CoRisk: measuring systemic risk through default probability contagion

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We propose a novel systemic risk measurement model based on stochastic processes, correlation networks and conditional probabilities of default. For each country we consider three different economic sectors (sovereigns, corporates, banks) and we model each of them as a linear combination of two stochastic processes: a country-specific idiosyncratic component and a common systematic factor. Through correlation networks we derive conditional default probabilities, thus obtaining the CoRisk, which measures the variation in the probability of default due to contagion effects. Our model is applied to Eurozone countries, and the results show that the sovereign crisis has increased systemic risks more than the financial one: the two events together have caused a phase transition difficult to reverse, as risk propagation does not act as a mean for balancing inequalities across countries but, on the contrary, weakens the weakest and strengthens the strongest.