

## **Phase transitions in operational risk**

Kartik Anand

In this paper we explore the functional correlation approach to operational risk. We consider networks with heterogeneous a-priori conditional and unconditional failure probability. In the limit of sparse connectivity, self-consistent expressions for the dynamical evolution of order parameters are obtained. Under equilibrium conditions, expressions for the stationary states are also obtained. The consequences of the analytical theory developed are analyzed using phase diagrams. We find co-existence of operational and non-operational phases, much as in liquid-gas systems. Such systems are susceptible to discontinuous phase transitions from the operational to non-operational phase via catastrophic breakdown. We find this feature to be robust against variation of the microscopic modelling assumptions.