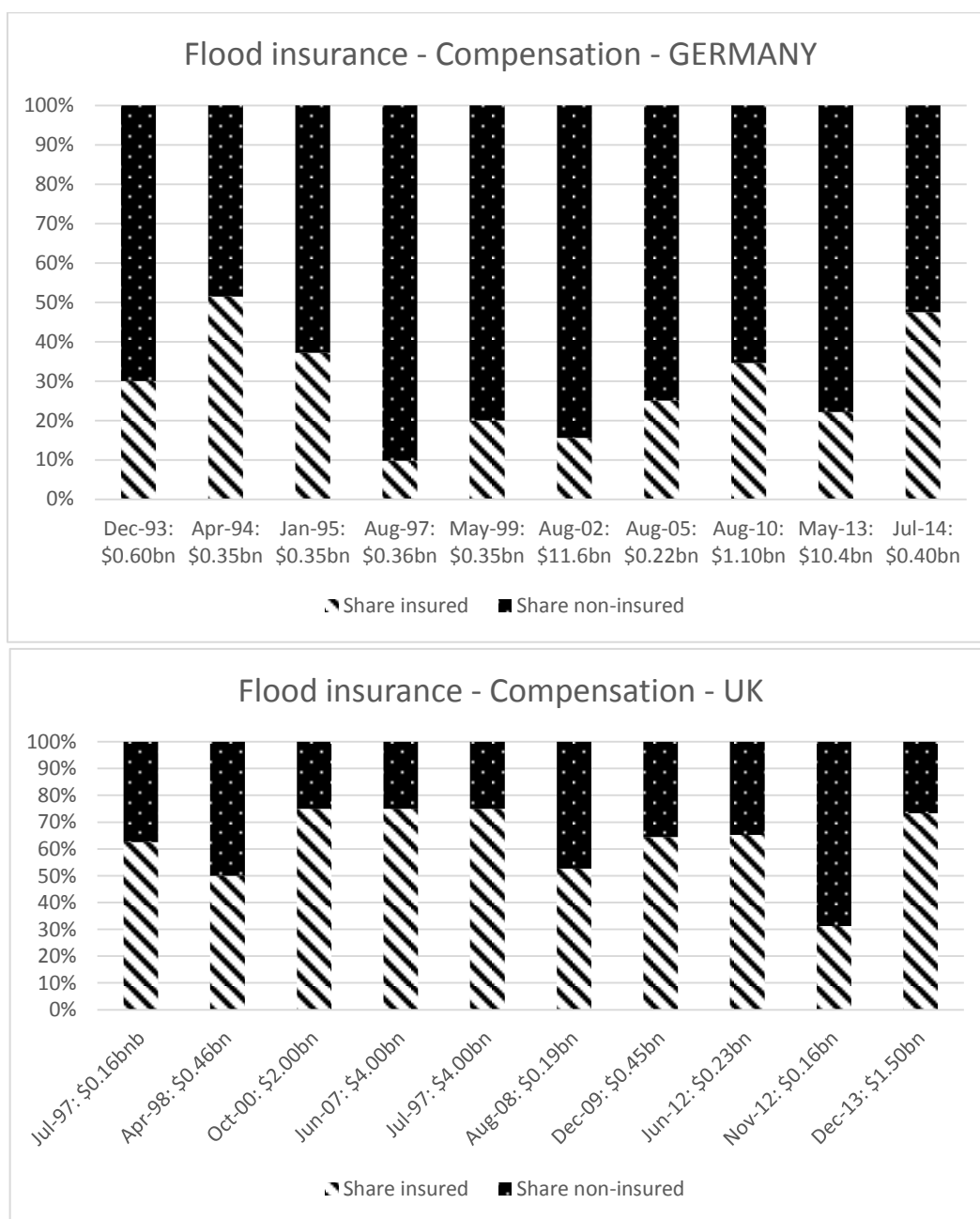
The following subsections present the extent to which the private insurance based disaster financing schemes contribute to governance objectives discussed earlier. It focuses on the two key functions of compensation and risk reduction. This section demonstrates that the optimists' views are not met by the governance performance of insurers. In particular, insurers in both countries fail to deliver on the risk reduction/regulation dimension.

### Compensation and financial recovery: limited contribution of German insurers

Flooding has caused significant economic losses in Germany and England over the past two decades. To what extent have private insurers helped recover from major flood events?

Figure 1 below provides an overview of the share of losses that was insured or otherwise, and some interesting insights. Firstly, private insurance covers only a share of the economic losses in both countries. In Germany, the insurance industry provided at most 51 per cent of compensation for losses (April 1994,

**Figure 1:** Economic losses, flood events, UK-GERMANY, insured and non-insured



Data source: MunichRe NatCat Service, 2015

Southern/Eastern Germany, \$0.32bn total economic losses) and at worst only 10 per cent (August 1997, Odra floods, \$0.36bn). In the UK, the best performance for compensation was delivered in 2000 and 2007 with 75 per cent of total economic losses covered (\$2.0bn and \$4.0bn total economic losses, respectively). At worst, UK insurers provided half of economic losses during the Easter 1998 floods (\$0.46bn). It is important to note that the economic loss figures include those losses incurred by the state (e.g. infrastructure damage). Secondly, as the figures indicate, even though promoted by both government and insurers, the insurance's compensation performance varies widely between the UK and Germany. In Germany, only 21 per cent of losses are insured on average compared to the UK average at 72 per cent. In key events, German insurers only covered 16 per cent and 22 per cent of the major losses in 2002 (\$11.6bn total economic losses) and 2013 (\$10.4bn) whilst UK insurers covered 75 per cent of major losses in 2007 (\$4.0bn) and 2000 (\$2.0bn).

Figure 1 conceals an important aspect of managing the economic losses and financial recovery, namely, the role of the state as a provider of disaster financing. The British government has historically left disaster financing to the insurance industry. However, more recently, after the winter 2013 floods, the UK government announced that 'money is no object' and provided 'repair and renew' grants of £5,000 to all affected households and businesses – along with tax relief and improved access to bank loans (Krieger and Demeritt 2014).

In Germany, the story of governmental disaster financing is more substantive. Specifically, in the aftermath of the floods in 1997, 2002 and 2013, governments at Federal and state level made significant reconstruction funds available, amounting to €0.25bn (out of €0.36bn of economic losses), €6.5bn (out of €11.6bn) and €8bn (out of €10.4bn), respectively. However, no special reconstruction funds were established in the aftermath of other events, such as the Rhine floods 1993 and 1995 although some tax relief was offered to the affected households, or the flooding in 2005 and 2010.

In short, the insurers' contributions to financial recovery vary widely between the two countries, with the UK industry playing an exclusive and central role in disaster financing. The reasons for and governance implications of these cross-country differences will be discussed later.

### *Risk regulation and reduction: failing to price risks adequately*

Insurance has been seen as an important instrument to reduce and regulate risks on the basis of its ability to put a price tag on risks and financially reward risk mitigation. To what extent did insurers differentiate prices on the basis of risk levels and provide economic incentives for risk reduction in Germany and the UK?

Examining the role of German insurers in reducing risk produces a mixed picture. A particularly strong price signal is if insurers do not offer flood cover in high risk areas. In the case of Germany, insurance availability declines as risk levels increase



but not consistently across the whole industry. A recent survey of 26 German insurance companies by a consumer rights organization (*Verbraucherzentrale-VZ*) shows about 30 per cent of surveyed insurers unwilling to insure properties (from the desk) in ZUERS risk zone III which has between 10 per cent and 2 per cent annual chance of flooding) and one-third in risk zone IV (>10 per cent annual chance of flooding) (VZ 2013). That means that properties in high risk zones III and IV seem to be in principle insurable from the perspective of the majority of German insurers (seven-tenths and two-thirds for zones III and IV, respectively). This inconsistency in relation to exclusion of high risk is also reflected in the temporary character of the withdrawal of coverage from high risk areas in particular of flooded properties after the devastating 2002 floods. The area for which flood cover was available fell from about 90 per cent to approximately 80 per cent after the 2002 floods (Schwarze and Wagner 2004). The withdrawal seems to have been of a temporary nature given that 99 per cent of Germany's building stock was reported to be insurable in 2013.

The inconsistency can also be found when examining premium rates in risk zones. The VZ report shows that offers for the same properties often vary by hundreds of euros between different insurers. For instance, for the same property in zone III, a policyholder could end up paying between €158 and €999 premium per annum and deductibles may range between no deductible at all to several thousand euros (VZ 2013). An earlier survey conducted after the 2002 flood by Thielen et al. (2006) of 25 insurance companies found that insurers use the deductible in a fairly static way, fixing it at about 10 per cent of the insured value, regardless of the risk zone location of properties.

The same survey shows that only a minority of the firms provided financial rewards, such as premium reductions (14 per cent), and household-specific information (25–35 per cent) for risk mitigation measures. Insurers also provide more generic information about flood risk, for instance in the form of information brochures to the general public and businesses (GDV n.d. Land unter; Schutz vor) or through the aforementioned information campaign in partnership with six German states (Stegbauer 2014).

While Germany's government emphasizes before events the importance of individual responsibility for risks and risk-oriented flood insurance, disaster financing measures in the aftermath of flood disasters have paid limited attention to providing incentives and information encouraging risk reduction. One case in point is that policymakers have repeatedly in 1997, 2002 and 2013 stressed that 'no-one should be worse off' than before the flood incidents (Krieger 2012; Stegbauer 2014), leading to financing the reconstruction of properties in high risk zones (Stegbauer 2014).

In another example, the Bavarian government provided disaster assistance guidelines in 2011 to pre-empt negative implications of government compensation on flood insurance for large scale disaster aid. Compensation would only be allocated if property has been damaged without own involvement (affectedness), the affected household is not in a financial position to recover from its own resources (neediness),

and no private flood insurance has been available before the flood (risk reduction and risk ownership) (MOF-BAV 2011). However, when it came to the implementation of the guidelines after the 2013 floods, the government violated its own principles. It made available ad hoc financial aid of €1,500 in cash for each household regardless of insurance status, income or actual size of damages. Additionally, households could apply for larger sums of disaster assistance but the allocation would in theory be subject to the aforementioned guidelines. In practice, Stegbauer (2014: 30) reports that:

during the implementation phase, averting the undesired long-term effects of relief, which has been a central ex-ante [policy] goal ... was considered secondary to speeding and sizing up relief efforts.

In short, price signals and financial incentives for risk mitigation are deployed inconsistently across Germany's insurance industry, casting doubt upon their ability to contribute to risk reduction. While insurers are not the exclusive or most important source of disaster compensation, Germany's governments, as the alternative source of compensation, also fail to provide economic incentives for risk reduction.

In the UK, insurers equally struggle to price insurance cover to reflect the level of risk. A 2008 report on flood risk pricing was undertaken by Flood Insurance Working Group of GIRO (General Insurance Research Organizing Committee) which surveyed the availability and pricing of 24 UK-based insurance companies (Lowe 2008). Notably, the survey found that even in the highest risk areas with an annual average chance of inundation of 1.3 per cent, 19 out of 24 insurers provided a quotation for cover. Even more interesting, the price difference between high risk areas and 'off flood plain' (i.e. lower probability of flooding than 1.3 per cent) amounts to only £52 per annum; the mean premium rate in high risk areas stood at £320 (with the cheapest available option being £170 per annum). It is important to note that the survey was taken at a time when the SOP of insurers and government had been in place for some years so insurers were no longer bound to provide flood cover at affordable rates even to high risk properties.

The GIRO findings broadly agree with observations of scholars such as Penning-Rowsell and colleagues (2014:9) who report:

Although there is anecdotal evidence that some people were unable to obtain insurance, in practice insurance was completely unavailable to very few properties. Instead, premiums from those flooded in 2000 may have risen in some cases, raising for the first time the issue of affordability of the product. Any premium increase however was not out of line with the Statement of Principle [with its continued generic commitment to availability and affordability].

And even if price differentiation has indeed become more common in the late 2000s, the problem of subsidized premium rates for high risk properties re-emerged through

the most recent reform of the UK's flood insurance system, the introduction of FloodRe with its formalized cross-subsidy from low to higher risk households.

Beyond risk pricing, the literature does not report any systematic financial rewards provided by insurers for risk mitigating measures at household level. For instance, the UK National Flood Forum reports that protection measures at property level in most cases do not result in improved insurance conditions (Cobbing and Miller 2012). Similarly, flood-resilient reinstatement is normally unsupported by insurance companies due to the significantly higher costs in comparison to standard reinstatement (ABI and NFF 2012; Surminski and Eldridge 2015). As for taking certain risk mitigating measures as a condition for cover, Surminski and Eldridge (2015) find no evidence in the design of the SOP or FloodRe.

Furthermore, insurers can directly provide information about risk levels and risk management options to policyholders thereby raise risk awareness as an important prerequisite for risk mitigating actions. UK insurers are particularly active in providing information to the general public. Most notably, the ABI has published a number of documents on flood-resilient construction (ABI 2004, 2005b; ABI and CILA 2006; ABI and NFF 2006, 2012). However, insurers have been less engaged in providing targeted information to individual households, for instance by including such information in insurance policy documentation. A case in point is FloodRe. While the advocates of FloodRe argue that the formalization and transparency of the cross-subsidy will increase the awareness of flood risk, others argue that the public awareness of risk levels is not increasing because clients do not directly deal with FloodRe and thus may not even become aware that their policy is insured via FloodRe (Surminski and Eldridge 2015). A similar logic of obscuring the level of flood risk to the policyholders themselves can be found in the FloodRe discussion concerning de-bundling flood insurance from other risks. One ABI representative involved in the FloodRe negotiations noted:

A lot of the options that we are looking into involve de-bundling flood risk, at least from, at least within the insurance company. It would not necessarily have to be de-bundled in the consumer interface. You might still buy it as a joint policy; it is just once you get into the insurance company, they split it all out.

(ABI interview, quoted in Keskitalo et al. 2014:322)

Finally, FloodRe has a provision that the ABI needs to provide a database of claims history from insurers at property level. However, this information will only be accessible to public authorities, not current or prospective individual homeowners (Surminski and Eldridge 2015).

In short, both German and UK insurers struggle to price risks adequately, inform the insured about their risk level, and reward risk mitigation measures. Given the limited reach of risk reduction by Germany's insurers with only 30 per cent market penetration, it is important to note that Germany's government bodies providing

compensation on an ad hoc basis have also failed to provide financial incentives for risk mitigation. Given the shared commitment to flood insurance as a risk mitigation tool among insurers and governments, how can the failure of insurers and governments to reduce risks be explained? This failure also raises questions about the long-term sustainability of disaster financing mechanisms.

### **Explaining governance failure – insurance, market failure and disaster politics**

This section explores how insurers and insurance markets interact in the political, economic, institutional and societal context. This ‘embedding’ of insurers leads to a more comprehensive underpinning of the pessimism with regard to insurance as governance. The challenges in the German case are special in that they feature a largely uncoordinated coexistence of governmental and private disaster financing schemes, as well as a limited size of the insurance market. The UK challenges are exceptional in the exclusively private provision of disaster financing, as well as the continued and increasingly counter-intuitive acceptance by insurers of constraints, at times seemingly self-imposed, at other times closely coordinated with government, on risk-based price differentiation and insurance supply. This points to the following challenges, namely how to boost demand (Germany’s limited market), price risks adequately (failure to price risks in both countries), and ensure the long-term sustainability of disaster financing (failure to reduce risks via pricing and information in both countries). It also raises the key questions as to why the insurance-based disaster financing schemes fail to address these challenges and have developed in this particular way.

#### *‘Boosting demand’ challenge: risk awareness, market failure, and charity hazard*

Sufficient demand is a prerequisite for insurance to play a role in governance. If demand is limited, the contribution to financial recovery after a flood and the reach of price-based regulation would be restricted to a relatively small proportion of households exposed to floods. This is particularly relevant in Germany’s disaster financing since market penetration levels remained relatively low at about 30 per cent.

The research on insufficient demand has focused on the behaviour of market participants. Firstly and most importantly, scholars have identified a lack of awareness of exposure to flood risk among homeowners as a key issue, resulting from various factors such as inadequate awareness of low probability risks (Tversky and Kahnemann 1974) or of direct exposure (Akre et al. 2010). In the German case, lack of public risk awareness seems to be one important factor. For instance, Thielen et al. (2006) analysed data from 1,248 households in Saxony and Saxony-Anhalt between April and May 2003. Of the 82 per cent of the insured households without prior flood experience, only 35 per cent knew that they were living in an area at risk from flooding. Of the 88 per cent of the uninsured households without prior flood experience, only 26 per cent were aware of their living in a flood-risk area. Analysing the cases of the Rhine floods in 1993 and 1995, Linneroth-Bayer et al. (2001) show

that, among other factors, the lack of historical risk awareness (in particular among an increasingly mobile population moving into risk areas) is responsible for the relatively limited density of flood insurance in Germany. More recently, however, Stegbauer (2014) using data collected from Bavarian households after the 2013 floods, argues that even households without prior flood experience have purchased insurance, suggesting that the connection between lack of exposure, risk awareness and demand for insurance may be more complicated.

Secondly, in the case of Germany, another argument relevant to the behaviour of market participants is adverse selection (Akerlof 1970). While this argument attributes risk awareness to household owners, it highlights the problem of the spatial concentration of flood risk that results in insurance demand mostly from those at higher risk. For instance, data on Bavaria from Stegbauer (2014) show that those insured tend to be more affluent and thus have more to protect. This is problematic for insurers because it limits their ability to spread risk across space, raising the issue of the financial sustainability of flood insurance. It is important to note that Linneroth-Bayer et al. (2001) in reference to data collected after the Rhine floods in 1993 and 1995, point out that Germany's higher income households have a preference for self-insurance and precautionary measures. These findings may have resulted from the fact that flood insurance was a product that insurers were reluctant to promote in the early 1990s.

Thirdly, the generous provision of state disaster aid in the aftermath of floods in 1997, 2002 and 2013 has been argued by some to undermine the demand for private insurance cover, a phenomenon called 'charity hazard'. Schwarze and Wagner (2004) suggest that 'the near certainty' of government relief after the 2002 Elbe flood undermined demand for flood insurance. However, it is possible to dispute this premise as there was limited state involvement in the aftermath of other major floods that occurred in 1993, 1995 and 2005 in Germany. Raschky et al. (2012) describe German ad hoc disaster aid by the state as uncertain. As a result, individuals cannot rely on being financially secure from flood risk and may consider buying insurance, enabling the co-existence of private flood insurance market and state disaster aid.

Given the government's emphasis on the importance of private flood insurance within flood risk management, how does this explain its direct involvement in disaster financing? One justification could be that as Germany is constitutionally a welfare state (*Sozialstaat*) it has to allow for disaster aid (Schwarze and Wagner (2004). However, the constitutional principle does not explain the particular pattern of the state's disaster financing since major flood incidents in the 1990s and 2000s did not trigger the same actions by the state. However, the level of disaster aid when provided along with promises such as 'no-one should be worse off than before the flooding' (ex-Chancellor Gerhard Schroeder after the 2002 floods), suggests that the government's involvement went beyond 'helping those who cannot help themselves'.

An alternative explanation for the engagement of the state is the political pay-off from generous disaster compensation (Schwarze and Wagner 2006). For instance, the

compensation offers in the aftermath of the 2002 flood were partly driven by the imminent Federal election in 2002. In the words of a Federal Ministry of Finance (BMF, *Bundesministerium der Finanzen*) official, the 2002 disaster financing:

carried a lot of political weight due to the imminent Federal elections. Hence, the public paid attention to how the two candidates and other campaigners acted.

(BMF 2008, interview, quoted in Krieger 2012: 266)

Such public disaster financing in general seems to have reflected a public sentiment for solidarity, as demonstrated by the scale of private donations after the Elbe and Odra flooding.

The politics of disaster financing in Germany also affected further efforts to address the low demand of insurance. A mandatory insurance scheme which would also increase demand was considered as a result of the major disaster assistance paid out after 2002. However, negotiations were stymied and stopped in 2004 as it included a role for the government as insurer of last resort for liability above €8 billion (Schwarze and Wagner 2006). The government feared that the proposed scheme would be an undesirable commitment to formalized disaster financing unlike the current unregulated engagement which allows it to apportion state involvement in response to the political stakes of the time.

The UK shows how the insufficient insurance demand problem has been resolved without formal state intervention. This was achieved through an informal agreement with bank and mortgage lenders requiring for flood cover for home and property loans, and making flood cover part of the all-risk standard insurance package. State involvement in disaster financing has also been very limited with the exception of smaller pre-election pay-outs in the winter of 2013/14.

Low demand is a well known challenge for low probability risk insurance markets. As the two cases illustrate, there are private and state solutions to addressing it. The German case is particularly interesting because the government's actions and inactions undermine insurance demand and/or fail to address the underlying market failure by not introducing mandatory insurance. This state failure is associated with the politics of disaster financing and thus points to the importance of taking a more *comprehensive* look at flood insurance, including the political dynamics triggered by disasters. Such a broad view would, however, reinforce the pessimistic perspective on insurance in governance by highlighting how politics may interfere with solutions to those challenges (such as market failures).

#### *'Pricing risk' challenge: disaster politics, market size, and state-insurer interactions*

Pricing risk in accordance with varying risk levels is an essential part of the insurers' appeal as governance actor and is important for the sustainability of their business

operations. However, in both Germany and the UK pricing risk is often undertaken in a manner that disregards varying risk levels.

In Germany, there are a number of factors that undermine price signals. One set of factors revolves around the specific challenges faced by insurers. In the 1990s, German insurers did not have adequate risk assessment capabilities to differentiate risk levels – and this resulted in a reluctant supply of natural disaster cover in Germany. These ‘technical’ challenges, however, were resolved by the industry-wide risk mapping project ZUERS. In spite of this, insurers’ pricing and supply do not consistently reflect risk levels, illustrating that pricing may also reflect the financial, competitive positions, and cost structures of individual companies.

The second set of factors is concerned with the government’s role in disaster financing. This is important in Germany’s case because of the limited market penetration of the insurers and the state’s engagement in providing compensation. Given the potential political pay-offs of appearing generous in times of need, the government prioritizes the principle of affectedness over the objective of long-term risk reduction which would require restricting help to those who, for instance, would have been able to obtain private insurance.

In the case of the UK, insurers also struggle to price flood cover on the basis of varying risk levels. This can be explained by the effects of the evolution of the UK flood insurance market on the insurers’ profit-seeking strategy, and the ‘political’ origin of the current flood insurance scheme. As commercial actors, UK insurers aim at making profits from their business operations. The conventional assumption, as expressed earlier, is that the insurers’ profit-making requires price differentiation.

Under the particular politico-economic context of the UK flood insurance market, however, profit calculations and concerns present themselves in a different way. Firstly, price differentiation raises concerns among insurers about their reputation among policyholders and prospective clients. As a representative of Aviva, a key player in the flood insurance market remarked:

It is difficult to charge the ‘economic premium’ [reflecting the level of risk]. [For some properties,] these could become prohibitively high. ... One of the main reasons why we cannot charge to full premium is that it would be a PR risk.

(Aviva 2009a, interview, quoted in Krieger 2012: 270)

Similarly, Penning-Rowsell et al. (2014) report that one of their interviewees highlighted the insurers’ concern that raising prices for flood insurance could damage the insurer’s other business lines.

These concerns are grounded in the particular perception of flood insurance in the UK. A study by Clark et al. (2002) argues that society views insurance as a ‘social’ rather than commercial process, and so the insurers are seen as assuming a social

responsibility to provide a financial buffer from the consequences of floods. Price rises, say the authors, are therefore perceived as a ‘social affront’ and ‘abrogation of duty’ (ibid.: 18). Huber (2004: 7) adds that flood insurance in Britain was seen as a ‘social policy successfully externalized to the economy’.

These public expectations are the result of the long history of UK flood insurance. The market expansion of the 1970s took place in a context in which flood risk assessment was still underdeveloped, making it difficult for insurers to differentiate prices and/or know about their own exposure (Penning-Rowsell et al. 2014). In fact, there was a significant and hidden cross-subsidy between low and high risk given the high market penetration. The size of the market kept the prices low, thus shaping public expectations.

Secondly, beyond reputational concerns, profit in the UK flood insurance market has been based on market size. This ensured that even though prices were low and undifferentiated the business remained profitable. As an underwriter from Aviva notes:

It is a matter of a critical mass and the law of the large number ... .  
Historically we have been able as an industry to earn enough premium income across the full range of cover provided. ... We have had enough premiums to make a profit for the majority of years and in a really bad year we can use some of the saved money to help pay for the bad year.  
(Aviva 2008a, interview, quoted in Krieger 2012: 264)

The perceived reputational repercussions of potential price hikes and market profitability imply a disincentive for insurers to radically change the overall system, e.g. by moving into a system in which prices reflect risks. This is reflected in the most recent policy change, the insurers’ endorsement of FloodRe. Penning-Rowsell et al. (2014) report that one of the key drivers of FloodRe was the emergence of new entrants in the flood insurance markets after 2000. These new entrants were able to pick ‘good risks’ and offer better conditions as they were not bound by the SOP’s commitments on affordable flood insurance. FloodRe would include these new entrants and force them to contribute by charging their clients for its cross-subsidy, levelling the playing field between the insurers. FloodRe continues the broad and affordable coverage of flood risk in the UK that formed the basis for the profitable market over the past decades and would be in line with public expectations.

It is important to note that the affordable and profitable market for flood cover that creates barriers to charging risk-based premiums in the UK has been strongly shaped by the interactions between insurers and government. As shown earlier, the current flood insurance scheme in the UK cannot be understood without the gentlemen’s agreement from the early 1960s when the threat of setting up a government disaster fund and of state interference with insurance markets led the insurance industry to provide flood cover at affordable rates (Penning-Rowsell et al. 2014). An explicit price cap in the gentlemen’s agreement explains along with other factors such as the



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non-availability of accurate risk assessments, the absence of price signals between the 1960s and 1990s, and the emergence of particular public expectations on the affordability of flood insurance in the UK.

In short, pricing risks adequately or introducing risk-reflective economic incentives to change behaviour poses a major challenge. The two case studies show that the difficulty in pricing risks is not primarily technical (e.g. inadequate risk assessments in the face of complexity), as implied by more conventional pessimistic accounts of insurance in governance, but also driven by commercial and political factors, such as reputation and the specific politics of disaster financing. Taking a more comprehensive look at insurance, and what is politically and commercially possible in a given political, institutional, societal and economic context, is therefore important in understanding the limits to insurance in governance. Given the poor performance in reducing and regulating risk, how do insurers and government in both countries ensure the sustainability of disaster financing?

#### *'Ensuring sustainability' challenge: disaster politics, state power, and moral hazard*

Sustainability of disaster financing schemes is a major challenge as economic losses from flooding are expected to rise in future. In both countries, such sustainability is uncertain but for different reasons.

In Germany, the private insurance scheme is linked to the limited size of the market for flood cover. Given the wide availability of flood cover across Germany and its poor performance on risk reduction, there is a question whether market expansion would actually be sustainable. Should the market expand, insurers would need to increase high risk premiums or limit exposure by a withdrawal from high risk areas, reducing their contributions to financial recovery.

Sustainability issues also emerge in the context of Germany's ad hoc disaster financing informed by the principle of affectedness. Given the political discretion concerning the state's involvement and the state's deep pockets, Germany is likely to be able to cover increasing future economic losses if it chooses to do so. However, this would imply a very limited contribution to risk reduction and raises the question whether the money would be better spent on other flood management or welfare priorities.

In the UK, the insurance industry faces a different challenge. Public expectations regarding availability and pricing of flood insurance – along with the profitability of the expansive market for flood insurance and the insurers' agreements with the government – narrow down UK insurers' options to devise a sustainable flood insurance scheme. As discussed earlier, attempts to differentiate premium levels or to withdraw from high risk areas even after replacing the gentlemen's agreement with the SOP in 2002 were limited partly out of concern about losing business to competitors.

Instead, insurers undertook efforts to reduce risk indirectly by influencing the governments' flood risk management. While the gentlemen's agreement only refers to the commitment of the government to provide a 'sufficient' investment in flood defences, the SOP from 2003 puts down a list of flood risk management measures expected to be delivered by the government in exchange for the continuing commitment to affordable flood cover. Government policies have indeed changed in the UK in the 2000s, including new planning policies, investment in flood warning, and more (Johnson et al. 2005; Krieger 2013). The insurance industry has an important role in the UK economy and is normally described as a powerful actor in its political economy (Penning-Rowsell et al. 2014). In flood management, the British government also has a strong interest in keeping flood cover available as otherwise financial risk from flooding would reappear on the government's horizon. Arguably, the frequent negotiations between insurers and government between 2000 and 2015 has led to an exchange of ideas and can be assumed to have shaped public policy.

At the same time, there are arguments to assume limits to the insurers' impact on government policy. A Treasury official's comments, for instance, point to a much greater degree of autonomy for the government from the insurers.

Some of them [the demands of the ABI] Defra can do as long as it is within their budget. But the ABI's demands were double of what Defra spends now – and this is already 1/5 of their budget. So such demand would mean for Defra to stop doing other things or reprioritize. So we have to be involved in [the SOP negotiations].

(HM Treasury 2009, interview, quoted in Krieger 2012: 258)

Even more clearly stated, a senior official interviewed by Penning-Rowsell et al. (2014) provides an insight into the power relations between government and insurers:

If the industry [after the 2000 floods and during the memorandum] did not respond helpfully then the government was going to make life a bit difficult for them.

(Senior UK civil servant, interview, Penning-Rowsell et al. 2014: 8)

Limits to the impact of the insurers' lobbying are reflected across different areas of flood risk management, from land-use management where the ABI policy proposal was rejected in favour of another approach (Krieger 2012) to flood investments where the comprehensive spending review from 2010 introduced a 6 per cent spending cut for flood risk management, much to the disappointment of the insurers (ABI 2010b). Finally, in the FloodRe scheme, the 'regulation' of government through the insurers is relegated to a 'letter of comfort' and its impact is questionable once the scheme is operational and the government is relieved of the financial risk from flooding (Surminski and Eldridge 2015).

In short, the German case offers limited insights to the challenges on sustainability, but the UK case is more fruitful. While the options of premium increases and insurance withdrawals are closed for commercial and political reasons, insurers aimed at influencing public policy to reduce potential losses and thus ensure the long-term sustainability of private disaster financing. However, ultimately, the government drawing on their power as regulator remained the key decision maker in dealing with floods in the UK. Being freed from financial risks for the foreseeable future (with FloodRe in place until 2035), it is uncertain to what extent the UK government will be investing in flood risk management – a phenomenon described as moral hazard on the side of the government (Huber 2004). Moreover, given the increasing flood risk due to global warming, it is unclear that FloodRe is sufficiently funded to deal with the economic losses of high risk properties in the UK (Surminski and Eldridge 2015). The questions about the sustainability of UK disaster financing further underpins the need to understand the political context in which insurers operate, for instance, by highlighting that the problem of moral hazard does not only apply to the insured but also to governments. Looking at insurance more comprehensively, that is as an actor embedded in a particular political, institutional, societal and economic context, further accentuates in the case of flood insurance, the pessimistic view on the role of insurance in risk governance, suggesting that its involvement may in fact be risk-increasing.

In sum, the discussion in this section demonstrates how important it is to take an inclusive and contextualized look at insurance in governance. This involves the examination of market dynamics and the behaviour of the insured, government actions and inactions, as well as interactions between governments and insurers, to identify the challenges to a sustainable functioning of the flood insurance markets in both countries. These challenges in turn reinforce and expand the pessimistic take on insurance-based governance. The detailed discussion shows that both too low and too high market penetration and demand for insurance cover can interfere with objectives of insurance-based governance. Similarly, coordination between insurer and government activities that are too close or too distant can undermine flood risk management through disaster financing. It is thus questionable that disaster financing can be organized to contribute sustainably to both risk reduction and financial recovery, given the political and politico-economic context in liberal democratic states such as the UK and Germany.

### **Conclusions: a more comprehensive pessimist's view**

Discussion here on flood insurance schemes in Germany and the UK results in a rather pessimistic view of the role insurance can play in governing a complex risk such as flooding. Both in terms of financial recovery and risk reduction, as key governance objectives associated with flood insurance, the two countries' insurance schemes face particular challenges. As a result, the insurers' contribution to risk reduction is limited in both countries and to financial recovery limited in Germany in particular.

In contrast to more conventional arguments of pessimists, however, this is not due to the complexity of the risk since flood risk assessments have made significant advances over the last two decades, or the catastrophic scale of damage as none of the insurers affected by recent flooding with record economic losses has gone bankrupt. Rather, the contributions can be explained by a combination of well known market failure arguments (low risk awareness and adverse selection) and arguments that link performance failure against governance objectives to the embeddedness of insurers and governments in a political, institutional, societal and politico-economic context.

While the ‘market failure’ arguments are important, it can be argued that they can in principle be remedied, whether by additional efforts of the insurers (e.g. communicating risk to the population more effectively; highlighting the benefits of private insurance) or by government intervention (e.g. risk communication; mandatory insurance schemes). However, the actions of government, and interactions between government and insurers and their consequences on the insurers’ role in governance are deeply embedded in the political, institutional, societal and politico-economic context of the two countries – and this embeddedness affects the actors’ ability and interest in addressing market failures and pursuing key governance objectives. In terms of politico-institutional context, for instance, government actions are driven by an interest in avoiding the financial liability of flooding (rejection of mandatory insurance scheme by Germany’s governments; strong governmental support for wide availability and affordability of flood insurance even for high risk properties in the UK) – in line with pressures to keep budgets balanced, and/or benefitting from the political pay-offs of helping people in need (e.g. Germany’s special reconstruction funds). Considerations of a long-term strategy to utilize financial incentives in reducing risks are outweighed by the transfer of financial risk to the insurance sector (moral hazard of governments) or the political pay-offs in discretionary disaster assistance. In terms of societal context, the particular expectations of populations in the UK and Germany towards ‘social’ insurers and the paternalistic welfare state create major reputational and electoral challenges for both insurers and governments respectively.

Ultimately, the different politics of disaster financing in the two countries raises questions on how to overcome barriers to mobilize the positive potential of insurance in risk governance and whether it is a good thing to deploy flood risk insurance in particular, and disaster financing in general, to achieve risk reduction from a governance viewpoint. Given the political and social difficulties in pricing risks adequately and the negative interactions of financial support with risk reduction, it might be more important to concentrate risk governance efforts on prevention through public regulation and investment in infrastructure rather than insurance.

As for wider lessons from the case of flood insurance, it is important to note that flooding – regularly associated with images of devastation and human suffering – activates a specific dynamism of disaster politics which leads to a prioritization of solidarity and compensation (either via ensuring affordability and availability of

insurance or direct state financing based on affectedness) in democratic states like Germany and the UK. Such politics is unlikely to be activated over motor insurance and related risk reduction efforts. However, the key lesson from this paper is that insurers and insurance markets are socially, institutionally and politically embedded actors and institutions – and that this embeddedness has to be taken into account when discussing the benefits of insurance-based governance.

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