On Critical Ising Models of Wealth Distribution

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Multi-agent based models have been successfully used to study social and economic phenomena. In particular, recently many interesting multi-agent based models, have been proposed to investigate the important problem of wealth distribution [1-3] and interesting, well empirically confirmed results have been obtained.

On the other hand, slightly different philosophy multi-agent models, i.e. lattice Ising type models, have been also used to study financial systems and some related problems such as stock price statistical and dynamical properties, traders behavior, etc. [4-7].

In this work, we investigate by mean of a bi-dimensional Ising model Monte Carlo simulation the dynamics of wealth distribution formation. By doing agents correspond to spins and their up and down states transitions interpreted as the "gaining" or "losing" of one arbitrary "monetary unit", we are able to generate the universal properties of wealth distribution at critical temperature T_c. The subcritical temperature regime is also interesting and is analyzed. We show that Gamma-like distributions emerge from our simulations at temperature T in the range $T < T_c$.

Keywords
Ising Model, phase transition, wealth distribution, power law tail, Gamma distribution

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