Agent Based Modelling & History

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Introduction

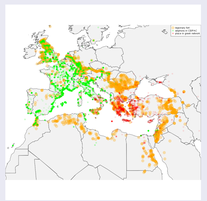
Understand the economics of our society is a complex task as it involve interaction between complex social structures. But understand past economics is another problem as in that case researcher cannot observe directly the phenomenon they want to understand but can only infer it using byproduct of this process that have remains somehow through the move of age. Using those remaining artefact historien and archaeologists proposed hypothesis about the process at the roigine of such byproduct. Often those hypothesis are sentences that are difficult to compare. We propose that embedded those hypothese into Agent Based Modelisation would allow to better test such hypothesis while allowing to better taking into account of historical context.

Monte Testaccio

An amphora garbage in Roma.



About 47000 amphora from CEIPAC database and other data in other databases (places in Pleiade, Greek names in Oxford...)



Roman Economy

What was the nature of the Roman Economy?

The primitivism/modern debate

The Roman Economy was already a free-market similar as today vs all price were fixed by the state, no free market, us of slave.

WEUBI

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Computer Model

An Agent Based Model mixing to main aspects (WSC – 2015):

1. a simple bargain mechanism,
2. and (cultural) evolutionary dynamics.

$\rightarrow$ Implement a "simple" theoretical abstract model, *to be "complexified"*.

Bargaining

- Agents have :
  - Goods
  - Value they attribute to goods
- Agents produce 1 good and use it to exchange for the other goods, given the value they associate to each good.
- After the exchange, agents consume the goods and get a "score" (utility?) depending on the amount of good they gather and a scale of "universal intrinsic value" for each good.

Evolving

After 10 steps of exchange :

- The less successful (in term of utility) agents copy the set of value of the most successful agent (Biased-Copy/selection).
- Given a probability μ the value attributed to some goods are modified (Innovation/Mutation)

Illustrate the opacity :

- One simulation : 57min
- 100 simulations (statistical need) : 5700min $\approx$ 4 days

Lets try with :

- 10 different probability exchange right. (0.001 to 0.20)
- 3 size of population (250 , 500 , 1000)
- And different number of goods : (3, 6 , 9)

$= 10 \times 3 \times 3 = 90$ "environments" (experimental setups).

$\rightarrow$ 360 days of continuous simulations.

Price Equilibrium