

Lecture 9

Population

(Based on Chapter 7 of Perkins et al.)

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# Concepts

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- Crude birth rate
- Crude death rate
- Rate of annual increase
  - Crude birth rate – Crude death rate
- Doubling time
- Replacement level of fertility.
- Age structure
  - Population pyramid
- Life expectancy

# Present Demographic Situation

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## ■ Trends

- Declining birth rates
  - Declining all the way as PPP GDP per capita rises from \$1000 to \$10,000 or more.
- Declining death rate
  - Declines as PPP GDP per capita rise to \$4000 and is insensitive after that.

## ■ Issues

- Age distribution (population aging).
- Spatial distribution (urbanisation).

# Birth Rate

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## ■ Determinants

- Age structure of the population.
- Share of population in the reproductive age who marry (includes long term relationships).
- Rate at which married couples reproduce.

## ■ Questions

- Is Europe at the receiving end of all three factors?
  - Is Europe trapped in a vicious circle of population aging?

# Theories of Fertility .... 1

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- Malthus.
  - “passion between the sexes”
  
- Socio-developmental theories.
  - Poverty.
    - Social security options.
  - Social norms.
    - Gender bias.
  - Infant mortality rates.
  - Women’s participation in labour force.
  - Income.

# Theories of Fertility .... 2

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- Becker

- Quality-quantity trade-off.

- Max  $U(N, Q, C)$

- Sub (a) time constraint, (b) budget constraint

- $N$  = number of children

- $Q$  = quality of children

- $C$  = other goods and services

# Theories of Fertility .... 3

## ■ Example.

### ■ Assumptions:

- A parent lives three periods.
- Decides on number of children, extent of labour force participation, and savings for old age.
- Parent's utility depends on own labour and leisure, as well as the children's utility.

$$\blacksquare \max U^P = U(C_{II}^P, l) + \rho U(C_{III}^P, \bar{T}) + \rho n V(I_{III}^k)$$

### ■ sub to

- (1)  $\bar{T} = t_w + t_K(n) + l$
- (2)  $C_{II}^P = t_w \bar{w}_p - S^P - p_H q(n)n$

# Theories of Fertility .... 4

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- Easterlin
  - Demand for children.
    - Taste
  - Natural fertility.
    - Biology
    - Culture

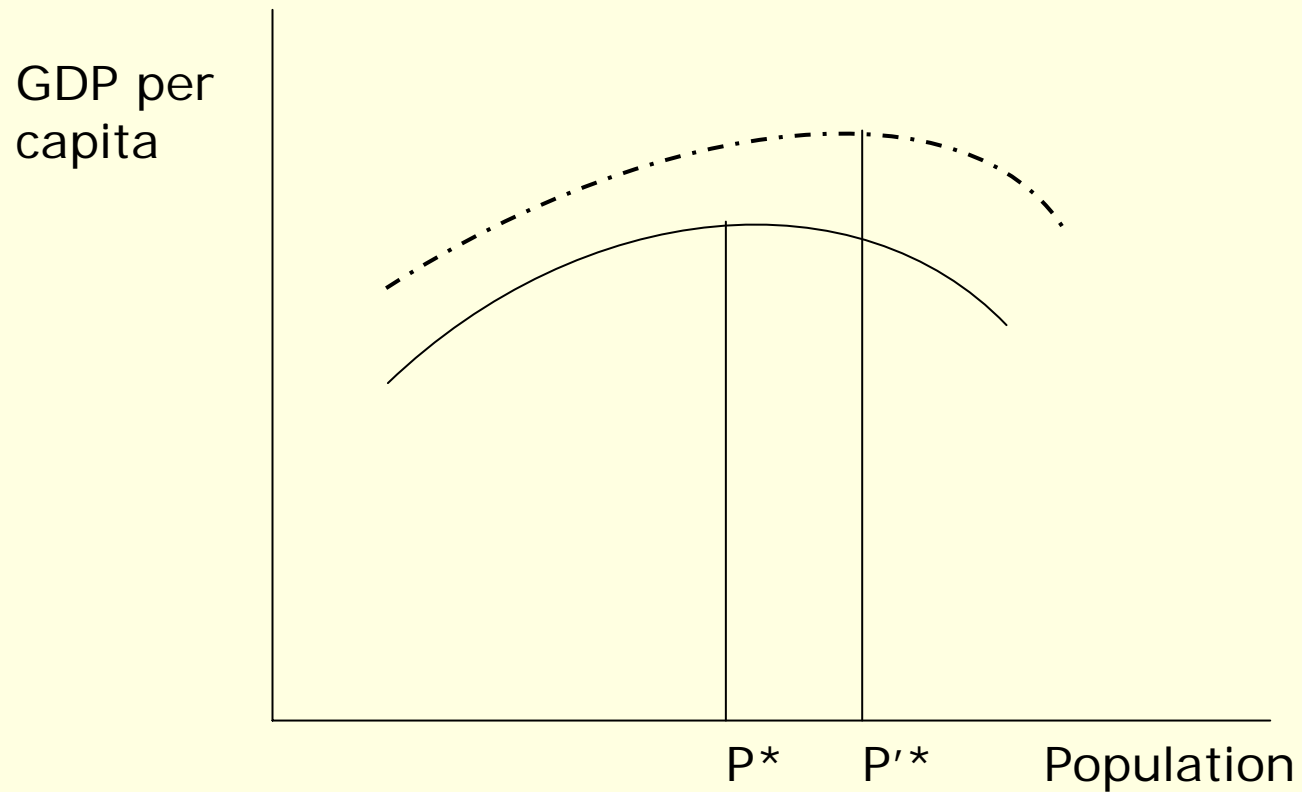


# Optimum Population .... 1

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- Population “too small”
  - $\Rightarrow$  not enough people available to use the stock of capital and other resources.
  
- Population “too large”
  - $\Rightarrow$  labour suffers from diminishing marginal returns.
    - Problem aggravated by slowdown in savings and investment as dependency ratio increases.
    - Further aggravated by slowdown in capital deepening.

# Optimal Population .... 2



# Population Issues

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- Pensions
- Fiscal deficit
  - Lee and Edwards (FRB Boston, 2001)
  - Atkinson (FRB Boston, 2001)
- Capital market
- Labour force