

**Economics 404W**  
**Lecture 17**  
March 14, 2006

**IV. Population, Demographics and the Labor Market**

**A. Review of Stylized Facts**

As industrialized countries grew, fertility gradually declined, mortality declined slowly, and emigration out of Europe moderated population growth.

Hence there was no big blip in population growth during the 18<sup>th</sup> and 19<sup>th</sup> century. It maxed at about 1.5 percent, and is now pretty low (0.7 percent).

Not so with the LDCs: mortality declines dramatically during the early stages of development (endogenous response to improving health conditions), and birth rates initially remain much higher than W. Europe saw. Thereafter, a slow decline in birth rates begins.

So the early stages of development usually are associated with a surge in population growth, followed by a gradual slowdown. (Refer to text, and graphs from earlier lectures.)

**B. Determinants of Population Growth Rates**

Population growth rates are simply the differences between birth rates and death rates.

Death rates respond to health conditions (medicine, hygiene, medical care, sanitation, insecticides), which depend upon per capita income and public expenditures. The more resources an economy has, the more it can spend on health.

More attention has been given to birth rates. These reflect the age structure of the population, and the desired number of children among couples of child-bearing age. In turn, the desired number of children reflects both economic and psychic considerations.

Benefits

*Psychic:*

- Children are usually better than pets; they also generate social approval.
- Having kids means not having to learn about and/or deal with birth control

*Economic*

- Child labor brings in income.
- Old age security: especially when own resources are limited, there is little opportunity to save (poorly developed financial markets), social security

programs are missing, infant mortality rates are high, and gender bias makes males more useful for old age support.

### Costs

#### *Psychic:*

- Kids don't always do what you want, or turn out the way you hoped.
- Sometimes they make you worry.

#### *Economic:*

- Opportunity costs: earnings and leisure foregone
- Direct costs: food, clothing, shelter, schooling, medical.

### These considerations suggest, among other things, that:

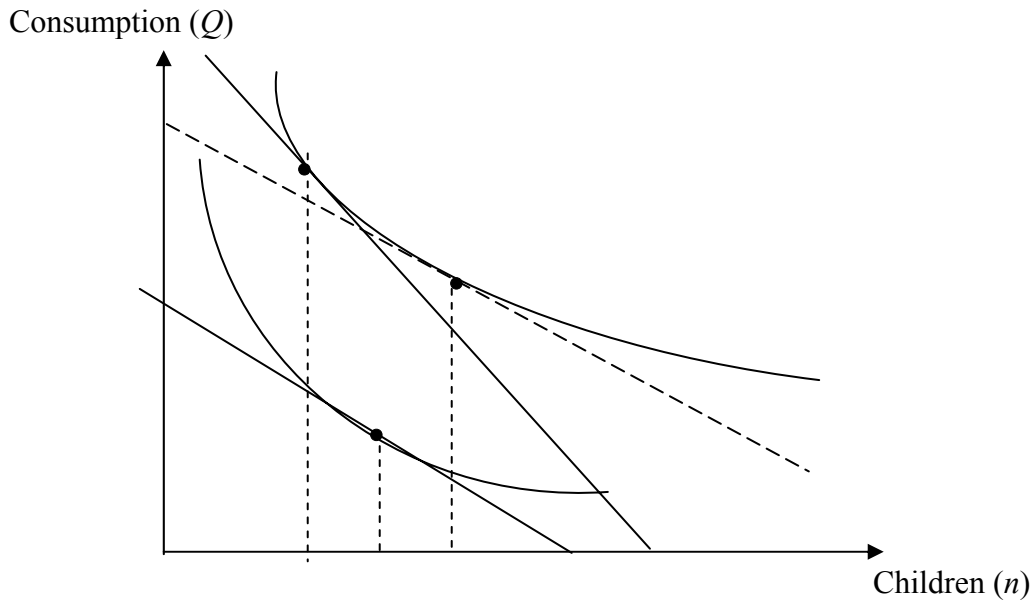
- Birth rates should be higher when children can contribute to income at a young age (often through farm labor).
- Falling infant death rates should reduce the birth rate by making fewer births necessary to achieve a given number of surviving children.
- Increasing the earning potential of children, especially girls, should reduce the desired number of children. (Increasing the predictability of their earnings potential through falling unemployment rates or reductions in wage inequality might do the same.)
- Increasing the opportunity cost of time should make having children more costly. Better job opportunities and moving to an urban environment (where space is scarce and extended family households are more unusual) all do this.

Each of these predictions is borne out by empirical studies of household behavior in developing countries and elsewhere.

Accordingly, falling birth rates are an endogenous response to rising per capita incomes, to urbanization, and to the emergence of off-farm job opportunities for women. Put differently, causality can flow from development to population growth rates as well as vice versa.

A puzzle: If children are normal goods, shouldn't higher income lead to more children?

The solution: Its true that we should see an income effect. But there is also a substitution effect working in the other direction, as the value of time increases with one's earning potential.



Where the household budget constraint is:

$$Q = w(L - \lambda \cdot n) + \pi - d \cdot n$$

$Q$  = goods consumption (the price of goods is normalized to 1)

$n$  = number of children

$w$  = market wage for mother's labor

$L$  = total hours available to mother (to be divided between child-rearing and income generation)

$\lambda$  = hours needed to care for one child

$\pi$  = father's earnings

$d$  = direct cost of children (food, clothing, health care, etc.)

Note that the term  $w(L - \lambda n)$  is the income earned by the mother in the time she is not devoting to child-rearing. To graph the budget constraint, note that if the couple chooses no children ( $n = 0$ ), it reaches its maximum consumption level:  $Q = wL + \pi$ . This is the intercept of the budget line. Also, for every child, the couple gives up  $-w\lambda + d$  units of consumption. This is the slope of the budget line.

This approach suggests that:

- Increases in income not related to the child-rearing person increase the desired number of kids, assuming that kids are a normal good. (In societies where women are not wage earners, the well-off families tend to be large—e.g., OPEC countries in the Middle East.)
- On the other hand, if the wage of the person who cares for the child increases, that person has an incentive to substitute away from child rearing. (Wage-earning opportunities for women; better education opportunities for women.)

Human capital investments also appear to be an endogenous response of parents to income growth. When parents' opportunity costs of time is high, but they are relatively efficient at rearing educated children, they tend to shift from reaping satisfaction through lots of children to reaping satisfaction through a smaller number of better educated children.

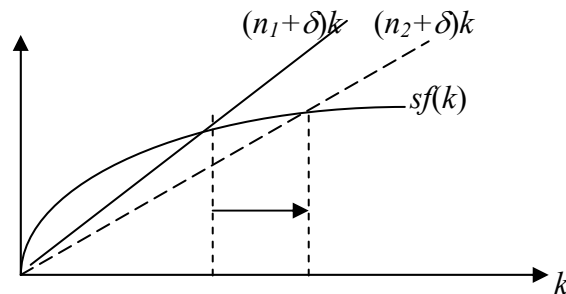
**C. Feedback from Population Growth to the Economy**

Thus far, we've talked about why population growth might respond to changes in the economic environment. Since the changes that accompany industrialization are generally likely to reduce desired family size, one might conclude that population growth will slow down as countries develop—that is, it will take care of itself. Or to put it in stronger terms, rapid population growth is a symptom rather than a cause of underdevelopment:

1. Urbanization shifts production to factory, children become less necessary as helpers and the costs of child-rearing are higher: women can't work and simultaneously keep an eye on kids. Factory jobs are available to women, making their opp. cost of staying home higher. All of these forces appear to have brought down birth rate in Singapore, Korea and Hong Kong during the 1960s.
2. Education reduces birth rate (for reasons to be discussed shortly), health care improvements and the provision of basic needs increase survival probabilities and reduce the need for lots of births to ensure a few supporters in old age. This force seems have been more important in the 1970s.

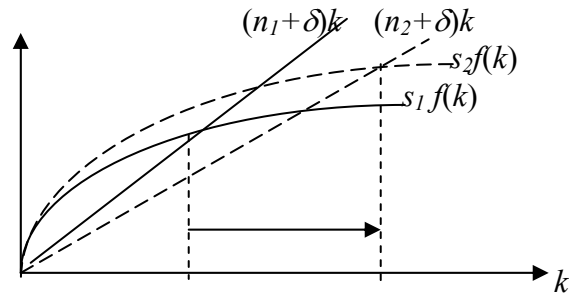
While this perspective is popular among some economists, it is also true that population growth *changes* the economic environment. That is, there are feedback effects:

1. As we saw this in connection with the Solow growth model, reductions in the rate of population growth should lead to higher capital-labor ratios, and higher per capita incomes (refer to diagram, in which population growth falls from  $n_1$  to  $n_2$ ).



Furthermore, reductions in population growth rates should gradually shift the age structure of the population toward working-age adults, and away from children

under 15. This makes a larger fraction of the population productive, and increases savings rates, which compounds the tendency to move to a higher  $k$  ratio.



2. Its also possible that, when couples choose both the number of children and the amount they invest in each child's education, population growth can play a central role in a poverty trap. (Becker, Murphy and Tamura, *Journal of Political Economy*, 1990).

More precisely, under these circumstances, multiple equilibria are possible:

- One in which each generation is low skilled/low income, and hence has low opportunity costs of time. The parents then choose lots of children (rearing them is cheap), but not much education per child. (Being uneducated themselves, they find it difficult to help with their children's education. Further, the return to education is low because there aren't other educated people around to interact with.) Lots of unskilled children grow up to hit the labor market, keeping unskilled wages low. These new adults thus find it optimal to repeat their parents' behavior.
- In the other equilibrium, each generation is educated, and hence is collectively productive and affluent. The opportunity cost of their time is high, so they don't choose to have many kids. But they do spend a lot on each child's education, since the return to doing so is high. This limited number of children, all educated, grows up to interact productively with each other, earning high incomes. Thus they become the next generation of high-income, high-education parents, and they repeat the choices of their parents.

Parents' characteristics		Parents' Incentives			Parents' Choices	
income	education	Opportunity cost of child rearing	Cost of educating each child	Need for children to work	Family size	Education per child
low	low	low	high	high	big	low
high	high	high	low	low	small	high

These cycles are summarized by the diagram above. The arrows represent the replacement of one generation by the next one. Each arrow describes a self-sustaining cycle. Hence this argument constitutes another instance where multiple equilibria are possible, and there is a case for a big push. What form might it take? (Education policies, fertility policies.)

Aside: The text book devotes some time to developing, then discounting, Malthus's argument. The discussion isn't very good, and since the model is flawed anyway, we'll ignore it.