WHITE PAPER: GERD TETZLAFF

G. Tetzlaff
Universität Leipzig
Germany

1. **What accounts for the dramatically increasing costs of weather-related disasters (specifically floods and storms) in recent decades?**

Weather and damage changes are implied to be of global character. Weather systems and their changes occur regionally and often are different from region to region, these differences not smoothing out when going to a global scale. The same is true for damage. Economic and social systems show even higher degrees of regional and temporal differentiation. Whether the spatial patterns of weather patterns match the ones of the economic ones within any given time interval could be investigated with enough high quality data being available.

Moving back and forth in time in steps of decades means to assure the quality of the data used for any comparison purposes. The quality of weather data is rather well known. However, weather damage comes with rare weather events, with limited accuracy of the occurrence frequency data. Most societies have regulations that ensure the existence of protective systems to reduce damage. In principle that would mean damage only to occur if threshold values are exceeded. In practice damage occurs gradually and already at values far below design thresholds because of error, negligence, or ageing. The threshold values and their enforcement strongly influences the relation between size of a weather event and damage. Future data solely rely on climate model results with error estimates of modest accuracies. Economic analyses are usually confined to one particular country. To produce long time series is not simple (Maddison 2003). The results available show quite some variety in the economic structure and their changes, being different also from country to country. When a retrospective analysis for Germany is extended over 100 years or longer it means to go through 5 major political and economic systems, and quite substantial changes in the country's size and population. This becomes evident when looking at economic indicators such as national wealth, natural capital, fixed assets, human resources, gross domestic product, capital productivity, capital intensity, interest rates, and inflation rates. These parameters show country-specific and parameter-specific different and specific changes. This makes the formulation of the relation between the size of a rare weather event and the economic damage complicated and inaccurate, and there are few concrete analyses available in this field, and in there no systematic error estimates are given.

The methods that different nations apply to combine and employ their assets to generate well-being after a weather event are multifold, each one itself complex. Unquestionably, human resources is the major contributor to national wealth and usually left almost unharmed after a weather event. Damage caused by weather events is inflicted to a major proportion on fixed assets (Kunte et al. 1998). It is however plausible that the use of economic damage or cost as a proxy for rare weather event data is possible only with very limited reliability, in the end probably not allowing to draw any globally and century-long valid conclusions on a quantitative relation between rare weather events and damage.

2. **What are the implications of these understandings, for both research and policy?**

Although it might be difficult to make use of national economic data as proxy for weather data, there remains the challenge to anticipate future changes for each nation separately. Whether global indicators of the past allow extrapolations into the national future seems to be doubtful. Research needs to develop methods to quantify errors of past and future national weather and national economic changes, both separately and together. It may be that scenario

techniques are closest to allow results.

Policies –on a national basis- need to acknowledge that the whole spectrum of future changes needs a variety of adaptation strategies, integrating projected weather changes into them.

References

Kunte A., Hamilton K., Dixon J., and Clemens M. : Estimatind National Wealth : Methodology and Results. World Bank ESD Papers 57, 1998, 53 p.

Maddison A. : The World Economy : Historical Statistics. OECD Development Centre, 2003, 274p.