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**Climate change, natural disasters 2021
and the impact on insurance demand! A
look at Germany from the perspective of
Behavioral Economics.**

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Climate change, natural disasters 2021 and the impact on insurance demand! A look at Germany from the perspective of Behavioral Economics.

Abstract

Natural disasters worldwide are becoming more extreme and more frequent. In Germany, the low-pressure area "Bernd" in the summer of 2021 caused costs of 40 billion dollars. An insurance against natural hazards protects against these risks and reimburses the costs incurred.

From the perspective of the availability heuristic, insurance inquiries increase due to media presence after such severe catastrophes and then drop again. Despite increasing and severe natural catastrophes worldwide as well as in Germany, the insurance density of natural catastrophe insurances is only about 46%. The increasing danger is no longer perceived as the media presence decreases. And thus, the presentness of the danger should be made clearer.

Key words: natural hazards, insurance demand, heuristics, subjective risk perception, Behavioral Economics

Introduction

Extreme weather events cost one of the world's largest reinsurers Munich Re¹ \$280 billion worldwide in 2021.

That's 70 billion more in losses than in 2020 and 114 billion more than in 2019. "The 2021 catastrophe statistics are striking. That's because quite a few of the extreme weather events are among those that are becoming more frequent or severe due to climate change," said Munich Re Chief Climatologist Ernst Rauch (Munich Re, 2022).

Germany also experienced its most devastating natural disaster ever in 2021. 40 billion dollars was the cost of the natural disaster triggered by the low-pressure area "Bernd" in the west of the country. Of these costs, the insured share was only \$10 billion (Capital, 2022).

Such natural catastrophes are insurable under insurance solutions. While no longer after the immediate damage, it is still before any damage occurs. Residential building insurance protects properties against the basic perils of storm/hail, fire and tap water. However, the addition of natural hazards such as flood, earthquake and backwater are also indispensable and necessary in the event of natural disasters. A study by the world weather attribution concluded that the probability of extreme rainfall increases by a factor of 1,2 to 9 due to the man-made rise in temperature (world weather attribution, 2021).

Homeowners insurance is not a mandatory insurance in Germany. Until 1994, there was an obligation to take out pure fire insurance. Indirectly, this insurance can be required by a bank as part of the lending process.

Insurance demand increased in the third quarter of 2021 following natural catastrophes, accompanied by media presence in Germany. Approximately 400.000 new contracts were added, while new contracts between 50.000 and 100.000 are usual (GDV, 2021c). This phenomenon is reinforced by the availability heuristic. Based on the public visibility of media events, such as immediately after the flood disaster, insurance demand increases. Yet the objective risk of a loss occurring remains the same whether or not a recent flood event occurred (Richter et al. 2017).

¹ <https://www.munichre.com/en.html>

The following slide shows the most devastating natural catastrophes based on the respective years (GDV, 2021b).

The 10 most devastating natural disasters in Germany between 2002 and 2020 (Claims expenses property (red) and motor (green) insurance, in million euros)

Sachversicherung + Kfz: Die zehn verheerendsten Naturkatastrophen in Deutschland 2002–2021

in Millionen Euro

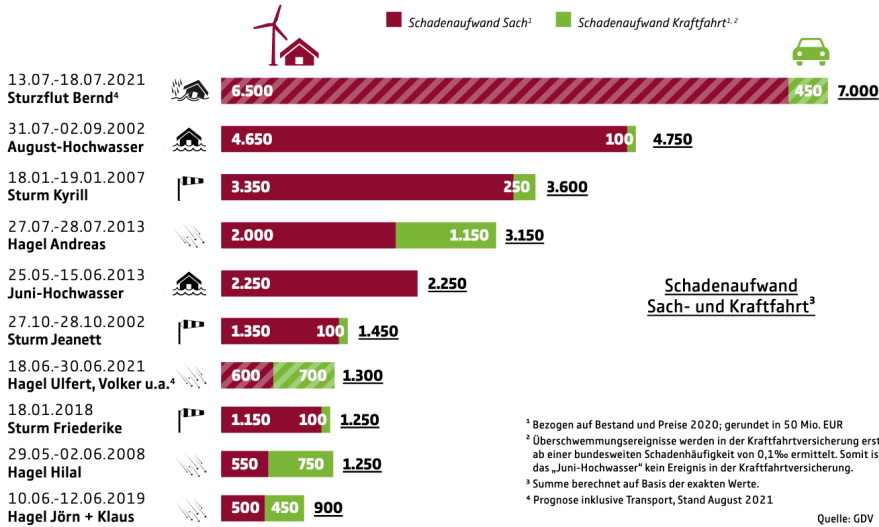
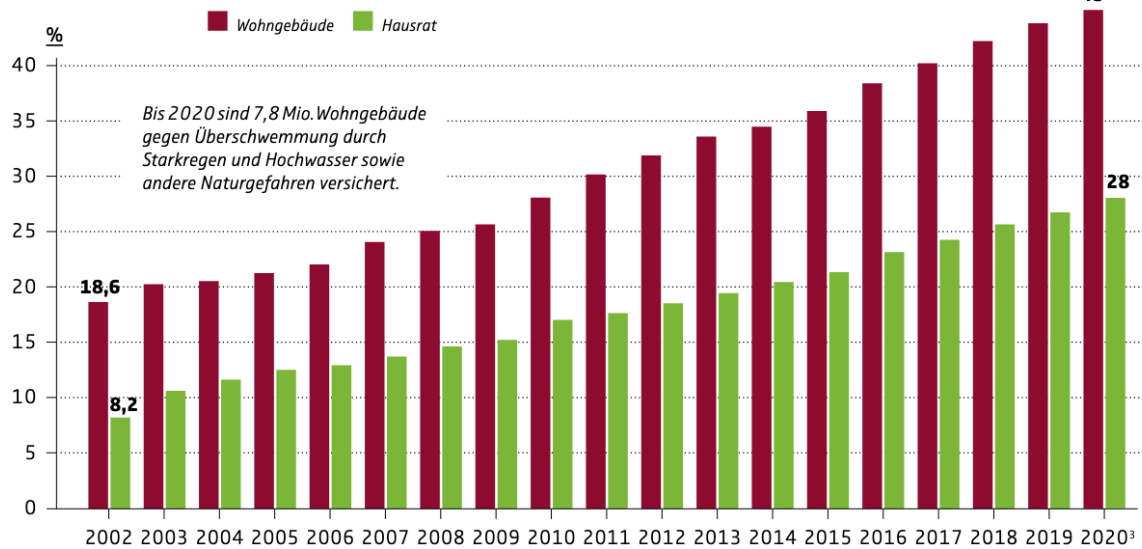


figure1: The 10 most devastating natural disasters in Germany between 2002 and 2020

The insurance density in Germany for residential building- (red) and household insurance (green) with natural hazards is as follows (GDV,2021b):

Wohngebäude- und Hausratversicherung: Versicherungsdichte für die Volldeckung¹ gegen weitere Naturgefahren (Elementar)²



¹ ohne reine Starkregenverträge und ohne die sogenannten Altverträge der ehemaligen Deutschen Versicherungs-AG
² mit reinen Starkregenverträgen und mit den sogenannten Altverträgen der ehemaligen Deutschen Versicherungs-AG: 2020³: 49/35 %
³ vorläufig
 Quelle: GDV

figure2: insurance density against natural hazards

Method

Explanatory approaches describing the behavior of why insurance signings first increase, level off over time, and eventually cease to have an impact on the totality of natural catastrophe insurance policies provide behavioral economics patterns. The following behavioral patterns, which are often biased, are shown by the following explanatory approaches:

Subjective risk perception

People are bad at estimating probabilities in many situations. Especially in events that are rare or difficult to observe. Events with extremely low probability (below an individual threshold) are completely ignored (Richter et al. 2017, p.15 and Slovic et al. 1977).

Since one must basically classify the effort as very high to be able to determine exact probabilities, decision makers resort to heuristics, i.e., simplified rules of thumb. These allow meaningful and quick decisions to be made in a complex environment. This carries the risk that supposedly sensible decisions are systematically distorted (Richter et al. 2017 and Kunreuther and Pauly, 2004). Subjective risk perception distorts perceptions and events are misjudged. Attributable to a very often observed wishful thinking. What one hopes for is considered more likely (Richter et al. 2017 p.16).

Availability heuristic:

Heuristics, such as the availability heuristic, state that the mental availability of examples is decisive for the assessment of probabilities or frequencies (Beck, H. 2014 p. 38-39). Thus, it can be assumed that the demand for insurance coverage increases immediately after a natural disaster.

"An event is intuitively judged to be more likely the easier it is to remember or imagine many similar events" (Pfister et al. 2016, p.137).

Excursus Heuristics:

A heuristic is a simple rule of thumb that is used to simplify decisions, especially in complex problems. It is also used to form judgments. A heuristic is applied spontaneously and intuitively. Judgments can thus be formed automatically (Pfister et al. 2016, p. 133).

Availability heuristics were part of the research field of Daniel Kahneman and Amos Tversky in 1971 and 1972. Kahneman and Tversky found what people do when they want to estimate the frequency of a particular category, "such as people who divorce after age sixty" or "dangerous factories." People recall examples from that category. That category is judged to be large if recall is easy and fluid. Both researchers defined this heuristic as the process of estimating frequency based on the ease with which example cases are recalled (Kahneman and Schmidt, 2016 p. 164).

Determinants of the availability heuristic



figure 3: determinants of the availability heuristic- own presentation according to Beck H. 2014; Schwarz and Vaughn, (2002); cf. Beck, H, 2014 as cited in Biller et al. 1992

The following examples explain the factors:

Public visibility- Reporting on celebrity divorces can lead to overestimates of divorce rates.

Context of the information- in a certain context things can be remembered better.

Time horizon- the memory of an event fades over time.

Personal experience- anyone who has ever been involved in a car accident themselves overestimates the likelihood of accidents.

Particularly dramatic incidents- terroristic attacks

Subjective effort- If you ask people to write down 12 situations where they were assertive, those people feel less assertive than people who had to write down six situations. The idea of 12 situations is more difficult than six. People with only six situations thus feel easier and think they are more assertive.

Personal judgement- who thinks that he has little idea about a subject, does not rely on his ability to recall images.

(Beck H. 2014; Schwarz and Vaughn, (2002); cf. Beck, H, 2014 as cited in Biller et al. 1992)

Interpretation of results

After the media presence weakened, it was already evident in the past that the insurance density did not increase significantly in the years following natural catastrophes. From the graph it can be seen that depending on when in the year the natural catastrophe occurred, the increase can be seen directly or in the following year. See August flood 2002/2003 and then 2004. 2007 storm Kyrill and 2013 hail Andreas and June flood. Even after the 2021 flood disaster, the demand for natural hazard insurance increased. Thus, Wirtschaftswoche (Economic Week, 2021) wrote as early as July, and thus in the middle of the catastrophe, that

insurance groups such as HDI, Ergo, Allianz, debeka, etc. have seen increased demand. More than 400.000 new contracts were recorded in the third quarter at GDV (GDV, 2021c), instead of 50.000 to 100.000 in years without natural disasters. Back in 2016, according to Wirtschaftswoche, a spokesperson for the insurance chamber said that shortly after a natural disaster, attention to such events is high. In 2016, there was an eight percent jump in natural hazard insurance following the floods in Bavaria and Baden- Württemberg. The regular new contracts are at four to 5 percent according to figures the GDV, see figure2. Probabilities, especially with regard to the frequency of a natural catastrophe, are subject to personal risk assessment. Extreme floods belong to "rare events" and are determined according to "annuality". The term "annuality" is misinterpreted by the public. People affected by floods often associate it with the fact that a flood with an annuality of 100 years occurs only once every hundred years. In fact, however, the term is based on a probability analysis that makes it possible for flood events to actually occur at shorter intervals (Umweltbundesamt, 2012).

Discussion

From the past, it could already be seen that insurance demand for natural catastrophe insurance jumped and then fell back to normal demand. The availability heuristic thus comes into play very strongly in the demand for natural catastrophe insurance. Now that the media presence of a natural catastrophe has waned and is no longer present or easily retrievable in people's minds, demand for natural hazard insurance is no longer increased. In view of climate change and the increasing and intensified number of catastrophes, this is very regrettable. The presentness of the danger must be made clearer so that the insurance density of natural hazard insurance increases and does not stagnate at the level of approx. 46% or only increases slightly. Solutions that this insurance is contracted more by the property owner should be urgently sought!

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