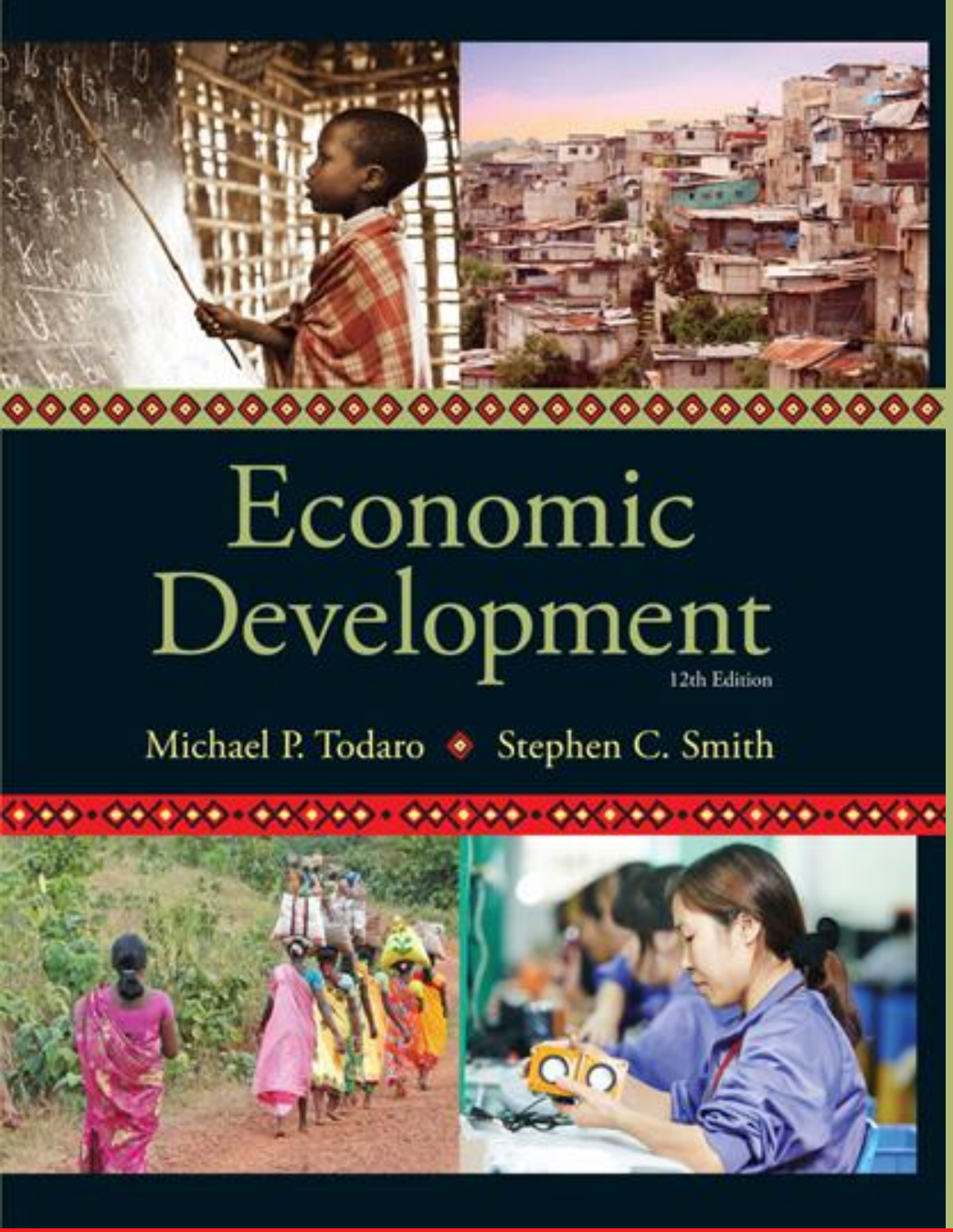

Chapter 6

Population Growth and Economic Development: Causes, Consequences, and Controversies

6.2 Population Growth: Past, Present, and Future

- World population growth throughout history

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Table 6.1 Estimated World Population Growth

Year	Estimated Population (millions)	Estimated Annual Increase in the Intervening Period (%)	Doubling Time (years)
10,000 B.C.E.	5		
1 C.E.	250	0.04	1,733
1650	545	0.04	1,733
1750	728	0.29	239
1800	906	0.45	154
1850	1,171	0.53	130
1900	1,608	0.65	106
1950	2,576	0.91	76
1970	3,698	2.09	33
1980	4,448	1.76	39
1990	5,292	1.73	40
2000	6,090	1.48	47
2010	6,892	1.22	57
2050 (projected)	9,600	0.98	71

Sources: Population Reference Bureau, *World Population Data Sheet* (Washington, D.C.: Population Reference Bureau, 2010 and previous annuals); Warren S. Thompson and David T. Lewis, *Population Problems*, 5th ed. (New York: McGraw-Hill, 1965), p. 384; United Nations, *Demographic Yearbook for 1971* (New York: United Nations, 1971); United Nations, *Report on the World Social Situation, 1997* (New York: United Nations, 1997), p. 14; and United Nations Population Division, *World Population Prospects: The 2012 Revision*. New York: United Nations (2013). An alternate system of broadly comparable and earlier estimates is found in Michael Kremer, "Population growth and technological change: One million B.C. to 1990," *Quarterly Journal of Economics* 108 (1993): 681–716.

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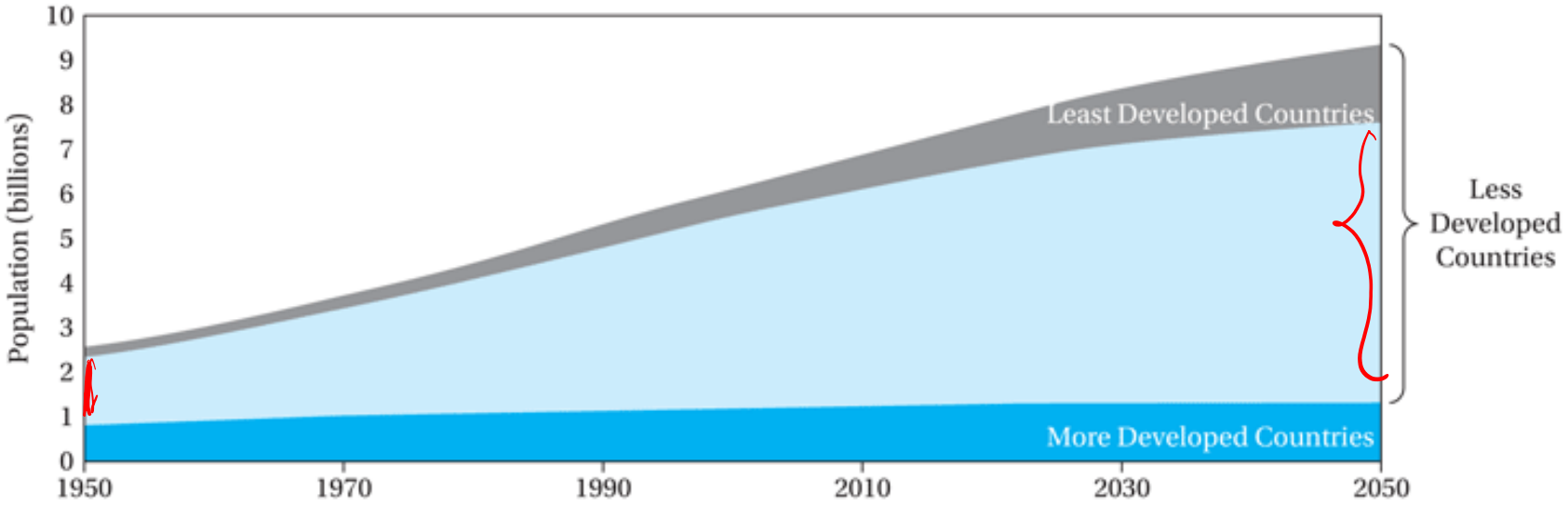
Figure 6.1 World Population Growth, 1950-2050



Source: Population Reference Bureau World Population Data Sheet 2012, page 4; data are drawn from United Nations Population Division, World Population Prospects: The 2010 Revision (2011), medium-variant estimates.

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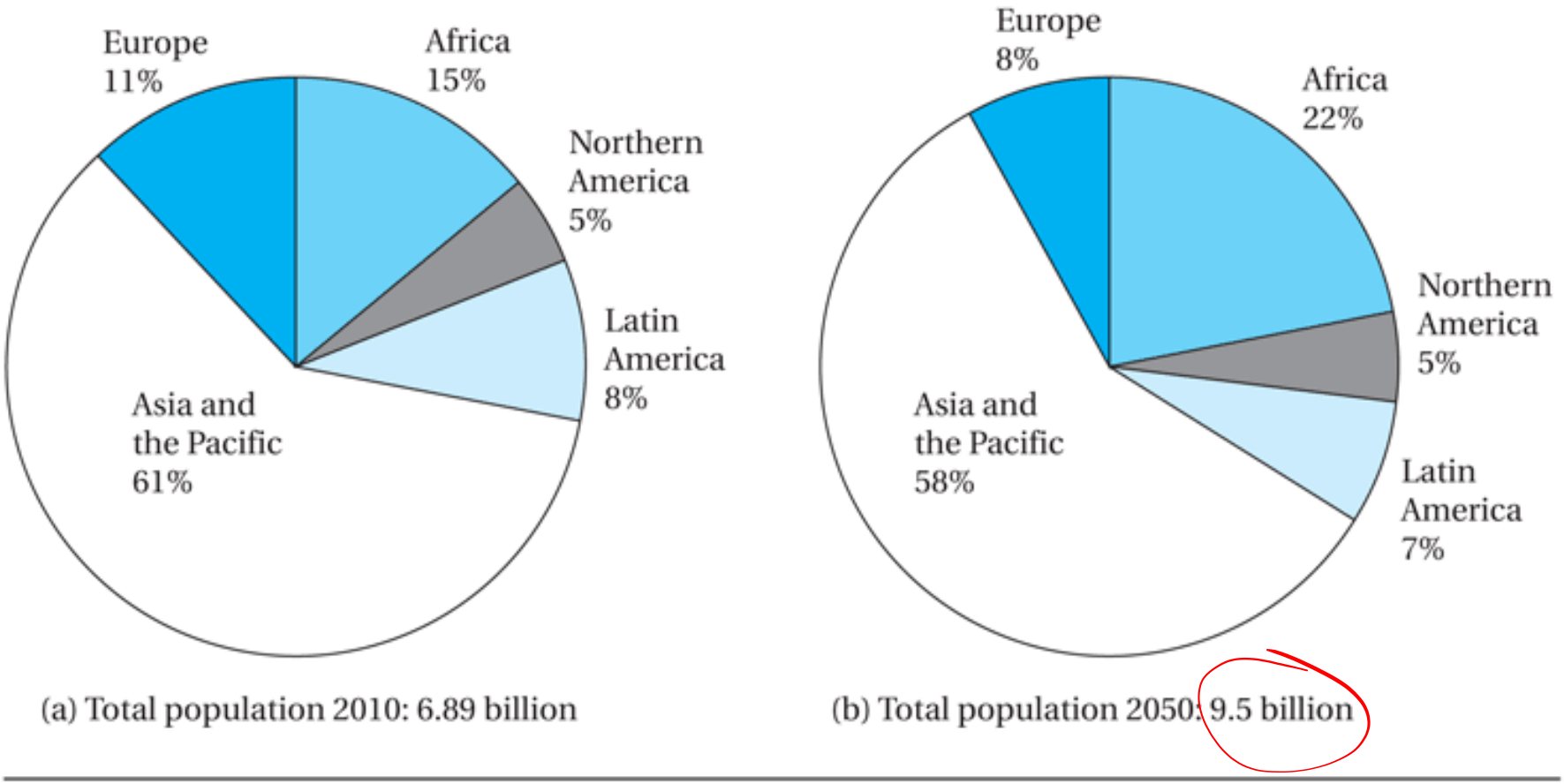
Figure 6.2 World Population Distribution by Region, 2010 and 2050



Source: Data from Population Reference Bureau, *World Population DataSheet*, 2010.

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6.2 Population Growth: Past, Present, and Future

- Structure of the world's population
  - Geographic region
  - Fertility and Mortality Trends
  - Rate of population increase
  - Birth rates, death rates
  - Total fertility rates
  - Age Structure and dependency burdens

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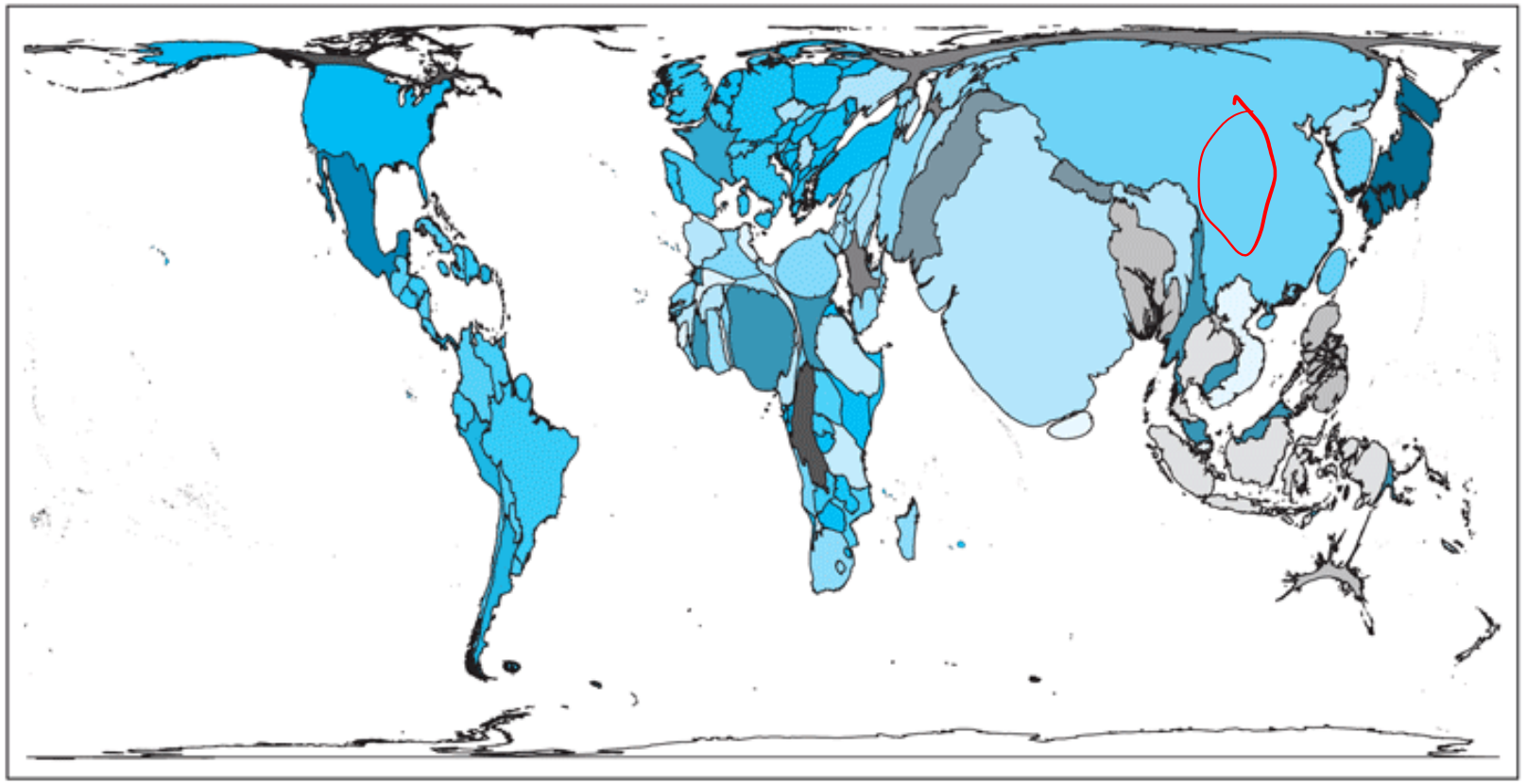
Figure 6.3 Map with Country Sizes Proportional to Their Fraction of World Population



Source: worldmapper.org:http://www.worldmapper.org/display.php?selected=2).

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Table 6.2 Fertility Rate for Selected Countries, 1970 and 2009

Country	Total Fertility Rate	
	1970	2012
Bangladesh	7.0	2.3
Colombia	5.3	2.1
Indonesia	5.5	2.3
Jamaica	5.3	2.1
Mexico	4.9	2.3
Thailand	5.5	1.6
Zimbabwe	7.7	4.1

Sources: World Bank, *World Development Report, 1994* (New York: Oxford University Press, 1994), tab. 26; Population Reference Bureau, *World Population Data Sheet* (Washington, D.C.: Population Reference Bureau, 2012).

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6.2 Population Growth: Past, Present, and Future

- The Hidden Momentum of Population Growth
  - High birth rates cannot be altered overnight
  - Age structure of developing country populations

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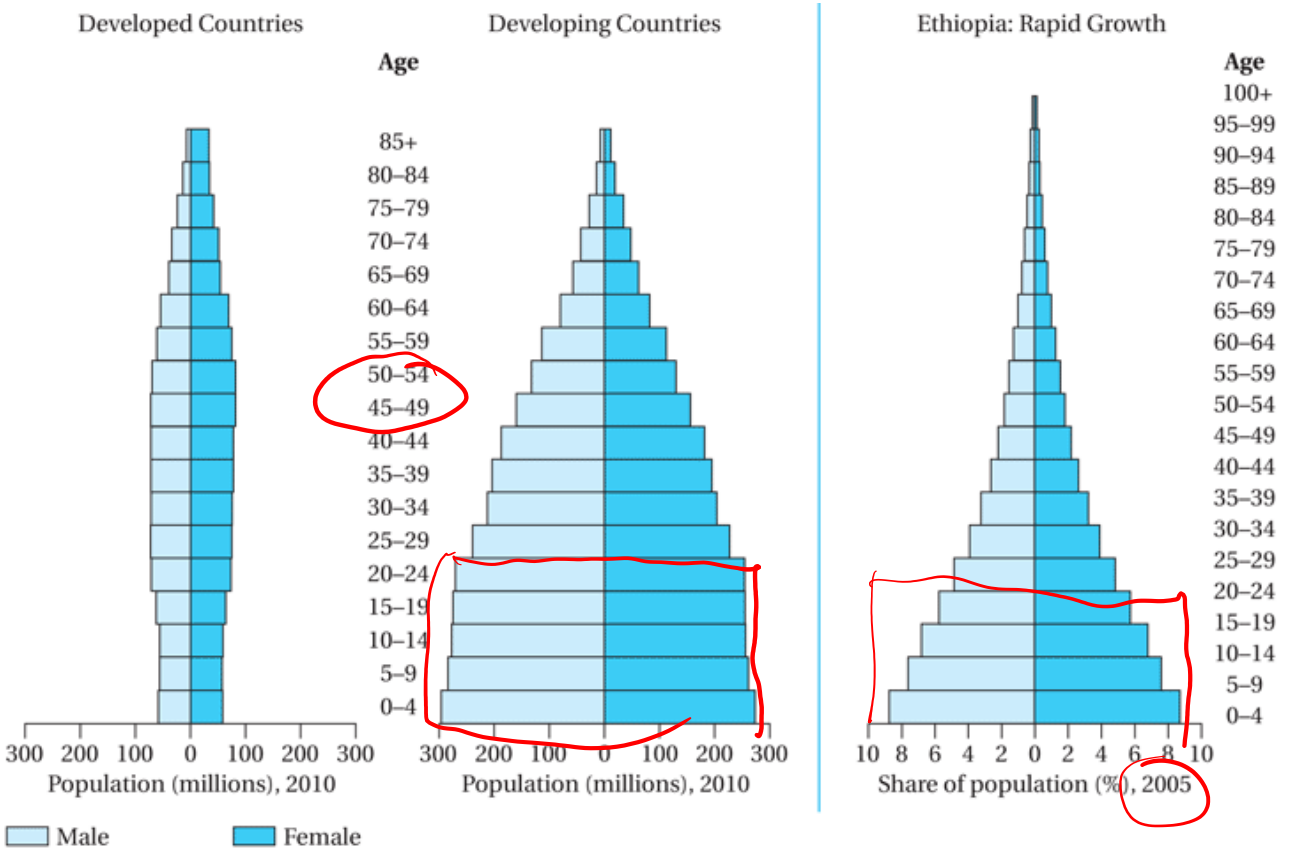
Figure 6.4 Population Pyramids: All Developed and Developing Countries and Case of Ethiopia



Source: Graphs detailing Developed Countries from *World Population Data Sheet of the Population Reference Bureau, Inc.*, by Population Reference Bureau. Copyright 2010 by Population Reference Bureau, Inc. Reproduced with permission of Population Reference Bureau, Inc., via Copyright Clearance Center. Graph detailing Ethiopia from *Population Bulletin* 62 (2007), p. 6. Reprinted with permission from Population Reference Bureau, Inc.

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6.3 The Demographic Transition

- Stage I: High birthrates and death rates
- Stage II: Continued high birthrates, declining death rates
- Stage III: Falling birthrates and death rates, eventually stabilizing

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Figure 6.5 The Demographic Transition in Western Europe

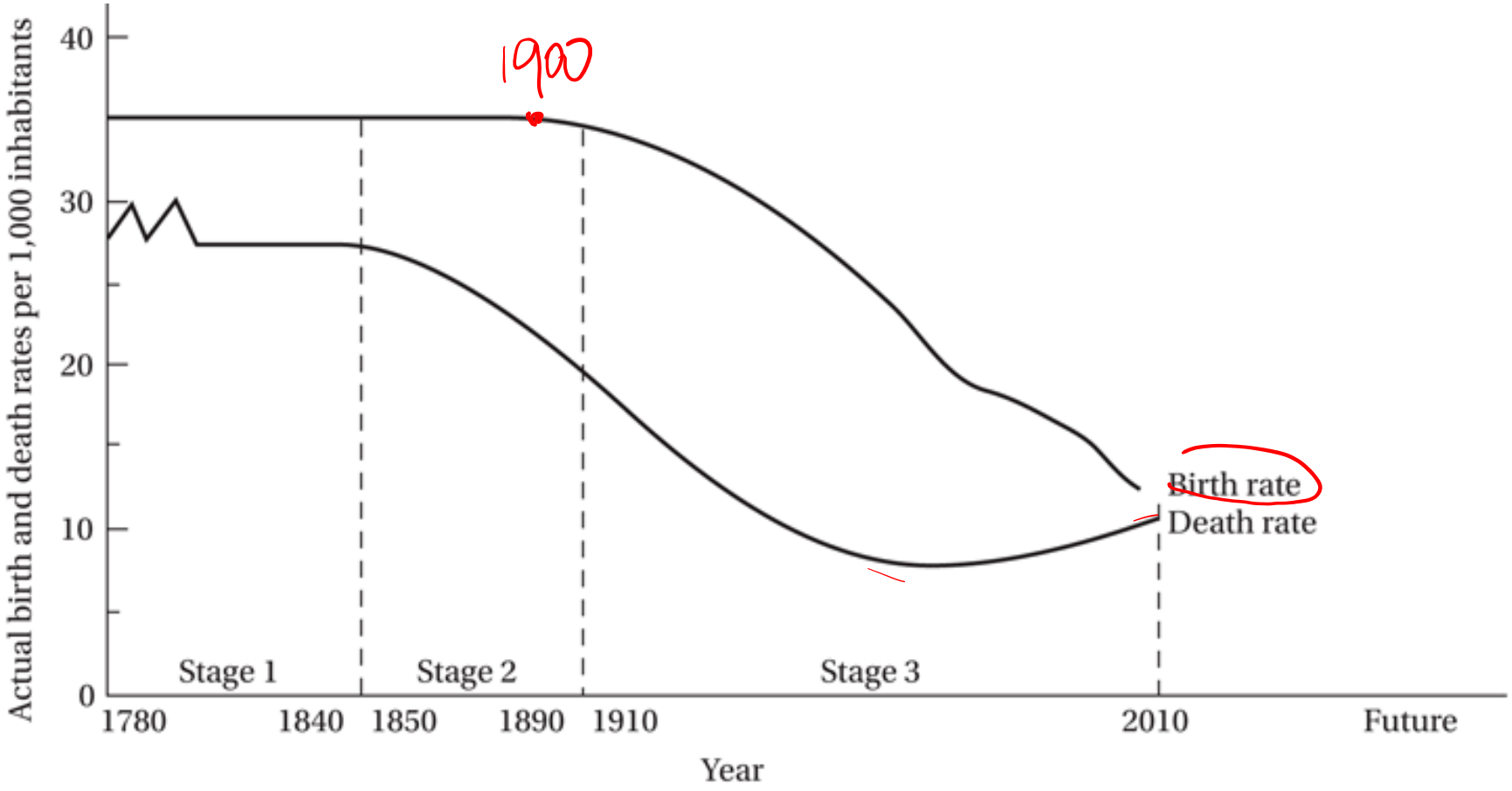

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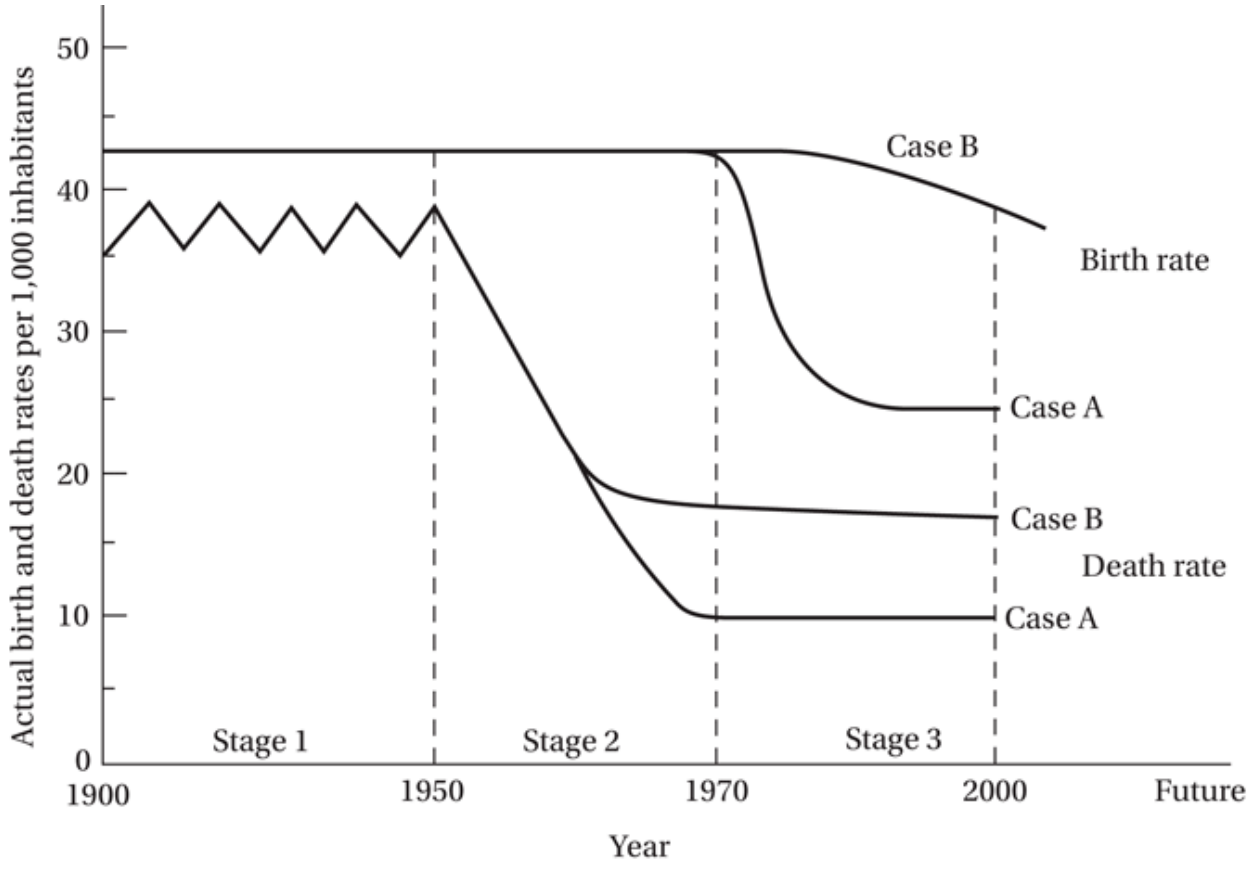
Figure 6.6 The Demographic Transition in Developing Countries



Source: Based on National Academy of Sciences, *The Growth of World Population* (Washington, D.C.: National Academy of Sciences, 1963), p. 15.

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6.4 The Causes of High Fertility in Developing Countries: The Malthusian and Household Models

- The Malthusian Population Trap
  - The idea that rising population and diminishing returns to fixed factors result in a low levels of living (population trap)

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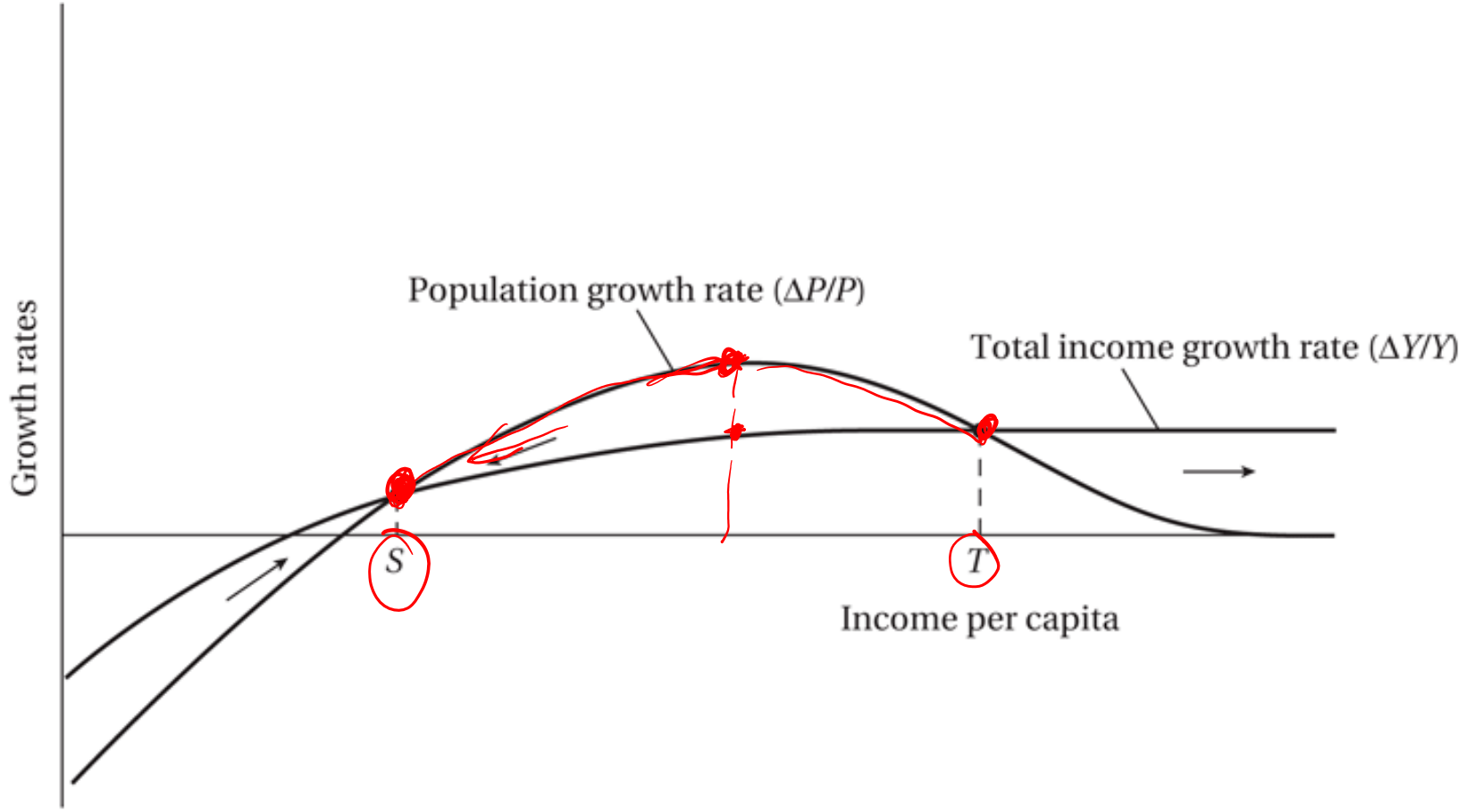
Figure 6.7 The Malthusian Population Trap



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6.4 The Causes of High Fertility in Developing Countries: The Malthusian and Household Models (cont'd)

- Criticisms of the Malthusian Model
  - Impact of technological progress
  - Currently no positive correlation between population growth and levels of per capita income in the data
- Microeconomics of family size; turns focus to individual rather than aggregate variables

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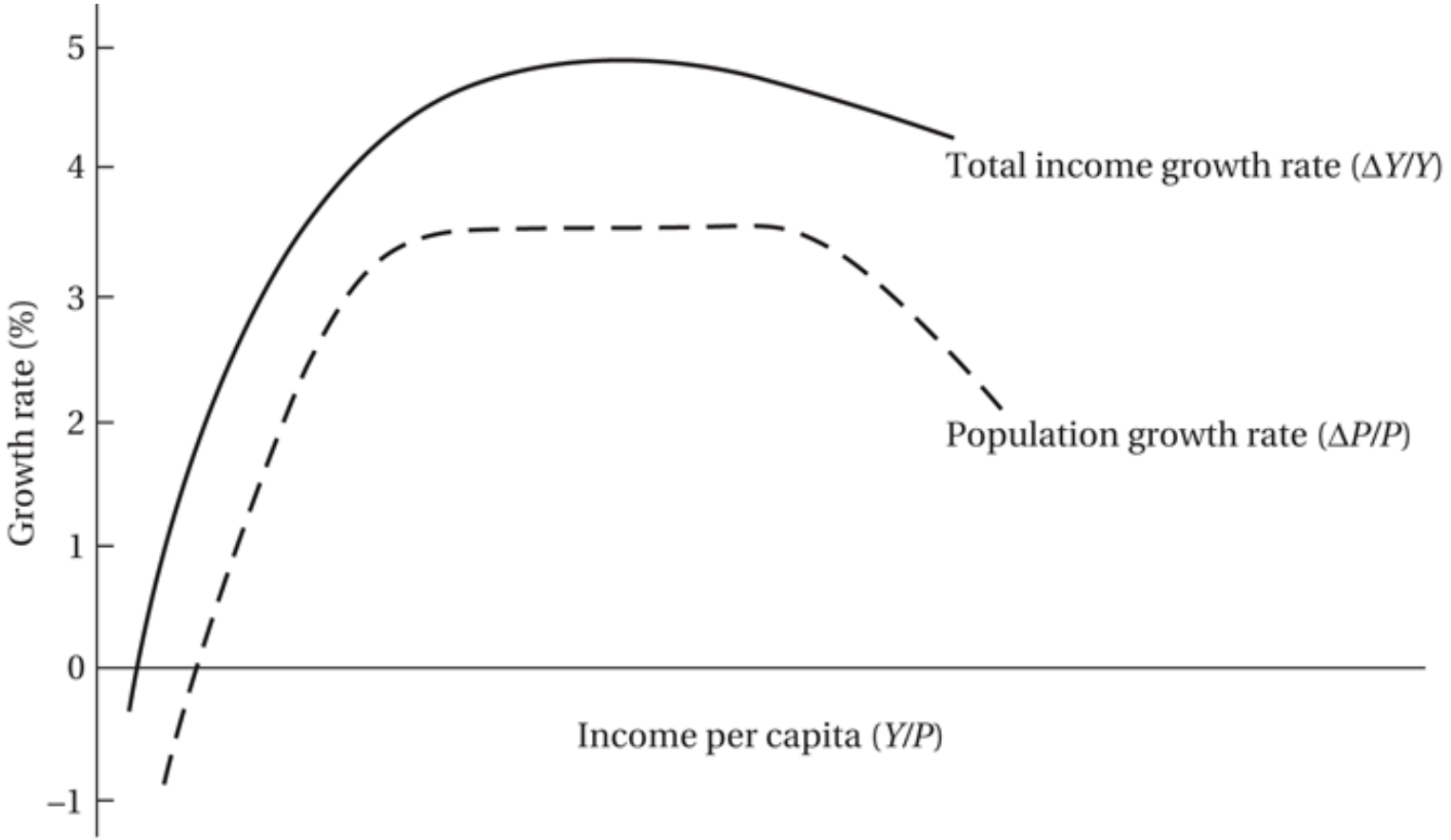
Figure 6.8 How Technological and Social Progress Allows Nations to Avoid the Population Trap



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6.4 The Causes of High Fertility in Developing Countries: The Malthusian and Household Models (cont'd)

- The Microeconomic Household Theory of Fertility
- The Demand for Children in Developing Countries
  - First two or three as "consumer goods"
  - Additional children as "investment goods":
  - Work on family farm, microenterprise
  - Old age security motivation

DINK

double income
no kids

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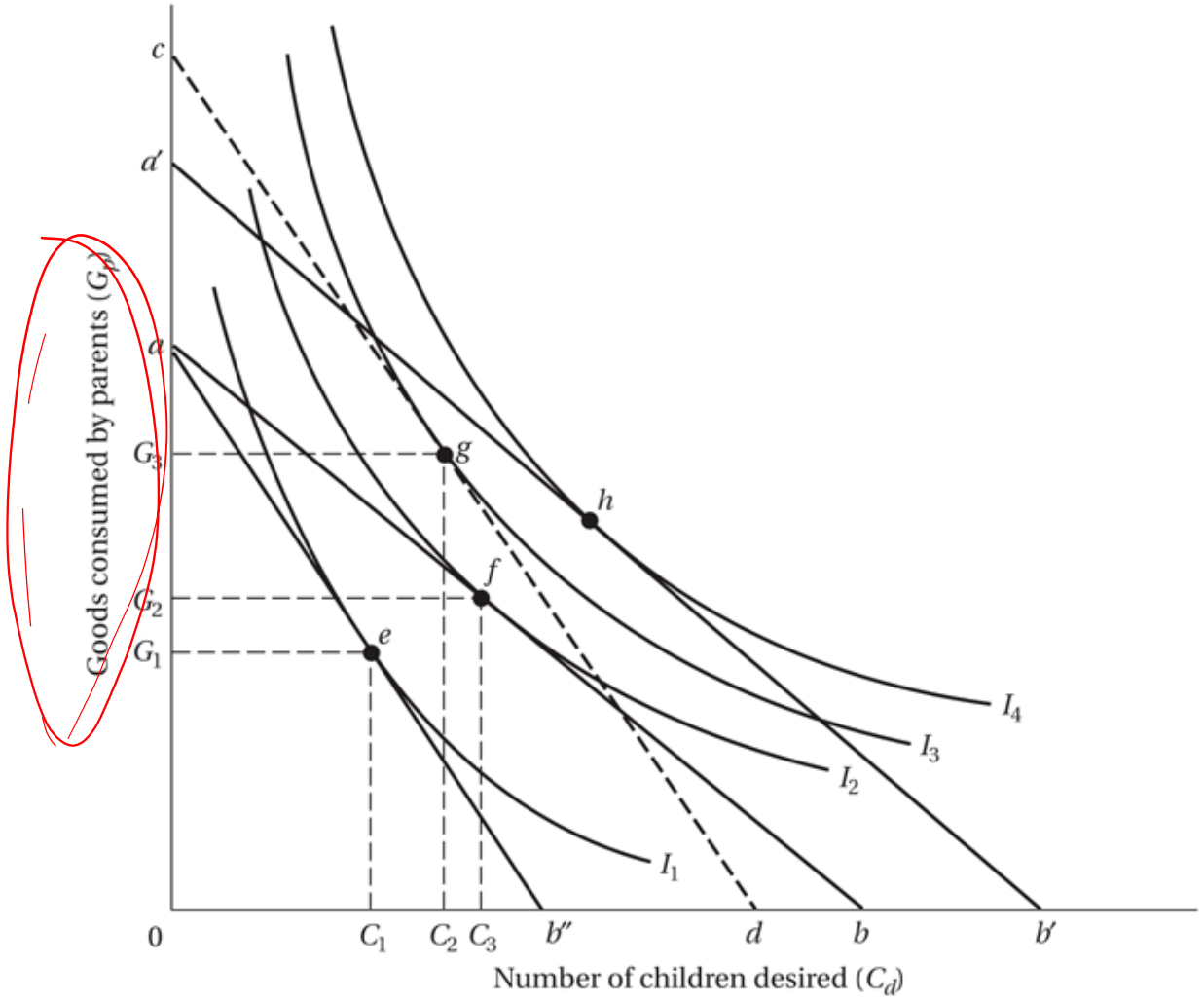
Figure 6.9 Microeconomic Theory of Fertility: An Illustration



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6.4 The Causes of High Fertility in Developing Countries: The Malthusian and Household Models (cont'd)

Demand for Children Equation

$$C_d = f(Y, P_c, P_x, t_x), x = 1, \ldots, n$$

Where

C_d is the demand for surviving children
Y is the level of household income
P_c is the "net" price of children
P_x is price of all other goods
t_x is the tastes for goods relative to children

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6.4 The Causes of High Fertility in Developing Countries: The Malthusian and Household Models (cont'd)

Demand for Children Equation

$$C_d = f(Y, P_c, P_x, t_x), x = 1, \ldots, n$$

- The higher the household income, the greater the demand for children.
- The higher the net price of children, the lower the quantity demanded.
- The higher the prices of all other goods relative to children, the greater the quantity of children demanded.
- The greater the strength of tastes for goods relative to children, the fewer children demanded.

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6.4 The Causes of High Fertility in Developing Countries: The Malthusian and Household Models (cont'd)

In symbols, these relationships may be written as:

$$\frac{\P C_d}{\P Y} > 0 \qquad \frac{\partial C_d}{\partial P_x} > 0$$

$$\frac{\partial C_d}{\partial P_c} < 0 \qquad \frac{\partial C_d}{\partial t_x} < 0$$

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6.4 The Causes of High Fertility in Developing Countries: The Malthusian and Household Models (cont'd)

Causes of, and Policy Responses to, High Fertility in Developing Countries: Lessons from Microeconomic Household Models

- Fertility may be lowered with:
  - Improved women's education, role, and status
  - Female nonagricultural wage employment
  - Rise in family income levels through shared growth
  - Reduction in infant mortality, better health care
  - Development of old-age and social security plans
  - Expanded schooling opportunities, lowered real costs
  - Lowered prices and better information on contraceptives
  - Direct incentives such as subsidy benefits
  - Policies that have the effect of reducing boy preference

The above list provides a framework for policy.

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6.4 The Causes of High Fertility in Developing Countries: The Malthusian and Household Models (cont'd)

- Implications. Fertility lower if
  - Raise women's education, role, and status
  - More female nonagricultural wage employment
  - Rise in family income levels
  - Reduction in infant mortality
  - Development of old-age and social security
  - Expanded schooling opportunities

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6.5 The Consequences of High Fertility: Some Conflicting Perspectives

- Population growth: "It's Not a Real Problem":
  - The real problem is not population growth but the following,
    - Underdevelopment
    - World resource depletion and environmental destruction
    - Population Distribution
    - Subordination of women
- "Overpopulation is a Deliberately Contrived False Issue"
- "Population Growth is a Desirable Phenomenon"

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6.5 The Consequences of High Fertility: Some Conflicting Perspectives

- "Population Growth *Is* a Real Problem"
  - Extremist arguments
  - Theoretical arguments
  - Empirical arguments
    - Lower economic growth
    - Poverty
    - Adverse impact on education
    - Adverse impact on health
    - Food constraints
    - Impact on the environment
    - Frictions over international migration

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Goals and Objectives: Toward a Consensus

- Despite the conflicting opinions, there is some common ground on the following:
  - Population is not the primary cause of lower living levels, but may be one factor
  - Population growth is more a consequence than a cause of underdevelopment
  - It's not numbers but quality of life
  - Market failures: potential negative social externalities
  - Voluntary decreases in fertility is generally desirable for most developing countries with still-expanding populations

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Goals and Objectives: Toward a Consensus

- Some Policy Approaches
  - Attend to underlying socioeconomic conditions that impact development
  - Family planning programs should provide education and technological means to regulate fertility
  - Developed countries have responsibilities too
  - Address gender bias, causes of boy preference

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6.6 Some Policy Approaches

- What Developing Countries Can Do
  - Persuasion through education
  - Family planning programs
  - Address incentives and disincentives for having children through the principal variables influencing the demand for children
  - Coercion is not a good option
  - Raise the socioeconomic status of women
  - Increase employment opportunities for women (increases opportunity cost of having more children, as in microeconomic household theory)
  - Help facilitate genuine and faster development of developing countries that still have high fertility rates

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6.6 Some Policy Approaches

- What the Developed Countries Can Do Generally
  - Address resources use inequities
  - More open migration policies
- How Developed Countries Can Help Developing Countries with Their Population Programs
  - Research into technology of fertility control
  - Financial assistance for family planning programs

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Concepts for Review

- Birth rate
- Death rate
- Demographic transition
- Doubling time
- Family-planning programs
- Fertility rate
- Hidden momentum of population growth
- Life expectancy at birth
- Malthusian population trap
- Microeconomic theory of fertility
- Mortality rate
- Natural increase
- Net international migration
- Population-poverty cycle
- Population pyramid
- Rate of population increase

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Concepts for Review (cont'd)

- Reproductive choice
- Total fertility rate (TFR)
- Under-5 mortality rate
- Youth dependency ratio

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