

Marie Curie CIG “Multivariate Shocks”

Final Report

The aim of the Marie Curie CIG “Multivariate Shocks” has been (and still is) to foster and further develop the use of shock and default models in the fields of economics and the social sciences, in particular when several sources of risk do interact and depend on each other. Under this project, several tools have been proposed and used, from urn models to point processes, from extreme value theory to Bayesian statistics.

Over the last four years, in accordance with the initial proposal and the mid-term report, interesting results have been obtained, and others will appear in the near future. Topics like the modeling of the probability of default of a counterparty in credit risk management, the recovery process of a defaulted exposure, the volatility of extreme losses, the joint mortality of couples of annuitants, the number and the entity of malpractice claims, the study of apparently infinite-mean phenomena, and even the distribution of casualties in wars and armed conflicts have been studied.

Behind these applications, new theoretical tools have been developed, like for example the shadow distribution approach for extremely fat tails, concentration profiles and maps to study the behavior of the very upper tail of a distribution, the Beta-Stacy Dirichlet bivariate process, and new algorithms for the computation of some exact multinomial probabilities.

The findings have been and will be published in peer-reviewed journals, some of them under the open-access policy. In any case, camera-ready versions of every paper are available on open repositories like SSRN, arXiv and TU Delft open research archive.

Some papers, in particular those dealing with the modeling of casualties in armed conflicts, gained a lot of attention from the Media as they seem to contradict the so-called “Long Peace” theory, supported by important sociologists and historians. Newspapers like The Guardian and The Telegraph reported the main findings, which were also discussed on important online platforms Like Yahoo!Finance and Vox.

As expected, the outcomes of the research have also been shared in several conferences and workshops, in the Netherlands and abroad. In most of the cases, the researcher has presented his results as an invited or even plenary speaker.

With the support of this Marie Curie CIG, two important research events have been organized:

- 1) Workshop on “Extremes and Risks in Higher Dimensions”, Lorentz Center, Leiden, September 12-16 2016. <https://www.lorentzcenter.nl/lc/web/2016/837/info.php3?wsid=837>
- 2) 11th Extreme Value Analysis Conference, TU Delft, Delft, June 26-30 2017. <http://www.eva2017.nl>

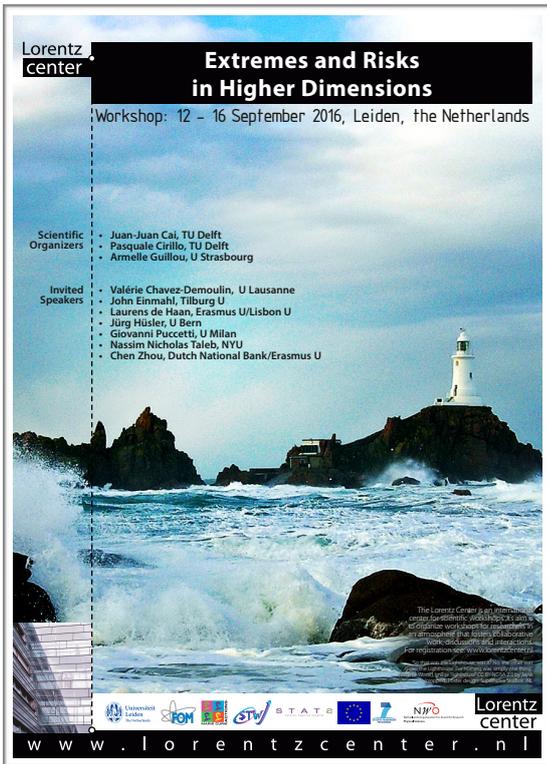
Both events have been considered a success by the participants.

The general public will soon have access to some of the results of this Marie Curie project in a forthcoming non-fiction book about fat tails and extreme risks, which the main researcher of this Marie Curie CIG is co-writing.

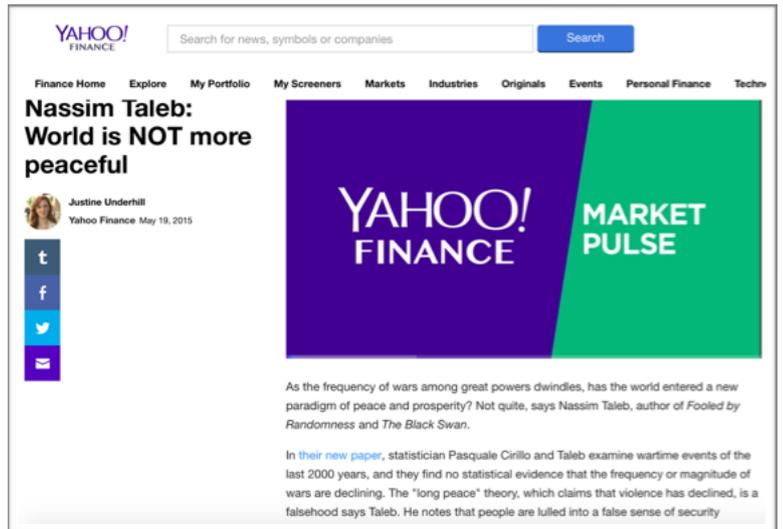
This Marie Curie CIG has represented a fundamental help for Dr. Cirillo to become a respected researcher and teacher in The Netherlands and abroad, and to receive his tenure from Delft University of Technology.

The research developed under the "Multivariate Shocks" project will surely constitute a solid basis for future developments and findings. At present two PhD students, financed by additional grants, are working on these topics under the supervision of Dr. Cirillo.

Poster of the ERHD Workshop



Screenshot of Yahoo!Finance



EVA 2017 Group Picture

