Managing systemic risks of climate- and weather- related extreme events

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Introduction

Since the 1980s, the number of registered climate- and weather- related loss events has been steadily increasing. In 2014 three times as many events were observed as in 1980.

Inflation adjusted insurance losses from these events increased from an annual average of around $10 bn in the 1980s to around $50 bn. over the past decade (Fig. 1). In Austria, the difference is even more striking (Fig. 2).[1]

Impacts of these events are felt across the full range of economic sectors, affecting households, firms, insurance companies, banks as well as local and national governments.

These sectors are intertwined. e.g. households hold insurance policies, have borrowed from banks, purchase products from firms and pay taxes to the government.

If a weather- or climate related extreme event occurs, each of these connections is affected:

- insurers have to payout,
- bank loan services may be interrupted,
- firms may not be able to supply goods because of supply chain interruptions
- governments face rising expenditures due to damaged infrastructure as well as compensation payments to affected households

2 types of risk are central: physical risk and liability risk.[2]

Physical risk: adverse impacts climate- and weather related extreme events have on infrastructure and property assets

Liability risk: when those who suffered losses and damages seek compensation from those they hold responsible.

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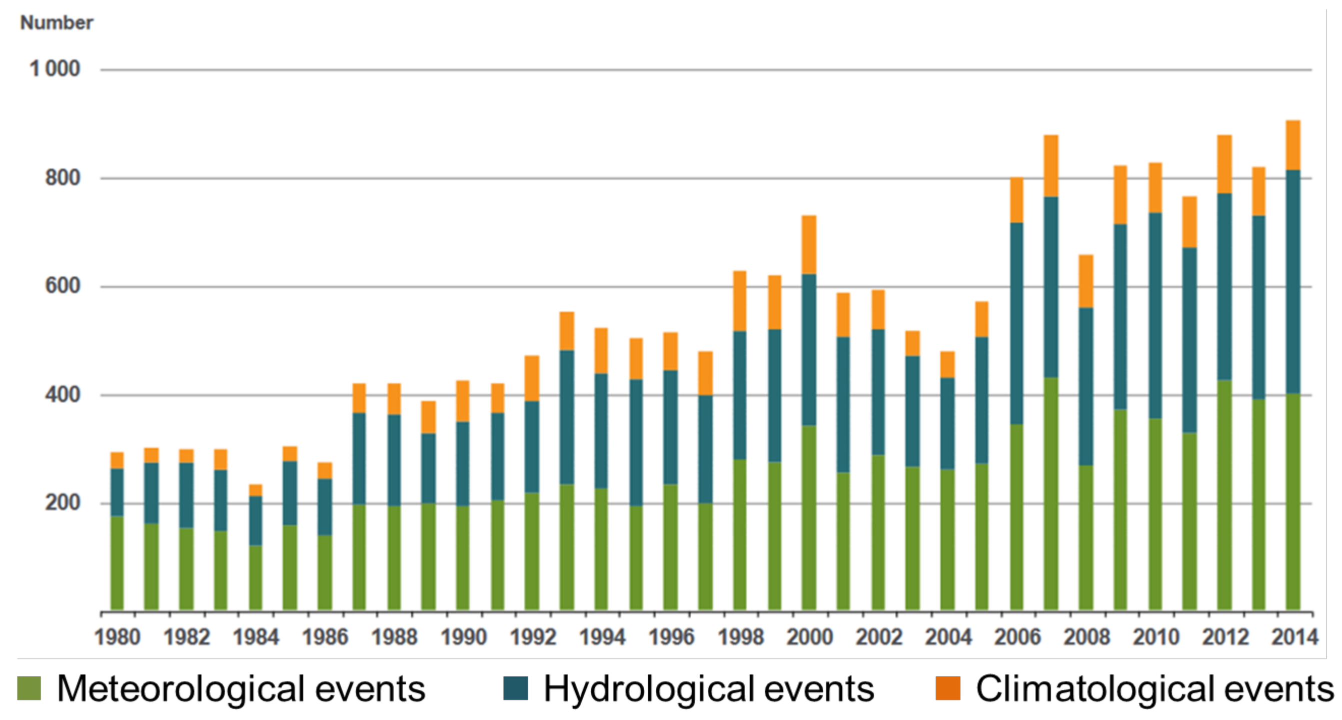


Figure 1: Loss events worldwide 1980-2014
source: Munich Re, NatCatSERVICE (2015)

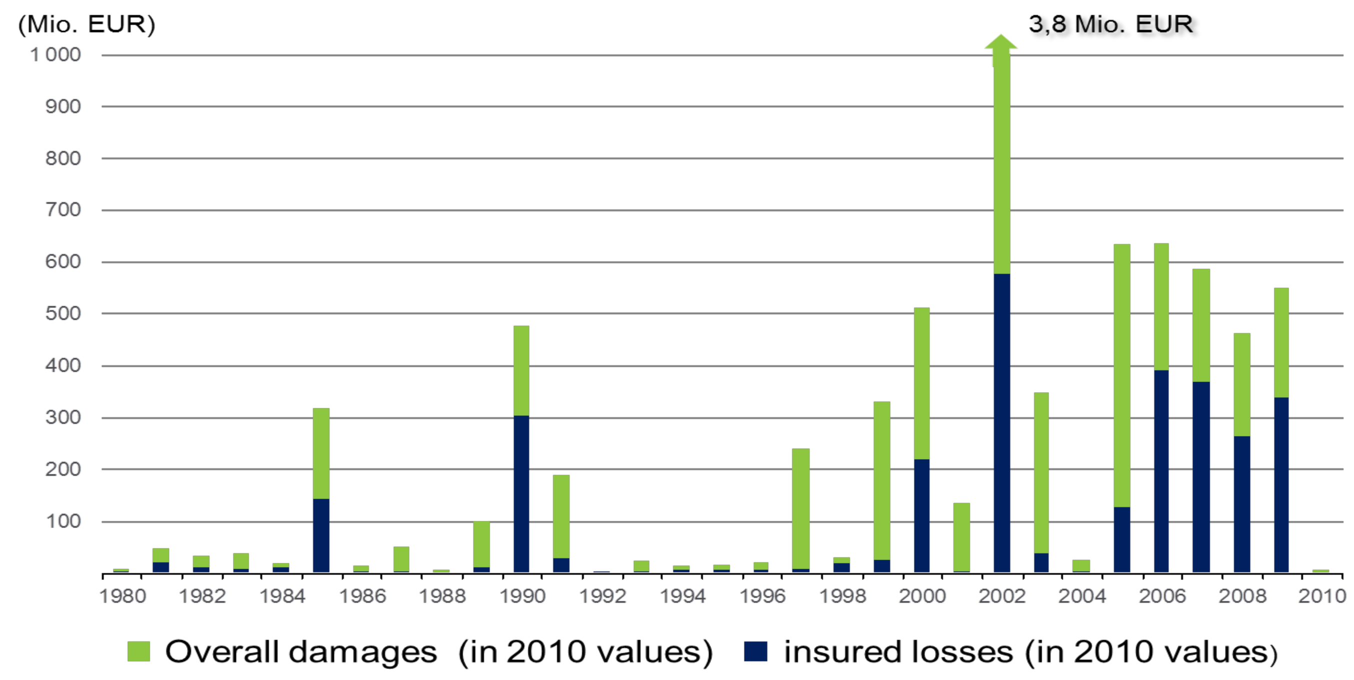
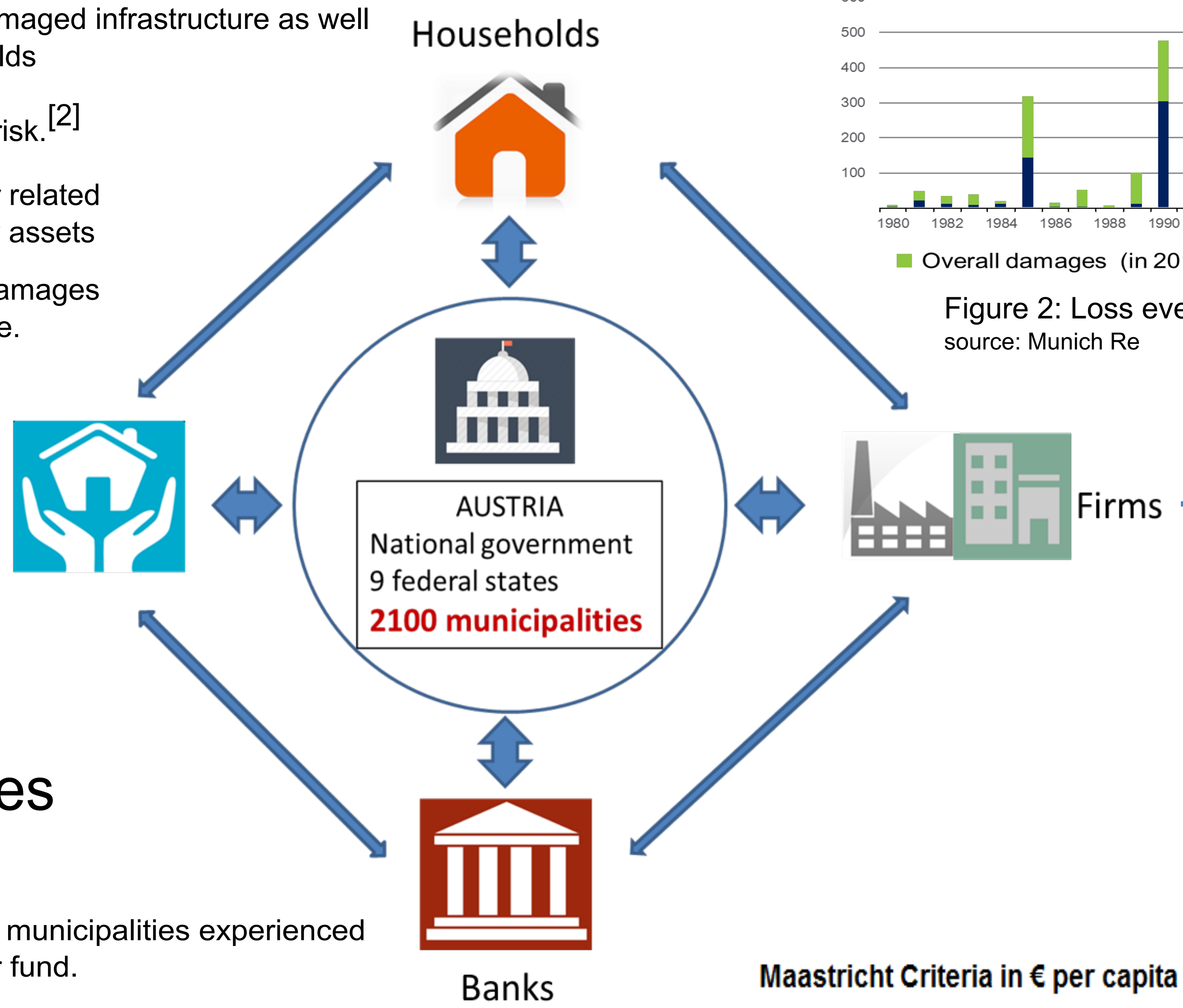


Figure 2: Loss events Austria 1980-2010
source: Munich Re



Austrian municipalities' ability to cover flood damages

In the floods of 2005, 2009 and 2013, 1195 Austrian municipalities experienced damages and reported them to the Austrian disaster fund.

These damages were compared with the Maastricht results each municipality reported on average between 2001 and 2010.

To account for population and size differences across municipalities, the numbers were broken down to per capita values.

As apparent from Figure 3, the distribution of damage per capita (DPC) is to the right of the distribution, which represents the average Maastricht results per capita (MPC). This implies that based on the Maastricht results, municipalities are not able to cover the damages caused by floods as experienced in 2005, 2009 and 2013.

Accounting for the fact that about 50% of the damages to municipalities' assets are covered by the federal state government and the Austrian disaster fund respectively, the DPC curve shifts to the left, as represented by the DPCMun curve in Figure 3. Municipalities are still not able to cover the damages.
Only if return periods are accounted for, i.e. the DPCMun10y curve, some of the municipalities are in a position to cover the damages by themselves.

Adaptation measures should seek to reduce the physical- as well as the liability risk so as to reduce potential damages, i.e. shift the DPC curve further to the left, and increase the financial scope of the affected sector, e.g. change the distribution of the MPC curve in Figure 3.

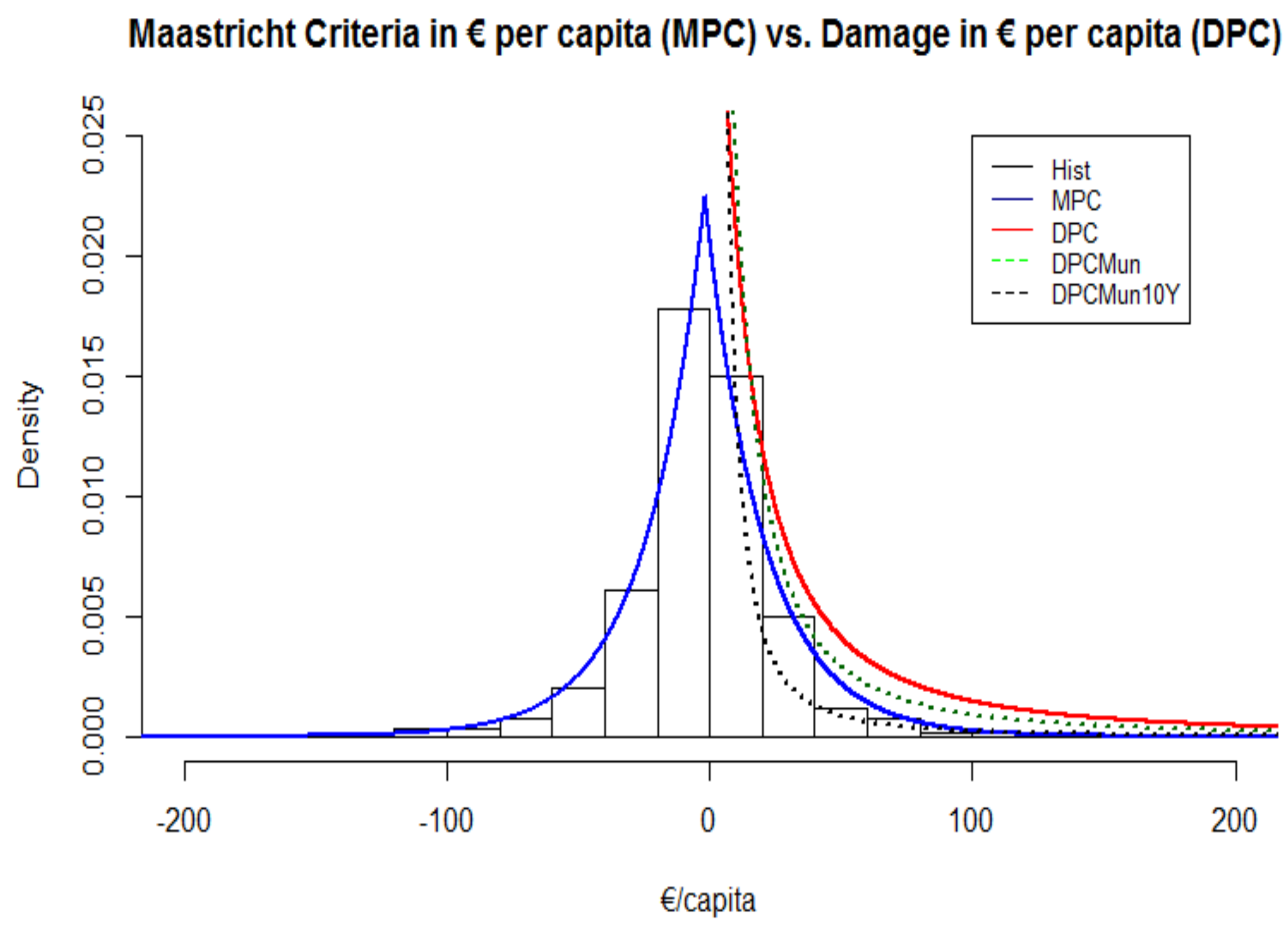


Figure 3: Average Maastricht result vs. experienced damages in €/capita values

References
[1] Munich Re, NatCatSERVICE (2015)
[2] Carney, M. (2015), Breaking the Tragedy of the Horizon – climate change and financial stability

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