

Wealth Concentration in a Model of Artificial Market

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We focus on the problem of wealth concentration in a model of artificial market. It is known that the wealth distribution of wealthy members of the society is governed by the scale invariance named Pareto law, which is discovered by an Italian economist Pareto more than a hundred years ago and has recently been verified by using real data. The law is typically expressed as

$$\log N(>x) = -A \log x + C$$

where $N(>x)$ is the number of people whose income is larger than x . The coefficient A is called as Pareto index and C is a constant. The typical size of A ranges from one to three. This law attracts our attention in twofold. First, the law is highly universal although A , C and the range of x for the law to hold vary slightly depending on the objects to look at. Second, the distribution of wealth is extremely concentrated to the richer side of a society. The degree of wealth concentration is also quantified by Gini coefficient.

The aim of our work is to find a microscopic background for such biased distribution based on multi-agent model simulations. We examine two models in the above-mentioned aspects and compare the sizes of Pareto index as well as Gini coefficients to the empirical values of those indices. One of the two models we adopt is a model of homogeneous agents that follow positive-feedback price changing rules [1], and another is a model of inhomogeneous agents inspired by the minority game [2]. In both cases we find indices within the range of measured values [3].

[1] Mieko Tanaka-Yamawaki, *Physica A* 324 (2003) 380

[2] D. Challet and Y.-C. Zhang, *Physica A* 246 (1997) 407-418

[3] Ministry of Health, Labour and Welfare of Japan, Report on Income Distribution in Japan, 2002 (2003), 795.