Complexity Economics: Problem Set Lab 6 (Group 2)

Consider the following setting:

- There is a population in a (real, not online) social network, connected by a network structure that resembles a Barabási-Albert-Network with parameter $k = 5$.

- Every agent is endowed with an initial wealth of EUR $K_0 = 100$.

- Agents invest their wealth and receive returns of $\varrho = 0.92 + \eta$ where η follows an exponential distribution with parameter $\lambda = 0.1$, thus: $\eta \sim Exp(0.1)$. Consequently, agent i's wealth at time $t + 1$ will be $K_{i,t+1} = \varrho K_{i,t}$

- How does the wealth distribution evolve? Does it converge against some limit distribution?

Please proceed as follows:

1. (60 min)

    (a) Discuss in the group how this system could be investigated using a python program.
    (b) Write a python program to study the problem (one python program per group).

2. (30 min)

    (a) Discuss the results together with the three other groups.

Additional notes

- Claudius and Torsten will be around. If you have any questions or if you are stuck anywhere, please feel free to ask or talk to us.

- Consider commenting your code extensively. This will make it easier to understand the code later on.

- If you have lots of time left, try the running the simulation with different network structures:

    - Complete network
    - Multiple-ring network with size-16 neighborhoods (agents arranged in a ring, connected to the 16 nearest neighbors, 8 on either side).