The World According to Malthus

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Economic Demography

Econ/Demog c175

Week 2: Lecture A

Spring 2017

Our Agenda

- The puzzle of stationarity
- Close reading of Malthus
  - Context
  - Some passages
- Formalization, with graphs
- An “App” example
- For next time: Dismal conclusions

The puzzle of stationarity

Total human population changed from the dawn of human history until about 1800 or so.

How did we manage this?

Imagine each woman had 1.01 daughters surviving instead of 1.00. How much difference does this make in growth rate? Pop size after 10,000 years?

Two Tales of Population Size

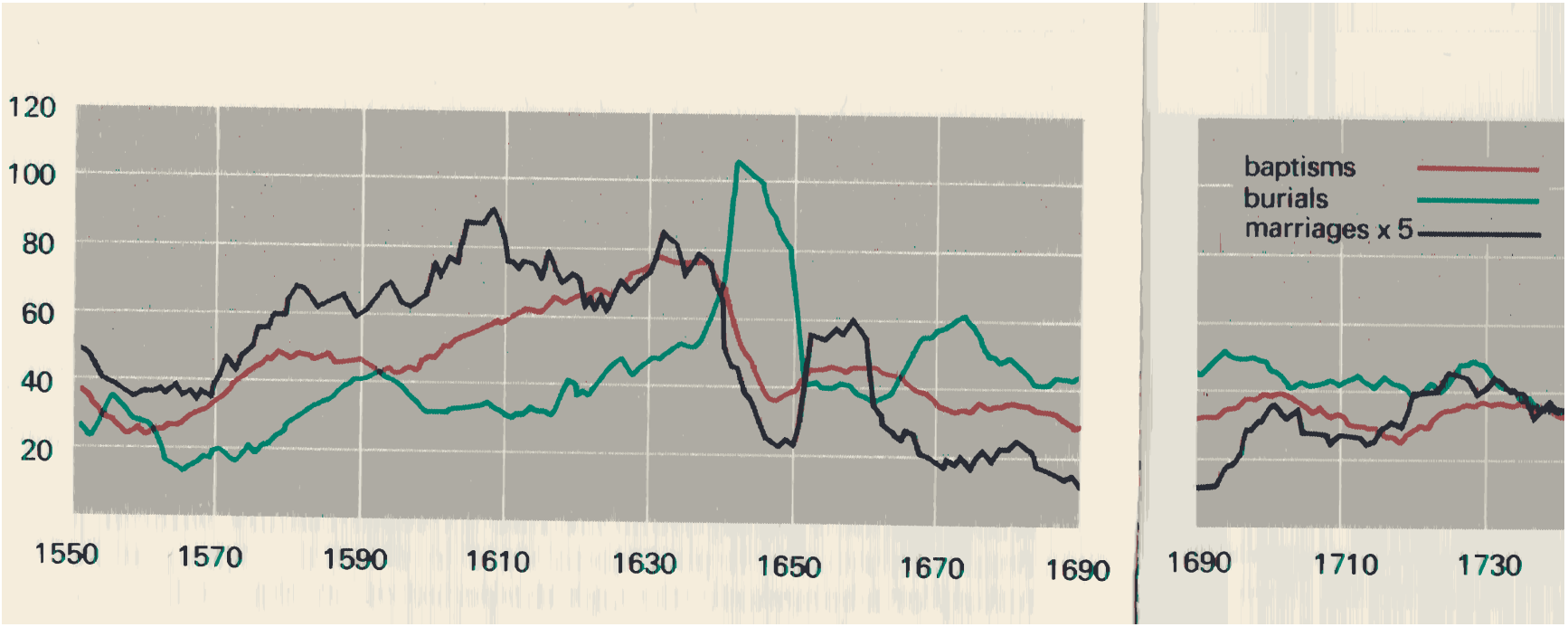
Why did England at the time of Malthus have about 9 million people in 1801?

1. An accident
   Population size in 1801 was the cumulative outcome of a long history of chance events: plagues, bountiful harvests, waves of invaders, …

2. "Design" (Systemic)
   A system-induced equilibrium

Oscillations in pre-industrial times

Malthus: a perpetual oscillation between happiness and misery”



Colyton, England (Source: Wrigley 1969)

Oscillations

- Births and deaths bounced up and down
- On average growth was close to zero
- Cycles of positive and negative growth

What a theory needs to explain

- Why populations were roughly stationary, neither exploding or going extinct
- Why there were oscillations
- Why standard of living didn’t really improve

Close reading of Malthus

Context

Some Passages

Malthus: the man

- Privileged background, a reverend, later a professor, founder of “political economy”
- An early support of poor-laws, but thinking in “Essay” made him a fierce opponent
- Aimed to be an empiricist, but in the long-term is famous for theory

Malthus's World

- Birth rates driven by wages through age at marriage, not by contraception ("vice")
- Death rates ("misery") driven by wages (relative to food prices)
- Wages driven by labor supply
- Labor supply driven by fertility and mortality
- A system with feedback (a "vicious cycle")

Oscillations

- Good times → Bad times → Good times …

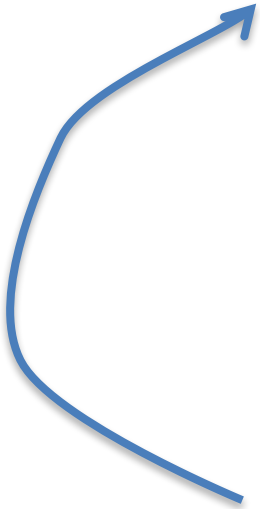
- Let's read Malthus's own words (p. 9)

The way in which these effects are produced seems to be this. We will suppose the means of subsistence in any country just equal to the easy support of its inhabitants. The constant effort towards population, which is found to act even in the most vicious societies, increases the number of people before the means of subsistence are increased. The food therefore which before supported seven millions must now be divided among seven millions and a half or eight millions. The poor consequently must live much worse, and many of them be reduced to severe distress. The number of labourers also being above the proportion of the work in the market, the price of labour must tend toward a decrease, while the price of provisions would at the same time tend to rise. The labourer therefore must work harder to earn the same as he did before. During this season of distress, the discouragements to

as he did before. During this season of distress, the discouragements to marriage, and the difficulty of rearing a family are so great that population is at a stand. In the mean time the cheapness of labour, the plenty of labourers, and the necessity of an increased industry amongst them, encourage cultivators to employ more labour upon their land, to turn up fresh soil, and to manure and improve more completely what is already in tillage, till ultimately the means of subsistence become in the same proportion to the population as at the period from which we set out. The situation of the labourer being then again tolerably comfortable, the restraints to population are in some degree loosened, and the same retrograde and progressive movements with respect to happiness are repeated.

This sort of oscillation will not be remarked by superficial observers, and it may be difficult even for the most penetrating mind to

Malthus's Dismal Cycle



1. Population increases
2. The laborers suffer, wages fall
3. Later marriage, fewer children
4. Agricultural intensification
5. "Tolerable comfort" re-established
6. Go back to "1" and repeat

“Preventive” and “Positive” Checks

- “the power of population being left to exert itself unchecked”
- “foresight of the difficulties attending the rearing of a family acts as a preventive check”
- “actual distresses … by which they are disabled from giving proper food and attention to their children, act as a positive check”

- “positive checks” → increase mortality
- “preventive checks” → decrease fertility

Formalization of Malthus (with graphs)

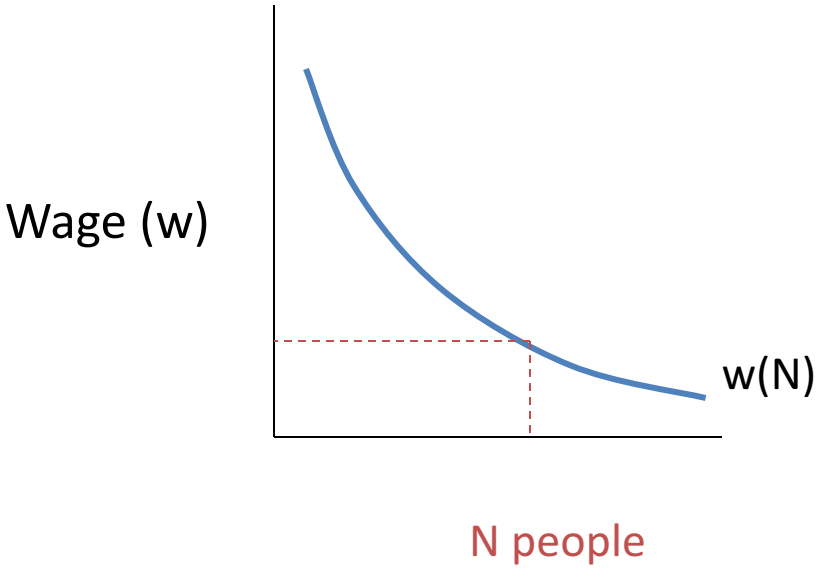
Context

Some Passages

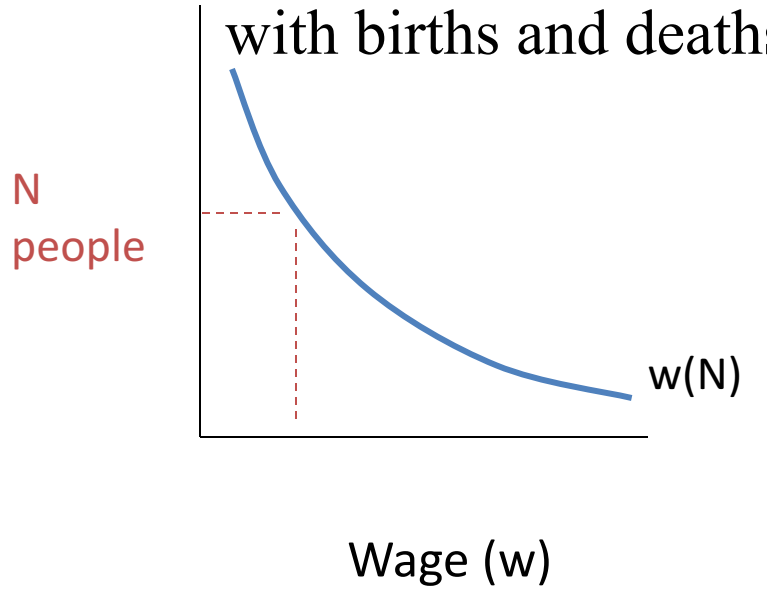
Modeling Malthus (1): Population and Wages

Diminishing returns → Downward sloping demand for labor

Usual picture



We flip the axes
so we can link wages
with births and deaths



Evidence that wages went up when there were fewer people

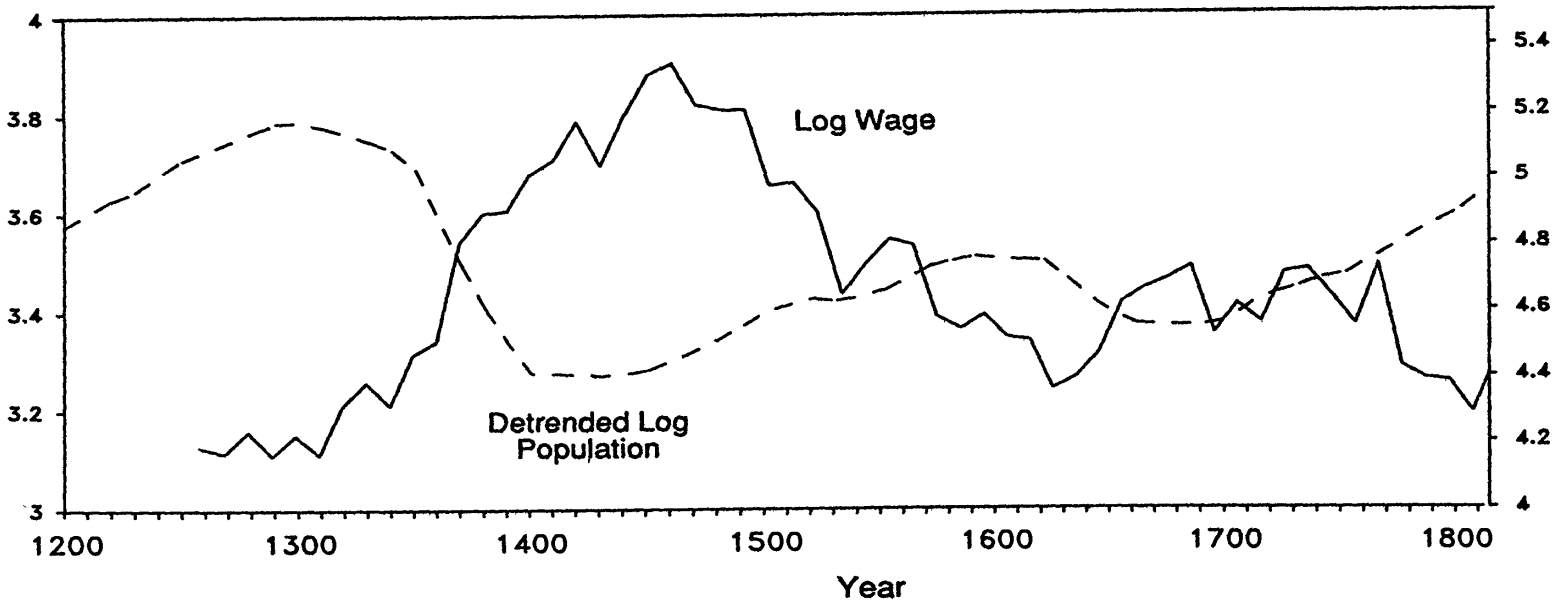
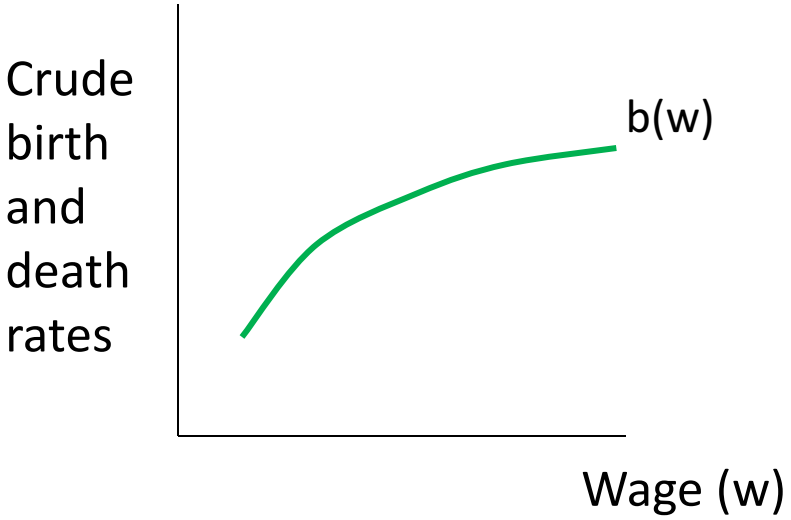


Figure 2.—Real Wages and Detrended Population Size (Europe, logs of decadal data, 1200–1810)

Detrended population allows for some secular trend in technological improvement

Source: Lee (1987)

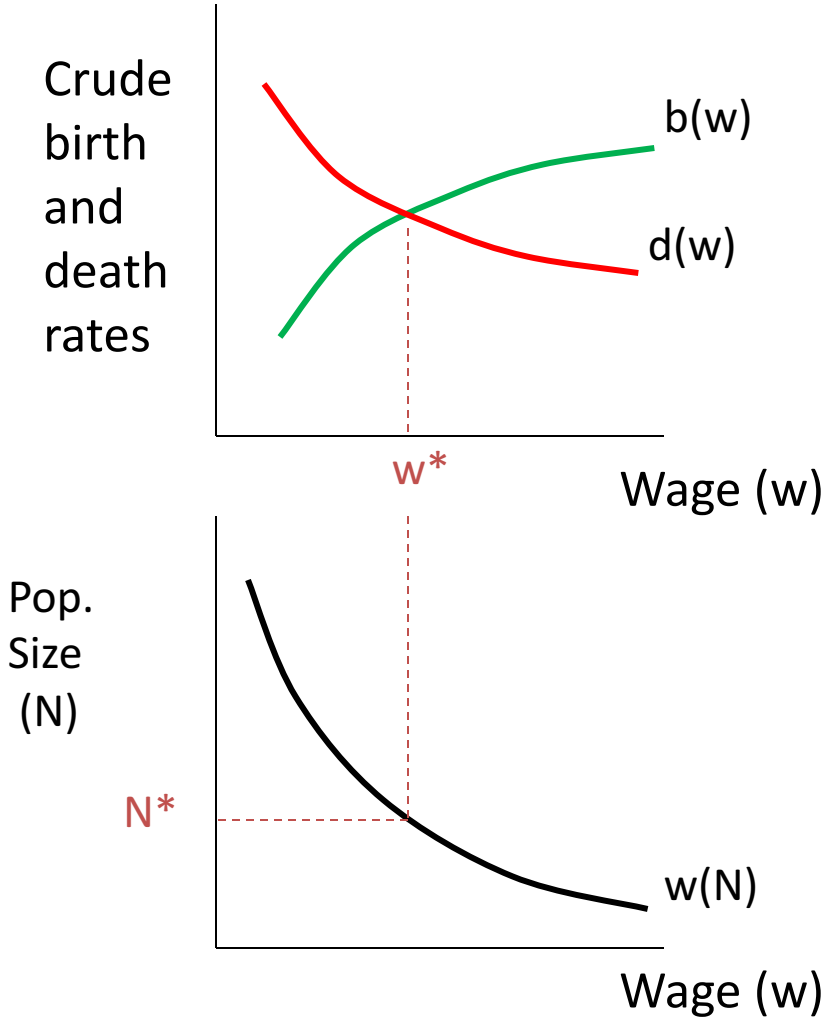
Modeling Malthus (2): Births



Higher earnings → more births
Mechanism: primarily more marriage,
(but also some evidence of control within marriage)

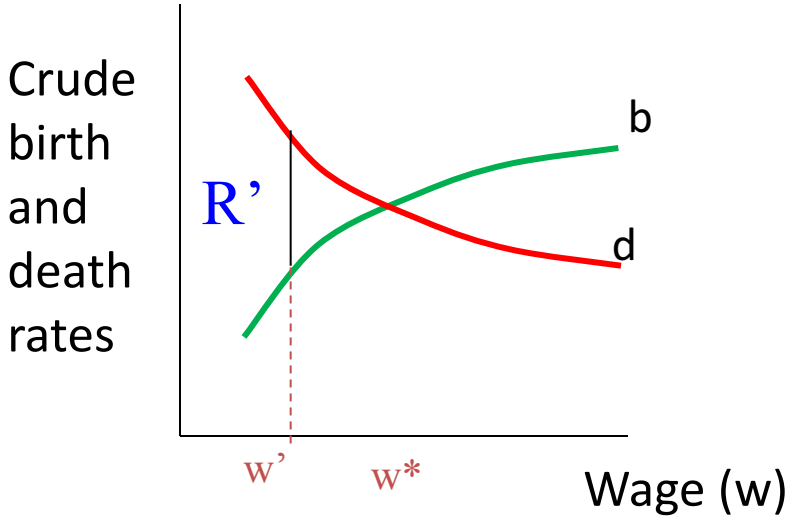
What about death rate? Sketch

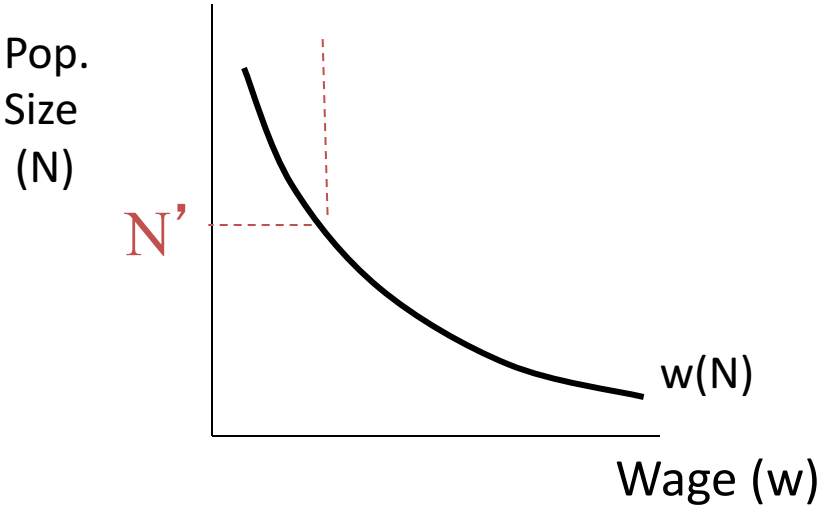
Malthusian link between economics and demography



- Simple Model
  - 1 fixed resource (land)
  - 1 variable resource (labor)
  - no capital accumulation
- Stable Equilibrium
- "Dismal" conclusions

Why is equilibrium stable?





- Imagine that we have "too many" people
- Population will shrink, at first R' = b - d

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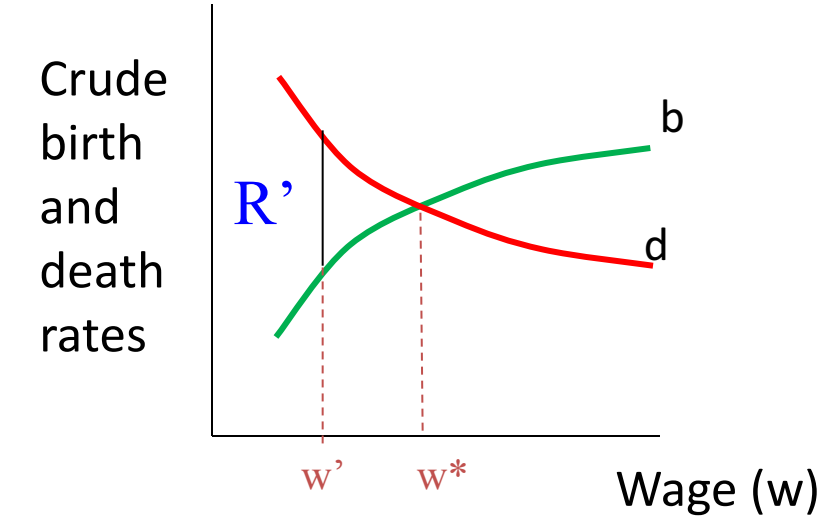

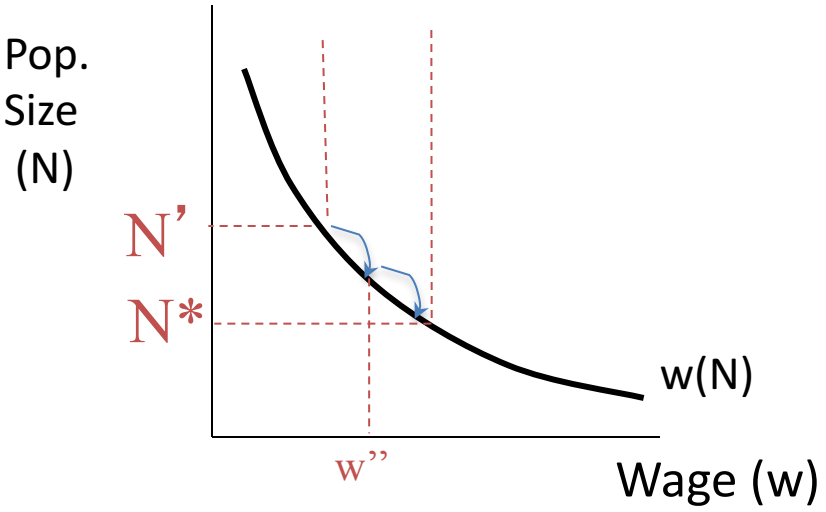

- Imagine that we start with "too many" people
- Population will shrink, at first R' = b – d
- As pop shrinks, wages will rise, first to w'', then eventually to w*

What if pop starts “too small”?

- Draw same picture with N’ < N*
- Do dynamics increase population back to N*?

We have an “App”

- http://shiny.demog.berkeley.edu/josh/new_malthus

- Let’s look again at dynamics if we start with pop that is “too big”
  - What happens to wages?
  - What happens to growth rate?

Next time

- More dismal conclusions
  - What if we invent a new technology?
  - What if we improve child health?
  - How could war and famine be good?
- Was Malthus right for his time? Empirical evidence.
- How could Malthus have been wrong?