

Complexity Economics: Problem Set Lab 6 (Group 1)

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 $K_0 = 100$.
- Neighboring agents engage in economic interactions. These interactions shall not be modelled in detail. Instead, they shall be approximated by exchanges between randomly selected pairs of neighboring agents. Both agents retain a share $\beta = 0.25$ of their wealth with certainty; the remainder of both agents' wealth is distributed randomly (uniform) between the two agents.
- 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)

of for different values of β .