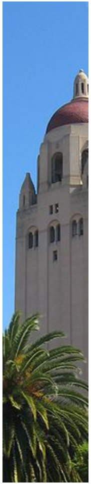


Discussion of Deborah Gordon, “The Ant Colony’s Dilemma”

Chad Jones
Stanford GSB

Hoover Conference on Long-Run Prosperity
March 29, 2024

Harvester Ants

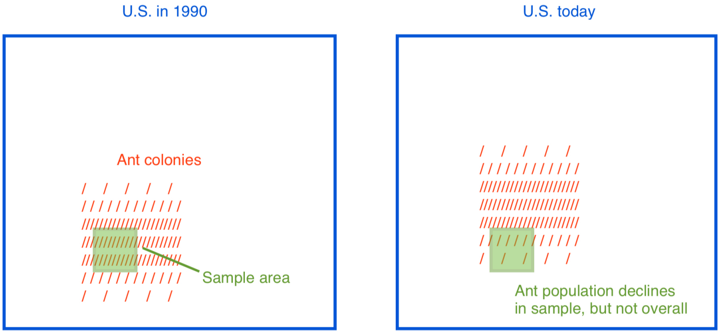
- Fascinating to see how a different discipline works and to ponder what we can learn about economics from ants.
- Ant facts
  - Queen lives for 30 years, peak size of a colony is 10,000 ants
  - Foragers gather food, trading off loss of body water versus finding food
  - If more foragers return with food, more ants leave to forage.
  - Heterogeneity across colonies in willingness to forage on dry days.
  - Heterogeneity can lead to more successful collections of colonies.

Climate Change

- Ants cannot innovate (or only limited / through evolution?)
- Race between evolutionary adaptation and speed of climate change
  - Waxy coating to reduce water loss
  - Density of colonies that survive (less dense and less competition for food).
- Malthusian world of ants (like Malthusian growth model)
  - High quality land/climate leads to more colonies surviving
  - Greater density of colonies?
  - Any change in peak size of a given colony?

The Macroeconomics of Ants

- What if the ecosystem of ant colonies shifts (north?) in response to climate change?
- Macro-adaptation may mean that the total number of ants does not decline?



- Human migration and the migration of agriculture likely important forms of adaptation

What is ant success? What is human success?

- Malthusian model means "ant success" is measured by the total population of ants not consumption per ant
- Economists typically focus on income per person but ignore the number of people
  - Japan since 1960 = growth miracle. But only increased population by 30%
  - Mexico since 1960 has below average per capita growth. But tripled its population
- Isn't a world with more people, *ceteris paribus*, better?
- What if we value increases in population as well?

"Population and Welfare: The Greatest Good for the Greatest Number"
(Adhami, Bils, Jones, and Klenow, 2024)

Counting people like we count ants!

- Total utilitarian social welfare: $W = N \cdot u(c)$ (linear in N)

  $\Rightarrow$ Growth in consumption-equivalent welfare:

$$g_\lambda = v(c)\, g_N + g_c$$

λ is consumption-equivalent welfare

g_c is the growth rate of per capita consumption

g_N is population growth

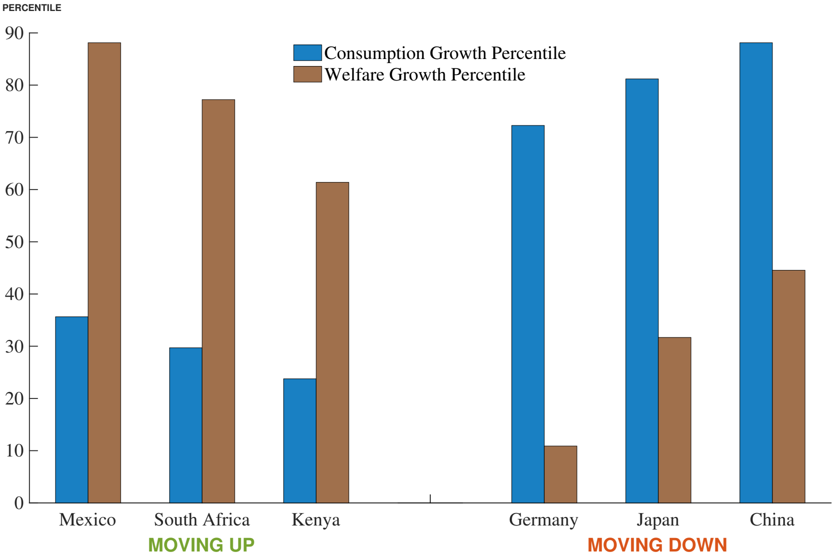
$v(c)$ value of a year of life as ratio to annual c

- In U.S. today, $v(c) = \frac{\$185k}{\$38k} \approx 5$
  - $v(c) = 0$ is an extreme corner
  - $v(c)$ rises with consumption; high for rich countries, low for poor

Decomposing welfare growth in select countries, 1960–2019

	g_λ	g_c	g_N	$v(c)$	$v(c) \cdot g_N$	Pop Share
Mexico	8.6	1.8	2.1	3.4	6.8	79%
United States	6.5	2.2	1.0	4.4	4.3	66%
China	5.8	3.8	1.3	1.8	2.0	34%
Japan	4.9	3.2	0.5	3.8	1.7	34%
Ethiopia	4.4	2.5	2.7	0.7	1.9	44%
Germany	3.7	2.9	0.2	4.0	0.8	22%

Some big differences in percentiles, 1960–2019 growth



Summary

- Fascinating to see complementarities between disciplines
- Interesting lessons from
  - Climate change and mitigation methods
  - Malthusian model of ants
- Fortunately, people can innovate and *technological evolution is much faster than biological evolution*