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The Political Economy of Natural Disaster Insurance: Lessons from the Failure of a Proposed Compulsory Insurance Scheme in Germany

Berlin, September 2006

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DIW Berlin
German Institute for Economic Research
Königin-Luise-Str. 5
14195 Berlin
Tel. +49 (30) 897 89-0
Fax +49 (30) 897 89-200
http://www.diw.de

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Reimund Schwarze*

Gert G. Wagner**

The Political Economy of Natural Disaster Insurance: Lessons from the Failure of a Proposed Compulsory Insurance Scheme in Germany

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* DIW Berlin and EUV Frankfurt/Oder, rschwarze@diw.de

** TUB and DIW Berlin, gwagner@diw.de

Abstract

This paper studies the politico-economic reasons for the refusal of a proposed compulsory flood insurance scheme in Germany. It provides the rationale for such scheme and outlines the basic features of a market-orientated design. The main reasons for the political down-turn of this proposal were the misperceived costs of a state guarantee, legal objections against a compulsory insurance, distributional conflicts between the federal government and the German states (*Länder*) on the implied administrative costs, and the well-known charity hazard of ad-hoc disaster relief. The focus on pure market solutions proved to be an ineffective strategy for policy advice in this field.

Zusammenfassung:

Dieses Papier untersucht die politisch-ökonomischen Gründe für die Ablehnung einer Versicherungspflicht für Elementarschäden in Deutschland. Nach einer Darlegung der ökonomischen Vorteilhaftigkeit und der Grundzüge eines praktikablen Modells einer Elementarschadenversicherungspflicht werden die drei wichtigsten Argumente der Kritiker diskutiert. Dies sind zu einem die Notwendigkeit und Höhe einer staatlichen Ausfalldeckung, rechtliche Bedenken gegen eine Beschränkung der Konsumentensouveränität und Verteilungskonflikte zwischen Bund und Ländern auf der Grundlage unterschiedlicher Gefahrenexposition sowie die politisch-ökonomische Rationalität von Soforthilfemaßnahmen. Die ökonomische Forderung nach einer reinen Marktlösung erwies sich in den Verhandlungen als ein Nirwana-Ansatz.

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1 Introduction

This paper examines the political and economic reasons for the rejection of a proposal to introduce mandatory natural disaster insurance in Germany. A high-level committee of experts was assembled by the Conference of German Finance Ministers (FMK) to discuss this proposal[1], but after lengthy debate, the idea was ultimately rejected. In the following, we present the economic arguments in favour of this kind of mandatory scheme, explain the basic features of a market-orientated approach, and discuss the counter-arguments and political motives of its critics. The main point of criticism was that the proposal implies a state guarantee covering large claims. Furthermore, critics of the scheme have raised questions about the legality of placing limitations on the consumers' right to choose, concerns about potential distributional conflicts between Germany's federal and state governments. Last but not least the overall political rationale behind the present system of emergency aid was a strong argument in favour of the status quo. After discussing these issues, the present paper concludes by highlighting the merits and drawbacks of a "pure" market solution for coping with natural hazards. The main lesson to be learned from the German debate and our analysis is that a focus on pure market solutions has proven to be an overly simplistic and ineffective strategy for policy-advice in this field.

Extreme floods have become frequent events in Germany. The past decade alone has witnessed four "floods of the century", which statistically occur only once every 200 to 300 years. In 1997, Germany and Poland suffered catastrophic flooding along the river Oder, followed in 2002 by the largest-ever recorded flood of the Elbe (notably in Dresden, cf. Schwarze/Wagner 2004) and a series of medium and large floods in 2005 and 2006 in the alpine regions of the south. As a consequence, proposals for mandatory insurance against floods and other natural disasters have been proposed by various parties.[2] The authors of this paper made an early contribution to the discussion with a concrete proposal

[1] The German Conference of Finance Ministers (FMK) is made up of the Federal Minister of Finance and 16 State Ministers of Finance ("Länderfinanzminister"). The FMK is regularly holding so-called "high level conferences" to discuss issues of mutual interest in the preparation for legislative proposals to the Conference of the Federal Heads of State ("Länderministerkonferenz", LMK). Before the FMK decides upon an issue, it is not unusual that a working group consisting of staff specialists of the Ministeries of Finance and invited experts, including academics and lobbyists, holds discussions to lay the foundations for the decision-making within the FMK.

[2] Supporters of this idea can be found in all political parties, ranging from the left-wing PDS (Roland Claus) to the center-right CSU (Edmund Stoiber).

(Schwarze/Wagner 2002, 2003), which was then taken up by the FMK working group in June 2003 to discuss the various concepts and to seek ways of implementing a mandatory insurance scheme. Several meetings were held with insurance experts and political delegates from the state Ministries of Justice, but the matter was ultimately dropped, and in February 2004 the working group ceased to exist. In its final report, it stated that "it is not possible to find an appropriate means of giving people legally binding protection against the risk of natural disasters, while relieving public budgets of the financial burden".

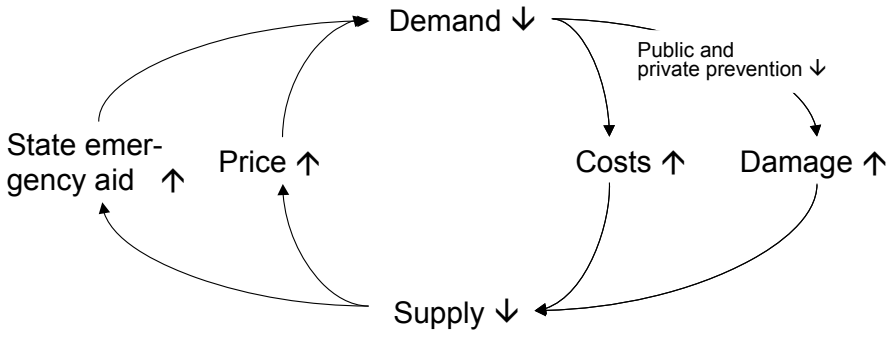
While this process was underway, the German Federal Ministry for the Environment drafted a bill on flood protection that was passed by the Federal Parliament in 2004.[3] It basically forbids building and commercial usage of land liable to flood; in other words, it imposes a ban of economic activity in these areas. But banning land use is not always the appropriate response to an increase in extreme weather events due to climate change. In a densely populated country like Germany, large areas of land cannot be simply withdrawn from the economy in response to increasing risks of floods and other natural disasters. Such a policy would not only be counter to people's needs, it would also be far too expensive in terms of opportunity costs. More than 16% of the land along rivers in Germany is already under intensive economic usage, and the percentage of buildings being built near rivers is rising faster than those being built outside inundation zones, mainly because sites near rivers are generally regarded as more attractive. In principle, there can be no objections to this trend as long as the "costs of enjoying a river view" are not borne by the general public (after cases of extreme flooding). Mandatory insurance would be one way to assure that anyone who wants to live near the Elbe or at the foothills of the Alps bears the financial consequences of the inherently higher risk.

[3] Act to Improve Protection against Flooding of 3.5.2005, BGBl. Part 1, No. 26, pp. 1224-1228 (www.bmu.de/files/pdfs/allgemein/pdf/hochwasserschutzgesetz.pdf).

2 The Disaster Syndrome: A Worldwide Problem

Considering Germany's experience to date with voluntary supplementary disaster insurance[4] as well as the experiences of other countries[5], we clearly see that a sufficient degree of insurance coverage against natural disasters can only be provided through some form of state intervention. With the exception of insurance against storm and hail damage, the "free market" only provides coverage for a small percentage of major natural disasters – between five and ten per cent.[6] This is due to distorted demand and insufficient supply, factors that are fatally interconnected and mutually escalate each other's effects. So we agree with Kunreuther[7] in describing this as a "disaster syndrome" (see figure 1).

Figure 1: The Disaster Syndrome and Insurance



Much has been written about the reasons for the lack of demand for disaster insurance.[8] The main reasons given for demand-side market failure are:

[4] Citlak/Wagner (2001), Schwarze/Wagner (2002).

[5] Ungern-Sternberg (2001, 2002), Prettenthaler/Vetters (2004).

[6] There are striking regional differences in Germany. The state of Baden-Wurttemberg, for example, has almost full cover (90% insurance density) for damage to buildings from natural disasters, as a result of the mandatory insurance required up to 2003. The eastern German states also have a high density of cover (approx. . 50%), as household policies were carried over from GDR times.

[7] Kunreuther (2000), p. 301.

[8] Cf. Kunreuther (1976 and 1996), Coate (1995), Noll (1996), Epstein (1996), Endres et al. (2003), Schwarze/Wagner (2004).

- Systematic underestimation and high discounting of the full extent of the risk of rare disasters by those people likely to be affected
- The availability of aid from the state and private charities when damage is incurred (the so-called "charity hazard")[9].

The underestimation of rare natural disasters (low-probability, high-risk events) is well documented in the literature on risk psychology.[10] Surveys of people living in areas at risk of earthquakes and floods have repeatedly shown that individuals systematically underestimate the likelihood of such events.[11] Events thought to lie in the distant future are strongly discounted and no technical or financial provisions are made.[12]

An additional problem on the demand side is the split responsibility for the construction and ownership of property in risk-prone areas. Municipalities, developers, and clients are not interested in insuring against rare and extreme events, for this could frighten off potential buyers and depress the price of the property. The same applies to those selling the property. Thus, anyone not planning to keep their property for generations will find it advantageous to view the risk of natural disasters as negligible and portray it as such.[13]

The lack of demand leads to problems on the supply side. Like any insurance, natural disaster insurance is a business with economies of scale. It is only possible for the insurers to "eliminate risk" (Sinn 1995) by piling up large stocks of statistically unrelated risks. Often risks of the same type are grouped into one pool. To make the law of probability work (which is the basis for the concept of insurance), these stocks must be of sufficient size.[14] The smaller the pool, the more difficult it is to insure against risks. Thus, the smaller the pool, the higher the premiums calculated by insurance companies. Consequently, the few insurance policies avail-

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[9] Browne/Hoyt (2000, p. 293) define "charity hazard" as the tendency of individuals not to insure themselves against possible natural disasters because they believe help will be available, e.g. from friends, family, the municipality, charities or state emergency programs.

[10] Tversky/Kahneman (1973) provide a thorough account of this.

[11] Cf. e.g. Palm et al. (1990); case studies showing similar results for Germany are Pfeil (2000) and Plapp (2004).

[12] See Kunreuther et al. (1998) specifically on the intertemporal underestimation of disaster risk.

[13] For this reason, since 1998, California has made it obligatory for vendors of property and estate agents to disclose any disaster risk (Residential Disclosure Law, California Civil Code, Section 1102). In Germany the private vendors of property are obligated by law to inform the potential purchaser of any known faults, e.g. dry rot, but not dangers like floods or backwater (verdict by the Federal High Court of 7.2.2003 - VZR 25/02, in: GE 2003, p. 518).

[14] Insurance against individual events is also possible; economically, however this is a gamble and not the core business of insurance providers.

able in Germany against natural disasters are more expensive than they would be if there were numerous buyers on the market. If the pool shrinks, there is also always an initial suspicion of adverse selection: it is frequently the good risks that leave the pool while the bad remain, increasing the expected damage occurring in the pool of insureds.

Both these factors together, and each one independently, drive up the costs and the price of insurance. But the rising price depresses demand. So any reduction in demand (whatever its cause) has a multiplier effect, depressing further demand.

These problems are inherent in the market, but there is also a fundamental policy failure. Obvious under-insurance provides the political legitimation for a policy of emergency aid. Private donations and state reconstruction programs are intended to help the victims to bear uninsured risks. But this makes the "the policy of aid" self-perpetuating, for by guaranteeing support it dampens the demand for insurance and thus reduces the number of insurance policies sold.[15]

A policy of state emergency aid not only dampens the demand for insurance, it also reduces the incentive to make provisions for self-protection, and reduces the pressure on local policy-makers to take public protection measures. These latter two factors increase the expected level of damage and thus also the costs of insurance, giving rise to a further wave of rising prices and falling demand.

This "Disaster Syndrome" can only be cured either by the radical remedy of refusing to grant state aid[16] or by making insurance mandatory. Refusing to grant state aid would not only be counter to the principle of the welfare state in Germany, it would almost certainly fail politically. As long as a policy of state emergency aid helps politicians win elections (as in the summer of 2002) emergency aid programs will continue to thrive. This is almost universally true. Thus, the only *pragmatic* solution for overcoming the "Disaster Syndrome" is mandatory natural disaster insurance.

[15] For the basic theory, see Coate (1995) and for an empirical discussion, Browne/Hoyt (2000).

[16] This is proposed by Epstein, for example (1996).

3 The Response of German Insurers to the "Flood of the Century" in 2002: Increasing Premiums and Withdrawal of Coverage

The German flood disaster of 2002 was the single most expensive flood in German history (see Table 1). Economic losses from the floods were estimated at €11.6 billion. Allianz Insurance Group was hit particularly hard by the summer floods. It faced losses of almost €800 million because the home insurance policies that it had taken over in eastern Germany during the reunification process provided blanket coverage for flood damage.

Table 1: Flood Damage in Germany

Month/Year	River/Region	Economic loss [mill. €]	Insured loss [mill. €]
3/1981	Germany	46	-
1981	Southern Germany	40	5
1983	Rhine	27	2
1984	Rhine	72	3
1988	Danube	27	4
12/1993	Rhine	540	162
8/1991	Danube	50	4
4/1994	Elbe	162	54
1/1995	Rhine	288	117
7/1997	Oder	324	32
11/1998	Germany	135	5
5/1999	Rhine	72	5
5/1999	Danube	375	63
6/2002	Western Bavaria	100	50
8/2002	Elbe	11600	1740
8/2005	Bavaria	220	50

Sources: Presseforum der Schaden- und Unfallversicherer 14.-15.5.2001, Düsseldorf (www.gdv.de); Data for 6/2002, 8/2002 and 8/2005 by Munich Re (/www.munichre.com).

Mindful of the rising exposure to risk, German insurers are currently adopting a more cautious stance, reducing coverage in high-risk areas and increasing premiums and deductibles.

Previously, the calculation of premiums was based on maximum flood-related losses of €2.5 billion and an observation period of 100 years. Now the basis of calculation is a total of €11 to €15 billion and an observation period of 200 to 300 years.[17] Premiums increased in high-risk regions of Saxony up to 60 per cent.

Table 2: Adjusted Probable Maximum Losses for Natural Disasters (in bn. €)

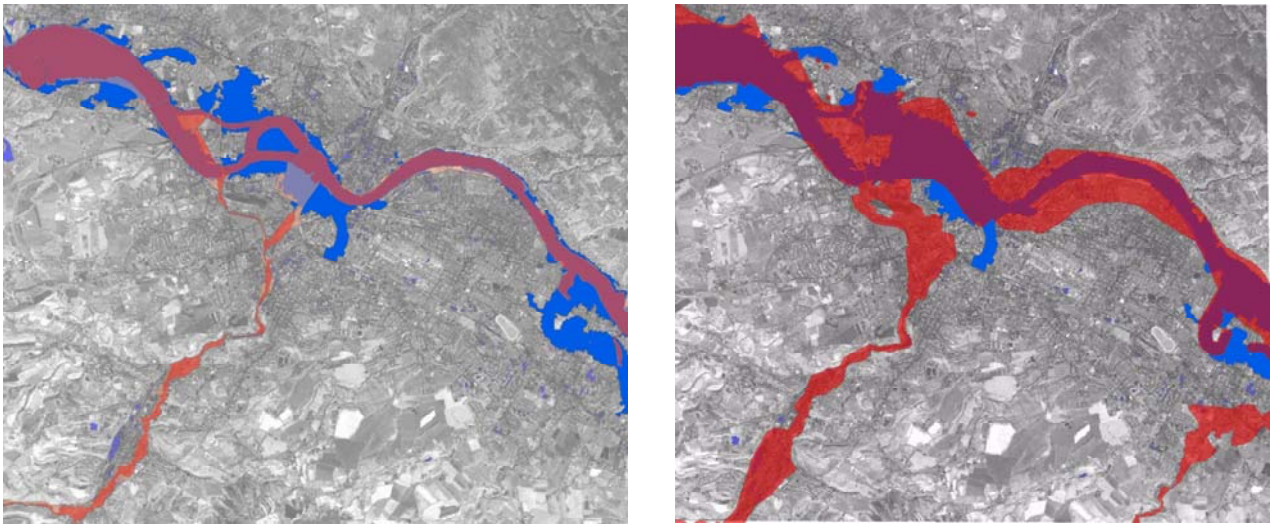
Return Period	200 years	300 years
Flooding	7.5 – 10	9 - 12
Earth Quake	6.5 – 9	9 - 12
Storm	7 - 9	9 - 12
Storm tide	10 – 20	

Source: Allianz (cf. Olaf Bogenrieder 2005)

Heavy rainfall and aging dikes have been added as risk factors that could justify denial of coverage in individual cases. Compared to the situation prior to the flood of 2002, this means that insurance companies now refuse to cover property that was previously considered "un-problematic." The German Insurance Association (GDV) estimates that if these risk factors are included, the share of uninsurable regions would increase from 10% today to between 20 and 25% (see figure 2a and 2b).

[17] The longer the period of observation, the higher the potential maximum damage that can be caused by an event. By basing PMLs on a 200-year return period, the German insurance market is adopting procedures that have long been common practice in the international reinsurance industry.

Figure 2a and 2b: Increasing Zones of Uninsurability (Dresden area)



Blue: Flooded area in Dresden 2002 (flood frequency: ff = 1/200; previously fully insurable)

Dark red: *Old* Zone 3 (= ff > 1/10; uninsurable)

Light red: *Old* Zone 2 (= ff > 1/50, partially insurable)

Dark red: *New* Zone 4 (= ff > 1/10; uninsurable)

Light red: *New* Zone 3 (= ff > 1/200, partially insurable)

4 A Proposed Market-Oriented Mandatory Insurance against Natural Disasters

Immediately after the 2002 flood, economists proposed a general mandatory insurance against natural catastrophes that would solve most of these problems. The mandatory natural hazard insurance that economists *and* the insurance industry favoured would be based on two principles:

- First, all basic natural disasters (wind storms, floods, earthquakes, etc.) would be covered by a single insurance policy. This pooling approach would increase the efficiency of risk coverage; moreover, the group of those potentially at risk would be as broad as possible.
- Second, in the case of floods, only 'once-in-a-century' damages would be insured. This means that practically all floods in non-risk areas would be covered, but that 'regular floods' in high-risk areas would not. In cases of catastrophic losses, the state would step in as the insurer of last resort. State intervention, however, would be strictly limited to covering 'mega-losses.'

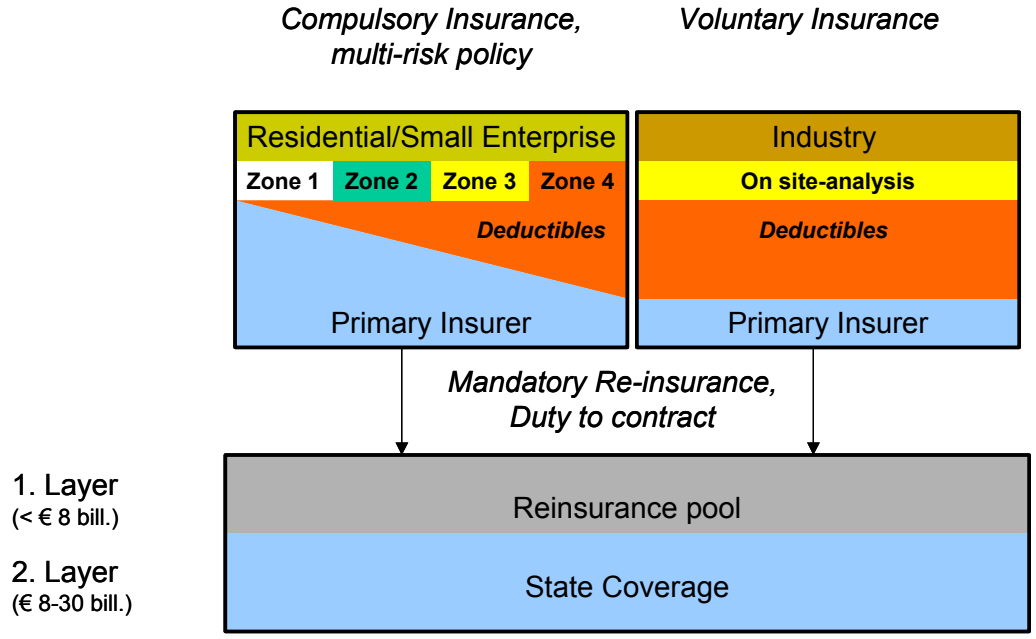
High risk-based deductibles would apply in extremely risk-exposed areas that are regularly hit by floods (risk zone 4, ff > 1/10), so that the insurance would cover only rare, large-scale events. At the same time, an obligation to insure would mean that all households could get at least this cover.

To foster loss prevention, premiums should depend on the extent to which individuals have taken preventative measures. For private buildings, for example, deductibles could rise in accordance with the exposure to risk. Failure to put provisions in place would, thus, be penalised more harshly in regions where natural catastrophes are frequent than in regions where they are rare.

The industrial sector already has substantial experience with differentiated, risk-based premiums for industrial fire and environmental liability insurance (Schwarze 2002); therefore, voluntary insurance seems sufficient in this case.

This market-oriented system of mandatory natural hazard insurance is summarised graphically in Figure 3.

Figure 3: Market-Oriented Mandatory Insurance against Natural Disasters (Flood Module)



State participation is needed in such a system. It would, however, have be strictly limited to covering 'mega-damage' (€8 –30 billion in the case of flooding). The insurance industry would not only act as a primary insurer but also provide reinsurance in the form of a pool with obligatory membership for all companies. Only when the primary insurance and reinsurance capacities are exceeded would the state provide additional capacity to cover the deficit.

Such insurance would make it possible to calculate how much compensation the insured person/company can expect, allow insurers to calculate their loss exposure and, at the same time, strictly limit government intervention. It would also serve as an incentive for loss reduction, because individuals could reduce their premiums by implementing preventive measures and because the cost of premiums in high-risk areas would increase political pressure for collective action.

5 Reasons for the Failure to Introduce Mandatory Disaster Insurance in Germany

In Germany the central government has one finance minister, and each of the 16 federal states have one as well. All of the finance ministers meet to discuss important issues at the Finance Ministers Conference (FMK). The reasons why the negotiations at the 2003/2004 FMK conference did not result in mandatory disaster insurance will be explained in this section. In particular, we will show that the problems leading to the downfall of the proposal to introduce mandatory disaster insurance:

- Failure to recognise the role of state guarantees in enabling private insurance
- Mistaken legal objections against mandatory insurance
- Distributional conflicts between central and state governments
- Re-election considerations by politicians.

a. Failure to recognise the role of a state guarantee

The main reason given by the German finance ministers for deciding against mandatory insurance for natural disasters is the level of the state guarantee demanded by the German insurance companies. The German Insurance Association (GDV) argued in the finance ministry working group that they could only obtain coverage on the worldwide re-insurance market for damage amounting to €8 billion a year. With maximum damage expectations of €30 billion annually[18], the state would have to provide a guarantee against losses of €22 billion. The finance ministers did not see any way to fit these sums into their limited budgets.

But the argument is neither logical nor convincing. The question is not whether the state would or would not incur costs of up to €22 billion to cover the insurers' losses in the event of a natural disaster, but whether the state would be called upon to provide aid beginning with the first euro or only above and beyond €8 billion in private insurance. Thus the refusal to grant a guarantee against loss on excess claims means rejecting the first layer of private cov-

[18] This maximum level of damage was a (never fully explained) figure presented by the German Insurance Association in FMK working group negotiations. It was based on two different damage scenarios (according to GDV representatives). One is a series of two extreme events (recurring every 200 to 300 years); the other is a single "millenium event" (recurring every 1000 years). The "millenium flood event" was put at around 25 billion euros, while the "millenium storm event" was said to cause damage of up to 26 billion euros. Damage figures include losses to private and commercial buildings but not losses to public infrastructure.

erage. This rejection is only cheaper for the finance ministers if they discount the aid they will have to provide for future disasters, or if they expect that the damage from future catastrophes will be carried by the victims to a greater extent than is currently the case—or even carried by them entirely.[19]

b. Exaggerated legal reservations

The main legal argument put forward against natural disaster insurance was that it would be constitutionally impermissible as an excessive state intervention into the general freedom of action. Mandatory insurance would indeed constitute a serious infringement on individual autonomy, which is only permissible under the German Constitution if

1. it is in the public interest,
2. the intervention is appropriate and proportionate, that is, there is no "gentler way" to achieve the objective.

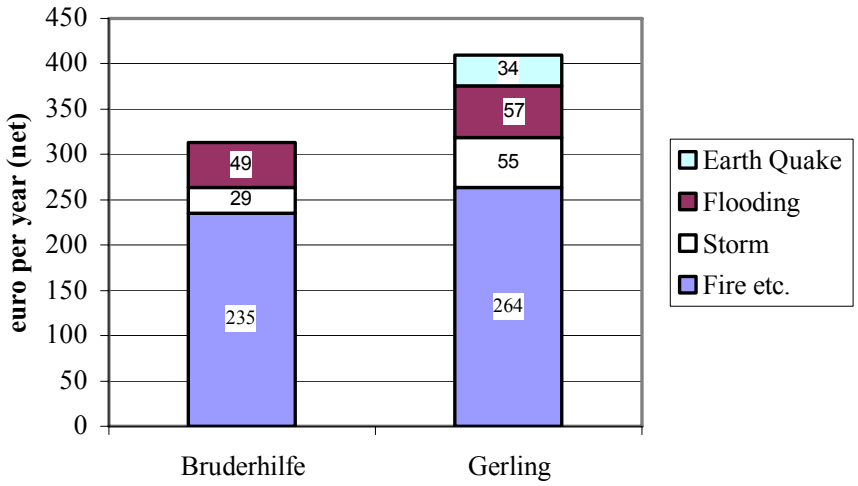
Ad 1: Avoiding the economic strain caused by politically motivated public emergency aid programs, in our view, constitutes sufficient public interest to justify general mandatory insurance. The legislature decided in favour of mandatory insurance for similar reasons in the cases of unemployment and care of the elderly in order to limit the extent to which private needs can be passed on as a demand on public coffers (i.e. social assistance). For unemployment in Germany, a state-organised mandatory insurance scheme was created some 80 years ago, long-term care insurance was introduced in the 1990s. Then situations compare to the need for protection against natural disasters, once it is recognised that these problems are now occurring on a national scale, and that they now affect regions previously immune, as natural disasters are become more wide-spread and more extreme as a result of global climate change.

Ad 2: Judging from experience in other countries and in some German federal states (especially Baden-Württemberg), a general mandatory insurance scheme is the only suitable way to meet this need. A "gentler way" would not be effective. The premium paid by an individual for a policy would be affordable and proportionate to risk. According to estimates by the Confederation of German Insurers (GDV), comprehensive disaster insurance would cost no

[19] There is indeed empirical evidence that politicians and bureaucrats at state agencies systematically discount uncertain future events in such a way (e.g., Zimmermann 1988, pp. 205 ff., also Noll 1996).

more than €150 a year for a typical single-family home (worth €300,000) in low-risk zones with the claimant paying the first €1,500 per claim as a deductible. However, insurance on properties in high-risk zones would cost more than €500 a year, with a high deductible of €15,000 payable by the claimant. Compared with the premiums of €300 now charged for supplementary natural disaster insurance (see Figure 4), this new policy would be a "bearable" burden on the individual homeowners.

Figure 4: Premiums for Natural Hazard Insurance in Germany



Explanantions: Premium calculations are made for a single-family home insured at an economic value of €300,000 with a deductible for flood-related damages at between 1% of the sum insured (Bruderhilfe) to 10% of the damage (Gerling). Calculations are based on information provided in Finanztest 5/2004. "Fire etc." summarizes risks related to fire, lightning, leakage from water pipes, and costs related to decontamination of soil. Earthquake insurance is only offered by Gerling. Premiums for flood insurance provided by Bruderhilfe, a regional insurance company in Saxony, range from €49 to €244 per year depending on the location of the building and previous flood claims (only the lower value is depicted in Figure 4).

c. Federal conflicts: not just a German problem

Natural disasters now affect all of Germany, but they affect the different regions to differing degrees. The damage from flooding along the Rhine, Mosel and Danube is naturally greater than on the Lüneburg Heath or in the Thuringian forests. It is thus unsurprising that past political efforts to create obligatory flood insurance came from the states of Baden-Württemberg, Rhineland-Palatinate and Bavaria (e.g. Stoiber 1999). But unlike the "flood of the century" in 2002, these early initiatives by individual states never made it onto the federal

government's political agenda. The damage caused by the flooding in Dresden and on the Upper Elbe was so immense that for the first time it created severe problems for the economy as a whole, calling for concerted action by the central and state governments (postponement of the so-called "second stage" of tax reform in Germany). Payments of €3.5 billion made by the states and municipalities into the reconstruction fund had to be made when their budgets were already overstretched. The resulting situation seemed to be a historical opportunity to finally achieve private financial provision on a national scale.

To achieve this, however, consensus would have been necessary, and this consensus failed to materialise out of the discussion over mandatory insurance against natural disasters. Instead there were the usual battles over the distribution of funds between federal and state government once it became clear that federal government alone could not provide the necessary funds for the state guarantee demanded by the insurance industry. There is no easy solution for how to distribute the burden of state guarantees between federal and state governments, and it was only possible to make a rough estimate of claims that could result from flooding. The volume of premiums needed for the intended obligatory insurance of buildings against flood risk was put at €1.7 – 3.1 billion per year. Assuming a volume of premiums of €2.85 billion a year, there would thus be *additional* federal revenues from insurance tax of €0.46 billion and a *reduction* in regional revenue from income and corporate tax of €0.73 billion.[20] The additional tax revenues from the mandatory disaster insurance would thus accrue entirely to the federal government (insurance tax), while the states would bear half the reduction in income and corporate tax revenues (42.5% and 50% respectively) in addition to the administrative costs of handling the mandatory insurance. It would have been necessary to solve the problem of distributing these gains and losses, and given the major political problems that mandatory insurance entailed, this problem finally proved insurmountable.

d. Public Choice Considerations

Although the discussion over mandatory disaster insurance was conducted mainly by specialists from the ministries, political (election-related) considerations played an important part in the decision-making process. The first of these problems was that ad hoc aid gives the decision-makers greater discretion in their response to natural disasters than regularised benefits.

[20] The effects on value added tax were regarded as insignificant.

Second, the fear was expressed that introducing mandatory insurance against natural disasters would weaken purchasing power at an already weak point in the economic cycle.

Much has been speculated about the general political advantage of ad hoc responses to natural disasters, but few analyses are available. Crisis situations, it is widely believed, benefit those in office and thus damage the opposition, for in crises "people look to their governments". The Elbe floods would appear to substantiate this, for Chancellor Schröder's energetic and sympathetic efforts to help Saxony during the floods led to the governing party's renewed popularity, helping the Social Democrats to win the 2002 election. In the past, too, other leading German politicians have become famous through their actions as crisis managers, and were subsequently voted into top office. One example is Helmut Schmidt, German chancellor in the 70s, who gained a national reputation in 1962 during the devastating tidal floods when he was Senator to the Interior for the State of Hamburg, and who later became Federal Chancellor. And the present Minister President of Brandenburg, Matthias Platzeck, became known through his energetic response to the Oder floods of 1997, when he was Environmental Minister, and thereafter was elected to the supreme state office and a high office in his party.

The political decision on mandatory disaster insurance, nearly two years after the end of broad media coverage of the floods, was determined more by the current economic situation and economic policy strategies of the federal government. The estimated withdrawal of €2.85 billion of purchasing power (the amount estimated for the premiums) was counter to the efforts by the federal government to strengthen purchasing power and stimulate growth, according to the final report by the Federal States' Commission.

Right as this argument was at the time the decision was taken (2004), it does not take account of the fact that a flood also withdraws purchasing power, and that in one specific case in 2002, it disrupted the government's tax reduction policy. The rule of the thumb that natural disasters are cyclically neutral (the damage equals the reconstruction costs) was not confirmed in that specific case. Nor did the Elbe flood bring a corresponding reconstruction stimulus in Saxony, as the short-term regional demand impulse in the building industry was outweighed by loss of turnover and demand in other sectors.

6 Lessons Learned: Intelligent Social Insurance Design is better than a Pure Market Solution

With hindsight, we believe that advising policy-makers to pursue a pure market solution, without any cross-subsidisation, was a strategic failure. It has caused two political problems.

First, there was no credible means of threatening the position of the private insurance industry. Only the threat of introducing a state monopoly would have forced them to provide transparent, feasible estimates of the maximum level of damage that could be covered by private insurers.

Second, with moderate cross-subsidisation it would have been impossible to make the argument that the insurance premiums were "not bearable". The figures from the insurance confederation on the level of premiums were not convincing to social policy-makers, particularly considering the high deductibles in some regions.

Retrospectively we also find that the requirement of 100% cross-subsidisation free insurance premiums is an utopian "nirvana approach". Any form of subsidisation in flood insurance must be judged against the present state practice of ad hoc measures, and not against a refusal to grant any state emergency aid, which is completely unrealistic and thus not a meaningful point of reference. But with state ad hoc aid provided, cross-subsidisation is, in principle, more serious because it is spread among all taxpayers. Moreover, the insurance scheme provides a much better incentive structure than ad-hoc measures can.

For the rest, international comparison shows that to a certain extent insurance damage always has to be borne by society as a whole. Differentiating premiums according to classes of risk (risk zones) does prevent *systematic* cross-subsidisation, but a remnant of cross-subsidisation always remains. We know from the physics of flooding that only a few centimetres difference in the water level can have a huge effect on the extent of the flood and its consequences. There is no classification system finely graded enough to reflect these differences fully. In reality, one also has to accept that flood damage is a community task in populated areas that have grown over time and cannot all be left up to the present owners. Thus insurance benefits always have to be socialised for a transitional period. A purist approach to economic policy is neither sensible nor practical in this context!

It is also evident, for example, in the United States, where basic insurance coverage for buildings and their contents against tidal and river flooding, heavy rainfall, erosion and subsidence

is subsidised by the Federal Emergency Management Agency (FEMA). More than 4.9 million households receive an insurance policy against flooding (which they need for their mortgages) at a price *60% below* the market price. Here, too, the incentive structure is decisive, for the subsidy is *only* given in municipalities that participate in the National Flood Insurance Program (NFIP). A condition for participating in this program is that the municipality has been evaluated as being at risk of flooding, thus ensuring that all inhabitants are aware of the risk. Another condition is that the municipality has taken the prescribed measures to protect against flooding. Subsidisation of demand is thus combined here with incentives for the public authorities as well to take preventive measures. The incentives are provided in a way that increases general awareness of the risk.

Our conclusion is the following. We need intelligently designed social insurance schemes for natural catastrophes like those in the US, not "pure" market solutions. We have come to this recognition too late in the discussion that followed the 2002 "flood of the century". It is our hope, however, that by documenting this recognition we are contributing to a future policy debate on mandatory disaster insurance – one that will inevitably be reopened after the next "flood of the century", which experience has sadly taught us to expect sooner than in a hundred years' time.

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