Midterm Thursday

• One single-sided “cheat sheet”
• Answer in pen on exam (no blue books)
• OH with Karmen tomorrow 1-2, Sequoyah 239
• OH with me at 9:30

Papers

• Q&A session with Dalia
  Thursday, 2/7, 5.30-7.30 pm, Sequoyah 140

• 5.30-6.10 pm Papers (Group A)
  6.10-6.50 pm Book Reports (Group B)
  6.50-7.30 pm Minority Reports (Group C)
Demographics and Education

(Weil CH #4, R&W CH #4)

1. Introduction: Population and Employment
2. World Demographic History
3. The Malthus Model
4. Malthus falls apart
5. Demographic Transition: Mortality
6. Demographic Transition: Fertility
1. Introduction: Population and Employment

- Economists are not in the business of prescribing demographic policy
- Rapid population growth challenges a country’s ability to accumulate K/L and education/L
- Rapid population growth implies high dependency ratio:
  - defn: Nonworking age pop / Working age pop
  - Food/child, parent time/child, education/child
- So what determines population growth?
Adult population grew from 55m adults in 1960 to 188m in 2001. Annual growth rate of 3.0%.

Source: World Bank, World Development Indicators
Comparisons: OECD ~≈0.5, Sub-Saharan Africa ~≈1
2. World Demographic History

Source: Weil, Figure 4.2
3. Malthus’ Model

- Malthus (1798) knew that
  a) population growth was slow, BUT
  b) Humans are capable of fast growth
    - e.g., Hutterites had median completed fertility of 9.4 (4.1% growth rate), 1880 til 1960
    - Quebec: 3,380 in 1680 became 2.5m in 1950 (68% genetic match to originals)

- So what limits human population growth?
Among plants and animals the view of the subject is simple. They are all impelled by a powerful instinct to the increase of their species; and this instinct is interrupted by no reasoning, or doubts about providing for their offspring. Where ever therefore there is liberty, the power of increase is exerted; and the superabundant effects are repressed afterwards by want of room and nourishment, which is common to animals and plants; and among animals, by becoming prey of others.
Malthus in words (cont.)

For humans, though..

*Impelled to the increase of his species by an equally powerful instinct, reason interrupts his career, and asks him whether he may or not bring beings into the world, for whom he cannot provide the means of subsistence.... Will he not lower his rank in life? Will he not subject himself to greater difficulties than he at present feels? Will he not be obliged to labour harder? and if he has a large family, will his utmost exertions enable him to support them? May he not see his offspring in rags and misery, and clamoring for bread that he cannot give them?*
Malthus in a diagram: Y/Pop vs. Pop

- Budget constraint Y/Pop. Vs. Pop.
- Subsistence constraint
- Equilibrium: e.g. Bubonic plague
- Productivity effect, e.g. potatoes triple Irish population (1750-1850)
- Public health improvements, moral restraint
- Excellent “predictive” power till about 1700, with EU agricultural revolution
Malthusian equilibrium

$P = \text{Population}$

$Y = f(P)$  $F' > 0$  $F'' < 0$

$Y/p$ - output

$\bar{Y}/P$ with Tech\nAdvance

Subsistence\nlevel of $Y/p$

$P^*$ - equilibrium level\nof population

Dismal because in equilibrium people eat (and live) at subsistence only.

"The Dismal Profession"
4. Malthus Falls Apart

• Historically.. See EU historical figure
• Currently.. See cross-country figure
• Income per capita and population show a negative correlation across countries
  - because of mortality?
  - because of fertility?
The Breakdown of the Malthusian Model in Western Europe

Source: Weil Figure 4.6
Source: Weil Figure 4.1, from World Development Reports
5. Demographic Transition: Mortality

Mortality Transition: A modern miracle

- Defn: Survivorship $\pi(i)$ – probability of being alive at age $i$
- Figure for Swedish history
- Defn: Life Expectancy $= \sum_{i=0}^{T} \pi(i)$
- Much faster in developing countries than in developed (see figures)

  e.g., French LE increases from 28 to 57 (1755-1930)
  Indian LE increases from 27 to 56 (1930-1980)

- Achieved at lower levels of GDP/capita
  - France 1930: $5000$, India 1980: $1200$ (2000 $s$)
Swedish Survivorship

Source: Weil Fig 4.13
Life Expectancy in Developed Countries

Source: Weil Fig. 4.8
Life Expectancy in Developing Countries

Source: Weil Fig. 4.9
Life Expectancy in MENA
1960-2001