Cities and Social Development: the More the Merrier

José Lobo
School of Sustainability
Arizona State University

By the way, I really like Jane Jacobs' books.

What I Will Do

- Connect work on urban scaling with two research traditions for intellectual and emotional support.

- Connect work on urban scaling with a third research tradition in order to built a model of urban economic growth fueled by innovation. [Creative failure.]

- Reminder: good theory indicates how to carve a system at the joints, identifying what is important and what can be safely neglected.

- Give you an econometric assignment.

Scaling Insight: (Population) Size Matters

- Central insight from the work on urban scaling: population size is a very important determinant of many variables capturing social behavior (outcomes) in cities.

- If a theory is to be build from the observed regularities we need to understand how population size --- i.e., the agglomeration of individuals --- affects the social behavior of individuals. And we also need to reach back in time.

- If economics will not suffice, what else then….

archaeology and anthropology!

Population Size and Social Development

- While cities are relatively recent chapter in the human experience, agglomeration is much older.

- When did modern humans become “modern”? Around 90,000 years ago. [Modernity = material culture.]

- What happened? *Did modern humans get smart or did they get together?*

- Social and technological development and demography: “complex” culture does not stem simply from individual cognition but from the shared knowledge that humans construct in groups.

Population Size and Social Evolution

- Anthropology and archaeology have long research traditions establishing the close and positive relationship between social and technological “complexity” and population size.

- Naroll (1956), Carneiro (1962, 1963, 1967, 1968, 2000), Ember (1963), Dummond (1965), Blanton (1975), Cogwill (1975), Johnson (1982).

- Population growth not a simple effect of cultural change but both a cause and effect of cultural change.

- Things really get wild right around the neolithic. The origins of “cityness” can be traced to the first settlements and towns.

The cultural niche: Why social learning is essential for human adaptation

Robert Boyd[a,1], Peter J. Richerson[b,1], and Joseph Henrich[c,1]

[a]Department of Anthropology, University of California, Los Angeles, CA 90095; [b]Department of Environmental Science and Policy, University of California, Davis, CA 95616; and [c]Departments of Psychology and Economics, University of British Columbia, Vancouver, BC, Canada V6T 1Z4

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In the last 60,000 y humans have expanded across the globe and now occupy a wider range than any other terrestrial species. Our ability to successfully adapt to such a diverse range of habitats is often explained in terms of our cognitive ability. Humans have relatively bigger brains and more computing power than other animals, and this allows us to figure out how to live in a wide range of environments. Here we argue that humans may be smarter than other creatures, but none of us is nearly smart enough to acquire all of the information necessary to survive in any single habitat. In even the simplest foraging societies, people depend on a vast array of tools, detailed bodies of local knowledge, and complex social arrangements and often do not understand why these tools, beliefs, and behaviors are adaptive. We owe our success to our uniquely developed ability to learn from others. This capacity enables humans to gradually accumulate information across generations and develop well-adapted tools, beliefs, and practices that are too complex for any single individual to invent during their lifetime.

cates, in fact, that local genetic changes have played only a relatively small part in our ability to inhabit such a diverse range of environments (9, 10).

Why are humans so much better at adapting to novel environments than other mammals? There have been many different answers to this question, but the most influential are rooted in the idea that people are simply smarter than other creatures. We have bigger brains and more computing power, and this allows us to adapt to a wider range of environments than other animals. One of the clearest statements of this hypothesis comes from a series of papers by Tooby, Cosmides, Pinker, and collaborators (11–14). Other animals, they argue, are limited to what they call "dedicated intelligence," domain-specific learning and decision-making mechanisms that are adapted to particular environments. Humans, by contrast, have evolved "improvisational intelligence," a suite of uniquely flexible cognitive capacities that allow our species to acquire locally adaptive behavior in a wide range of environments. In short, we are adapted to the "cognitive niche" (11–14). These

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Population size predicts technological complexity in Oceania

Michelle A. Kline* and Robert Boyd

Department of Anthropology, University of California, Los Angeles, CA 90095, USA

Much human adaptation depends on the gradual accumulation of culturally transmitted knowledge and technology. Recent models of this process predict that large, well-connected populations will have more diverse and complex tool kits than small, isolated populations. While several examples of the loss of technology in small populations are consistent with this prediction, it found no support in two systematic quantitative tests. Both studies were based on data from continental populations in which contact rates were not available, and therefore these studies do not provide a test of the models. Here, we show that in Oceania, around the time of early European contact, islands with small populations had less complicated marine foraging technology. This finding suggests that explanations of existing cultural variation based on optimality models alone are incomplete because demography plays an important role in generating cumulative cultural adaptation. It also indicates that hominin populations with similar cognitive abilities may leave very different archaeological records, a conclusion that has important implications for our understanding of the origin of anatomically modern humans and their evolved psychology.

Keywords: technological complexity; demography; cultural evolution

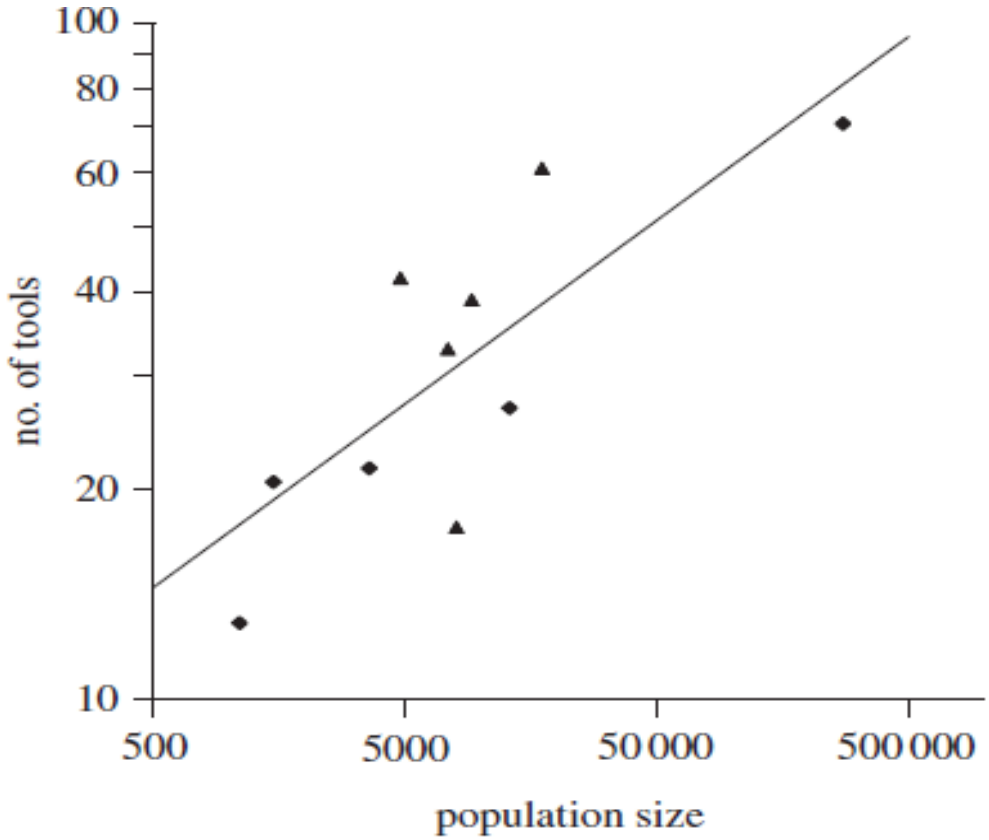


Figure 1. Number of tools as a function of population size. Larger populations have significantly more tool types than smaller populations. The trend line is based on a linear regression of the logarithm of the number of tools against the logarithm of population size ($\beta = 0.805$, $p = 0.005$, $n = 10$). Four of five low-contact groups have fewer tools than expected, whereas four out of five high-contact groups exceed the expected number of tools. Diamonds, low contact; triangles, high contact.

Urbanization as an Innovation

- Work evidencing the role of urban agglomerations in furthering technological, cultural and organizational innovation: Redman (1981), Hall (2000), Algaze (2008), Taylor (2012)…

- Cities as networks of interlocked economic, social, political, religious practices. “A mass of connected humanity.”

- Note: much easier to record what came out of cities than it is to deduce how it was done. It will be difficult to obtain facts about ancient cities.

Technological Change and Population Growth

- But wait, (some) economists have also argued that larger populations encourage technological and organizational change.

- Ester Boserup (1965, 1976, 1981) : According to Malthusian theory, the size and growth of the population depends on the food supply and agricultural methods. In Boserup's argument agricultural methods depend on the size of the population.

- Lee (1988), Simon (1977, 1986), Kremer (1993), Jones and Romer (2010): ***the nonrivalry of technology implies that larger population means more potential inventors/innovators.***

But Are More People Enough?

- Around the time of the industrial revolution the relationship between population size and development begins to break down. (Which is not to say that it ceases altogether.)

- Population size and economic development ----- China: counter example; USA: supporting example.

- Recipe: people and… “institutions.”

Urban Scaling and (Endogenous) Economic Growth

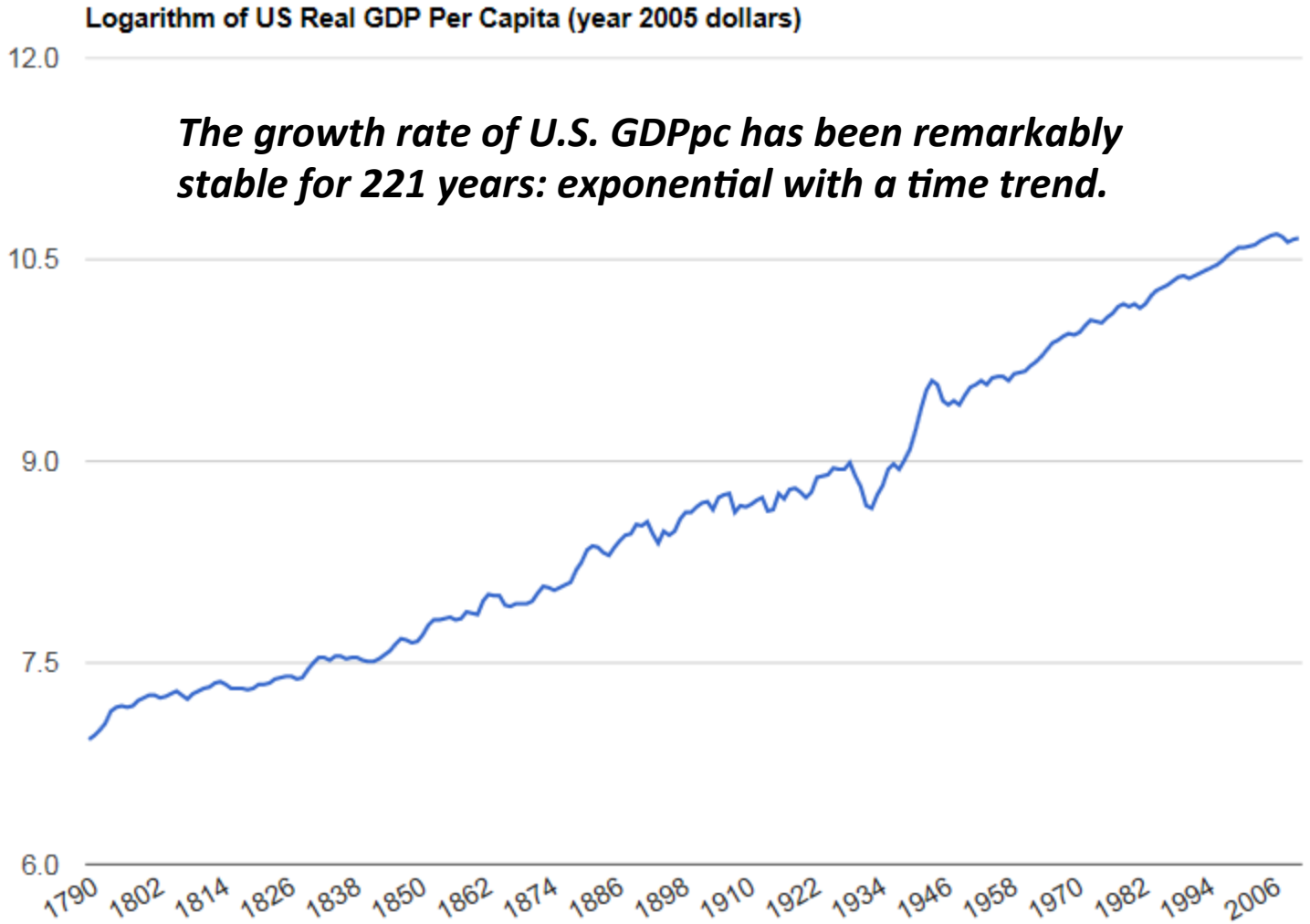
$$y = mL^{\gamma}$$

output per capita

number of individuals creating and sharing ideas

$$Y = Y_0 N^{\beta}$$

It would seem that the urban scaling perspective and (endogenous) growth theory are closely related. Combine them and we are done.



The growth rate of U.S. GDPpc has been remarkably stable for 221 years: exponential with a time trend.

What is the Problem?

- By any measure, the number of individuals engaged in the creation of ideas has increased many times faster than the growth rate of the economy.

knowledge ---- **Something happens .** ---> economic growth

- Similar situation obtains for U.S. urban areas: simply having more knowledge creators (or more people) is not enough to bring about prosperity.

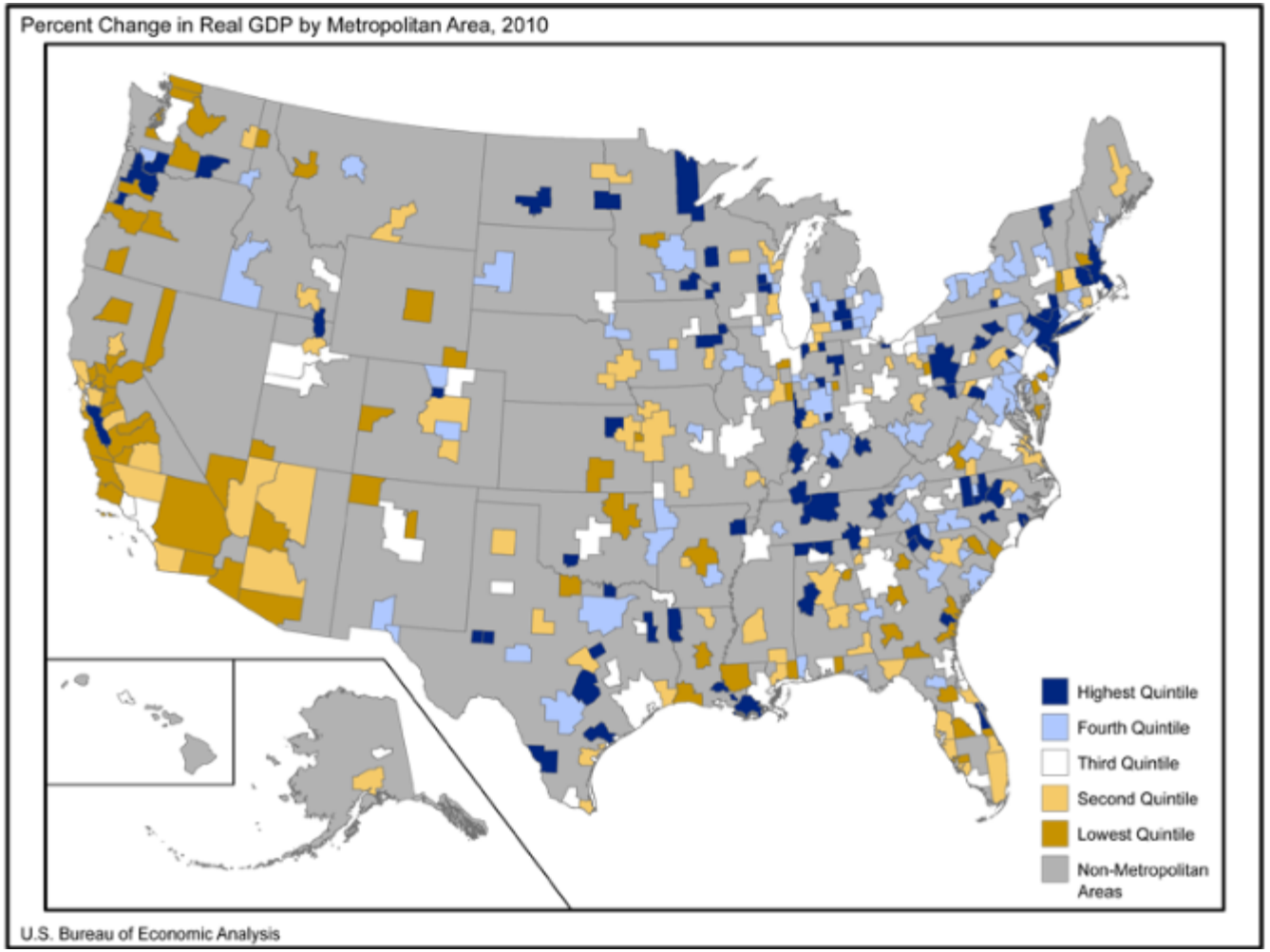
- Oh no, are we back to details?....

What do we want?

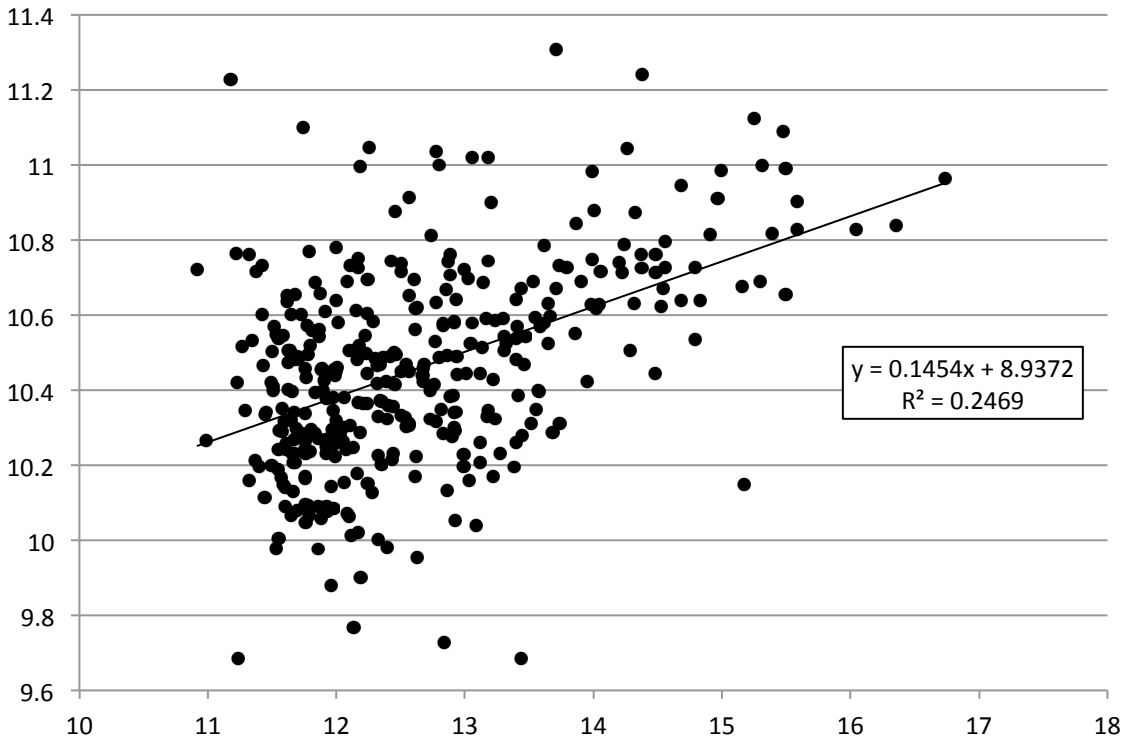
- A formal, unified framework for understanding urban economic growth which incorporates the virtuous cycle between population and which accounts for the observed patterns of urban economic development.

- We haven’t yet carved the system in the right way.

U.S. MSAs: 93% of GDP, 86% of population, 19% of land area



U.S. Continental MSAs (data averaged over 2001 – 2006)



Ln(GDPpc)

Ln(population)

Growth rates? Forget about it!