

Growth and decline of polities

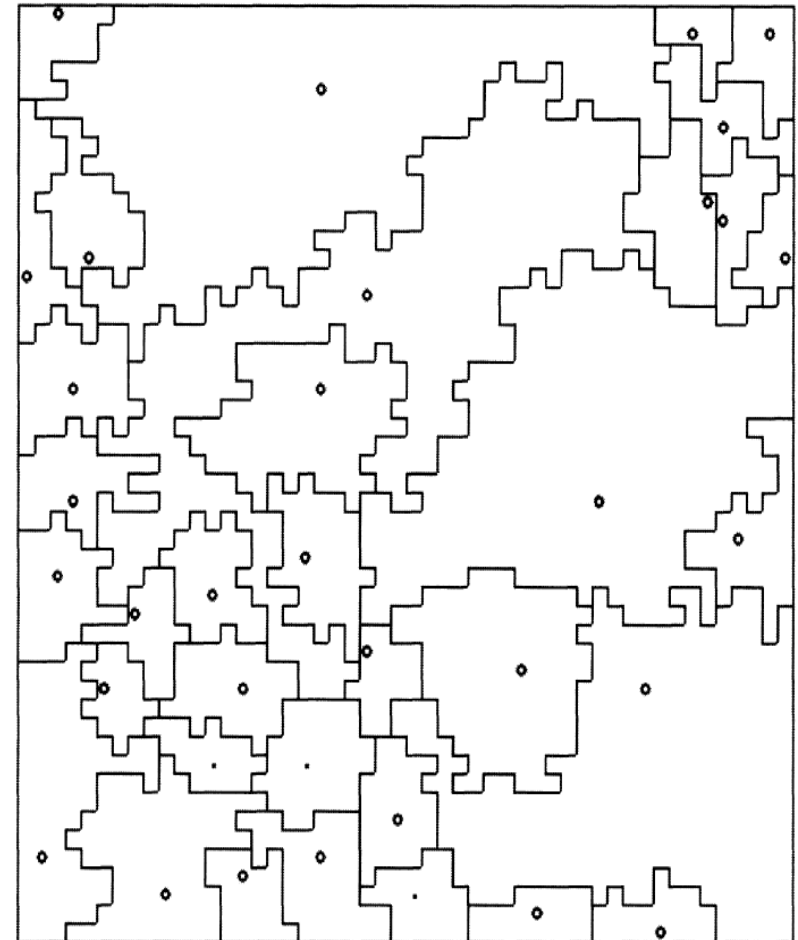
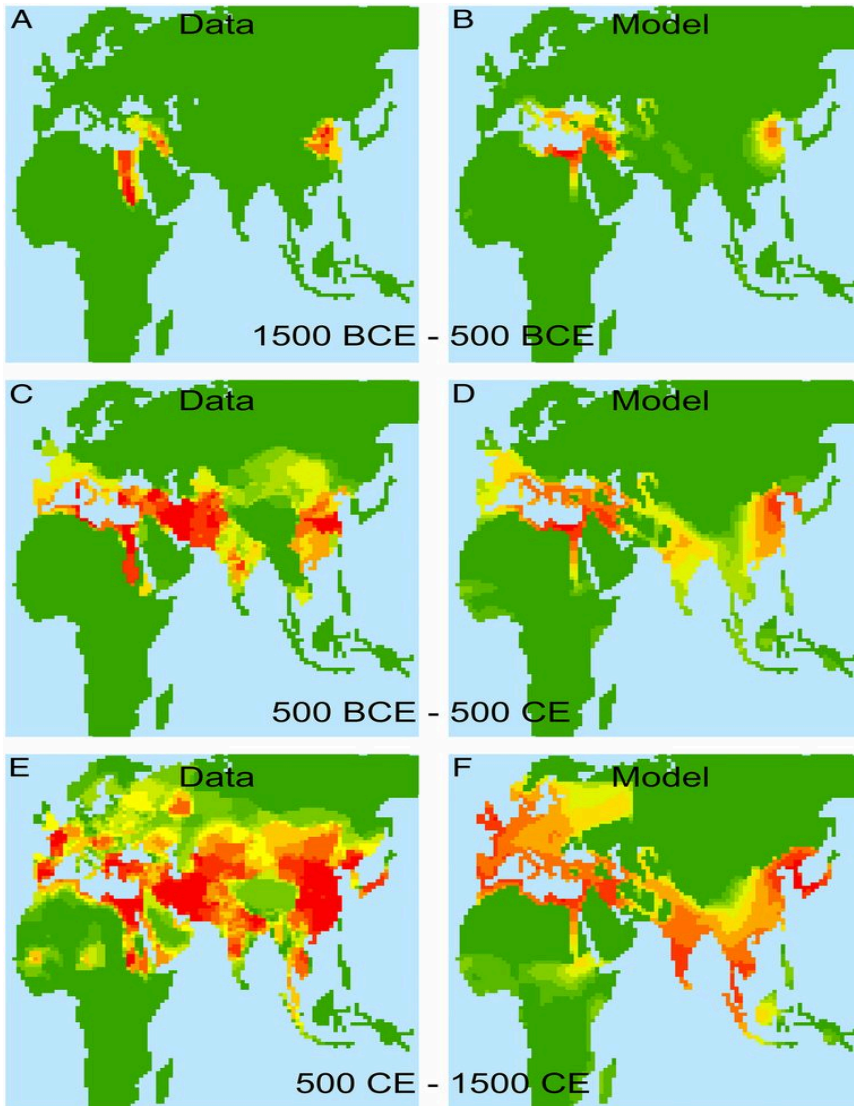
polity: population with independent territory ruled in some way

Jeroen Bruggeman

Two interesting models – can
they be combined?

Key features in common

(1) Geography, realistic or abstract



mountains, desert, agriculture

Key features in common

(2) Military **technology**, diffuses from specific/random origin

(3) **Size** of polity -> size of army?

Both factors increase chance to win war

From here on the models differ

Polity dynamics

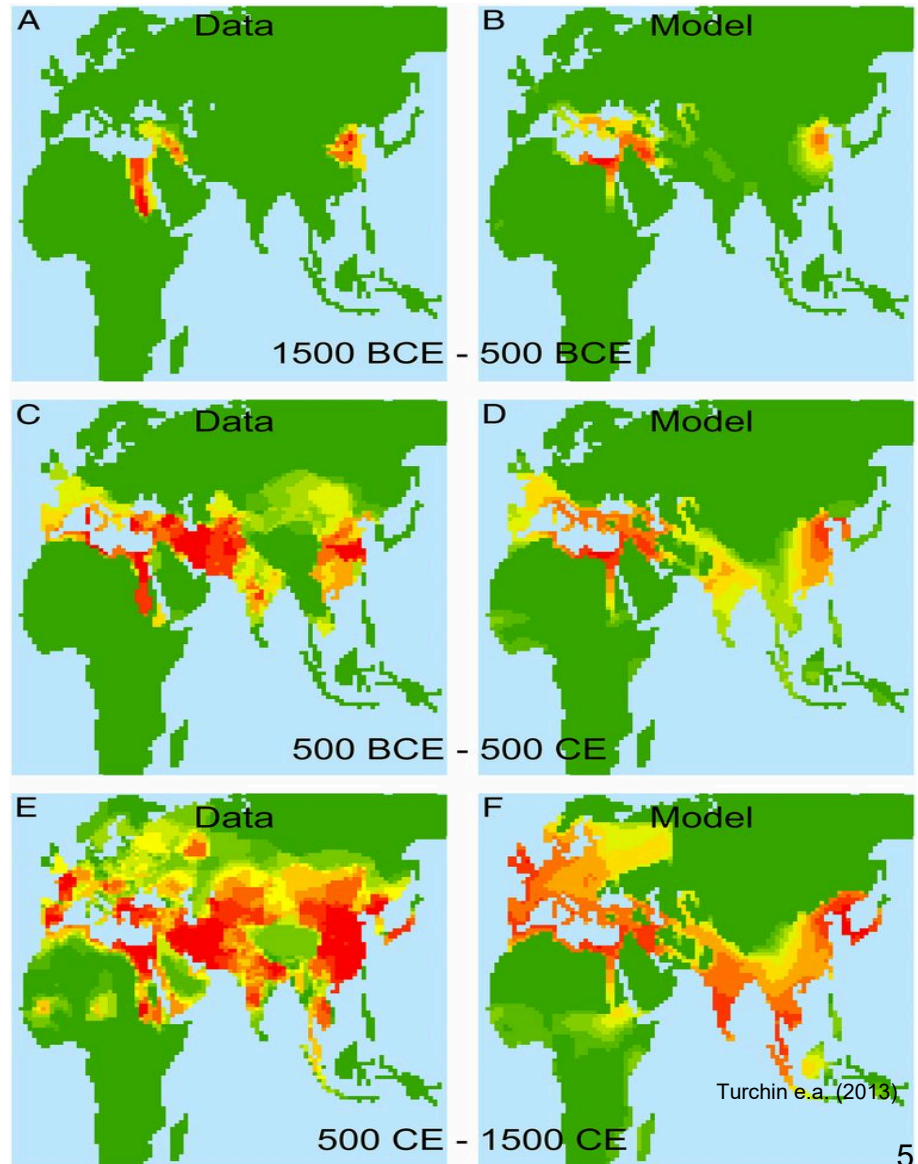
Turchin e.a. 2013

$R^2 = 0.65$

- (1) Geography
- (2) Military technology
- (3) Size
- (4) Inclusive institutions

<https://www.pnas.org/content/110/41/16384/tab-figures-data>

Code: Python



Inclusive institutions

Acemoglu & Robinson

opposite: extractive institutions, i.e. coercion

- Protection of contracts, trade and property
- Authority for conflict resolution
- Education (at least for officials)
- Meritocracy (at least in army)
- Checks and balances
- Provision of some public goods, e.g. protection against invaders
- All this is **costly**:
chance founding < chance dissolving

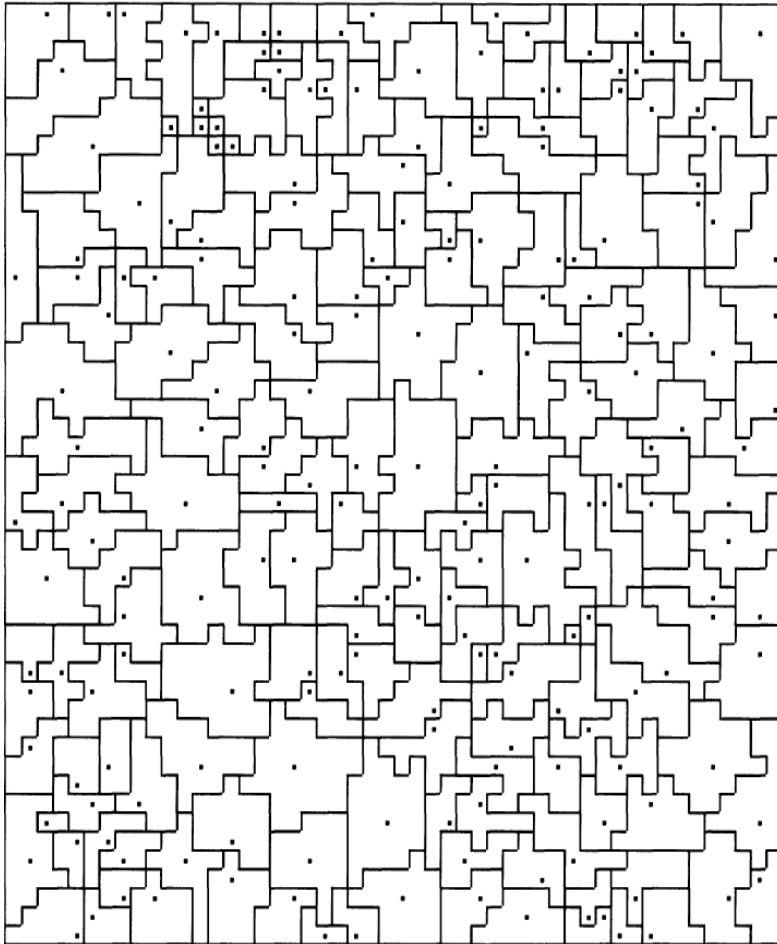
Discussion

- Warfare explains growth and decline of polities, seems to explain inclusive institutions
- Military technology should include social technologies of logistics, motivating soldiers, training
- Role of random chance (much) larger than qualitative historians realize
- Specific features of leaders (other than being leader) unimportant for overall pattern
- Something important missing in model?

Self organized criticality

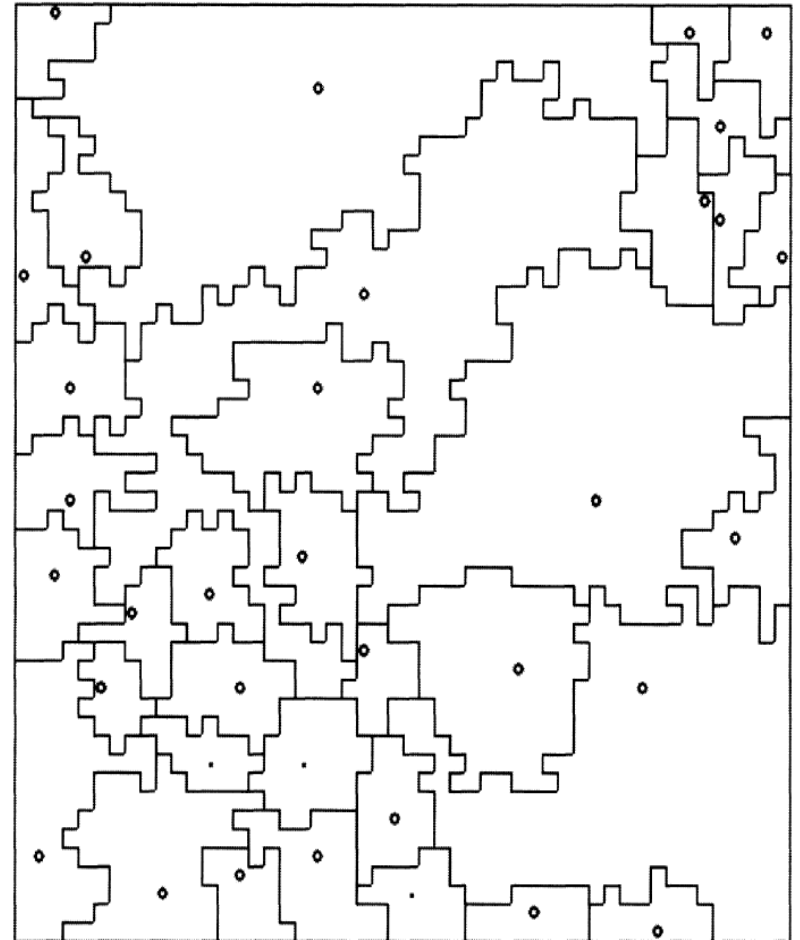
Cederman 2003, goal: explain *power law* of war sizes

Having **new weapons** increases tension, released in war. **Context activation**.
Explicit resource allocation. Polity size constrained by **over-extension**



Start of simulation

code:
Java

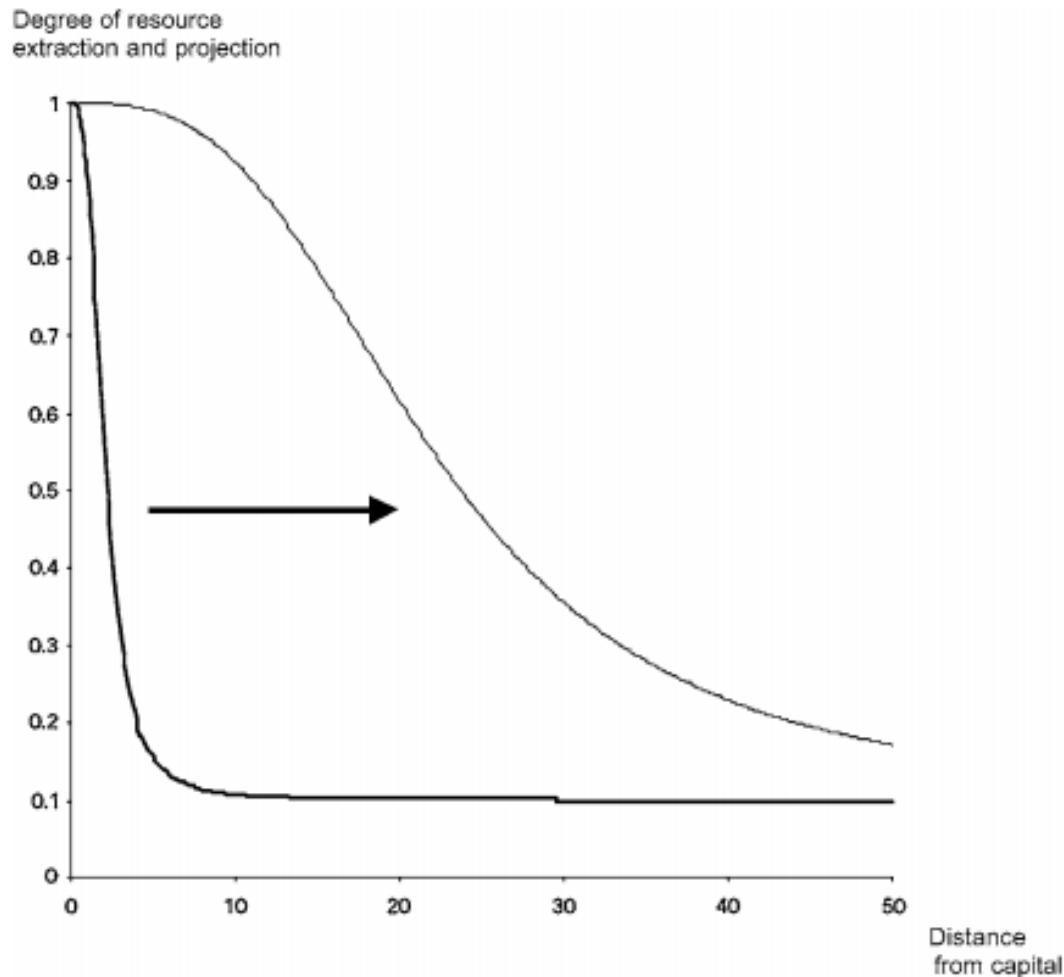


End of simulation

Over-extension

more difficult to collect tax and control population further from capital

FIGURE 2. Technological Change Modeled as a Shift of Loss-of-Strength Gradients



Discussion

- Increasing tax income seems more likely due to better institutions than better technology
- Missing in both: alliances, trade, ideology
- Can the two models be combined, and continued to (almost) present day?