Geophysical Research Abstracts
Vol. 15, EGU2013-3694-1, 2013
EGU General Assembly 2013

Probabilistic economic frameworks for disaster risk management

Guillaume Dulac (1) and Marc Forni (2)
(1) Consultant in risk management (gdulac78@gmail.com), (2) Senior disaster risk specialist, World Bank

Starting from the general concept of risk, we set up an economic analysis framework for Disaster Risk Management (DRM) investment. It builds on uncertainty management techniques – notably Monte Carlo simulations – and includes both a risk and performance metrics adapted to recurring issues in disaster risk management as entertained by governments and international organisations. This type of framework proves to be enlightening in several regards, and is thought to ease the promotion of DRM projects as "investments" rather than "costs to be born" and allow for meaningful comparison between DRM and other sectors.

We then look at the specificities of disaster risk investments of medium to large scales through this framework, where some "invariants" can be identified, notably: (i) it makes more sense to perform analysis over long-term horizons –space and time scales are somewhat linked; (ii) profiling of the fluctuations of the gains and losses of DRM investments over long periods requires the ability to handle possibly highly volatile variables; (iii) complexity increases with the scale which results in a higher sensitivity of the analytic framework on the results; (iv) as the perimeter of analysis (time, theme and space-wise) is widened, intrinsic parameters of the project tend to weight lighter. This puts DRM in a very different perspective from traditional modelling, which usually builds on more intrinsic features of the disaster as it relates to the scientific knowledge about hazard(s). As models hardly accommodate for such complexity or "data entropy" (they require highly structured inputs), there is a need for a complementary approach to understand risk at global scale. The proposed framework suggests opting for flexible *ad hoc* modelling of specific issues consistent with one's objective, risk and performance metrics. Such tailored solutions are strongly context-dependant (time and budget, sensitivity of the studied variable in the economic framework) and can range from simple elicitation of data from a subject matter expert to calibrate a probability distribution to more advanced stochastic modelling. This approach can be referred to more as a proficiency in the language of uncertainty rather than modelling *per se* in the sense that it allows for greater flexibility to adapt a given context.

In a real decision making context, one seldom has neither time nor budget resources to investigate all of these variables thoroughly, hence the importance of being able to prioritize the level of effort among them. Under the proposed framework, this can be done in an optimised fashion. The point here consists in applying probabilistic sensitivity analysis together with the fundamentals of the economic value of information; the framework as built is well suited to such considerations, and variables can be ranked according to their contribution to risk understanding. Efforts to deal with second order uncertainties on variables prove to be valuable when dealing with the economic value of sample information.