

# A kinetic equation for modelling irrationality and herding effects

Bertram Düring<sup>1</sup>, Ansgar Jüngel<sup>2</sup>, and Lara Trussardi<sup>2</sup>

<sup>1</sup>University of Sussex, Department of Mathematics, Brighton, United Kingdom

<sup>2</sup>Technische Universität Wien, Institut for Analysis and Scientific Computing, Vienna, Austria

In financial crises, often herding behaviour, which is characterized by prize bubbles and crashes, can be observed. This behaviour may be caused by an irrational behaviour of the market participants, e.g. driven by emotion. We suggest a simple kinetic equation based on binary interactions of the market agents.

The goal is to describe the evolution of the distribution function of the value of a given product in a large market taking into account the effect of a herding behaviour (which is not possible with classical linear financial models) and the rationality of the individuals. We derive the corresponding nonlocal Fokker-Planck equation in the crazing collisions limit and we prove the existence of weak solutions. Finally, we present some numerical simulations.