Outline

• The determinants of economic growth
• Full employment and potential GDP
• The Solow growth model
4.1 The Determinants of Economic Growth

- Labor
- Capital
- Technology
The Production Function

• How much output can be produced from given amounts of labor, capital and technology

\[ Y = F(N, K, A) \]

• It depends on labor for a given capital stock and a given level of technology
$F (N, K, A)$

OUTPUT ($Y$)

EMPLOYMENT ($N$)
4.2 Full Employment and Potential GDP

• The growth model assumes that the economy is at full employment:
  
  Demand for Labor = Supply of Labor

• Potential GDP = amount of production when labor is fully employed

• To determine potential GDP
  – Calculate N corresponding to full employment
  – Consider A and K given – find N
Potential GDP

\[ Y^* = F(N^*, K, A) \]

= amount of output produced when the labor market is at full employment

= full employment level of output

- Link to chapter 1: we found that potential GDP grows steadily, while actual GDP fluctuates around a growth trend

- Link to chapter 3: the natural rate of unemployment \((U^*)\) is the amount of unemployment in the economy when employment is at full employment \((N^*)\) and GDP is equal to potential GDP \((Y^*)\).
Positive Supply Side Shock
Outline

• The Growth Accounting Formula
• Endogenous Growth Theory
• Policies to Stimulate Growth
• The Neoclassical Growth Revival
• Real wages and Labor Productivity
• Productivity and the New Economy
5.1. The Growth Accounting Formula

- Framework that can be used to determine the contribution of labor, capital and technological change to economic growth:
  - Rate of growth of output = technology growth + weighted rates of growth of labor and capital (growth accounting formula)

\[
\frac{\Delta Y}{Y} = \frac{\Delta A}{A} + \frac{0.7 \Delta N}{N} + \frac{0.3 \Delta K}{K}
\]
Historical Growth Accounting

• The formula can be used to determine the contributions of each factor in the long-term growth in the US in the last 35 years.
Figure 5.1 Sources of Growth
Policies to Stimulate Capital Formation

• Government policy has historically concentrated on capital formation

• A rising capital stock adds to economic growth (see the growth formula)

• An extra 1% of capital growth adds 0.3% point to growth in output. To get an added 1% of growth in output, the capital stock would have to grow 3.3% per year.
Policies to Stimulate Capital Formation

• 1% more growth would restore growth rate from 1960s, increase living standards, and bring additional technical innovations – leading to more growth.

• Increased growth in capital stock requires increased investment spending; this occurs only if we reduce consumption, government purchases, or net exports.
Policies to Stimulate Capital Formation

Ex: 1962 President Kennedy sponsored a new investment tax credit – investment increased 30%

Feasible but not sustainable – investment declined to normal levels: growth in capital stock of 7% in 1966, then 5% in 1974, then between 1 and 4% from 1975-1982 (same investment tax credit)
Policies to Increase Labor Supply

• An extra 1% of employment growth adds 0.7% to output growth. Or, to get an added 1% of output growth, it takes 1.4% of added employment growth.
Policies to Increase Labor Supply

- Increased employment growth through:
  
  a. reduction in income tax rates
     - increases the incentives to work by increasing the wage
     - makes people better off – which depresses labor supply
     - net effect is small
The diagram shows a graph with the real wage \( \frac{W}{P} \) on the vertical axis and employment \( N \) on the horizontal axis. The supply curves are labeled \( S \) and \( S' \). The points \( A \) and \( B \) represent different levels of employment. The tax cut is indicated by the shift from \( S \) to \( S' \).
Policies to Increase Labor Supply

• Increased employment growth through:

b. Tax reform
  - change the marginal rates and average tax rates without changing average income
  
  Ex: change the amount of deductions = change the average rate
  - not an incentive for leisure
From GDP Growth to Per Capita Growth

\[
\frac{\Delta Y}{Y} = \frac{\Delta A}{A} + 0.7 \left[ \frac{\Delta N}{N} \right] + 0.3 \left[ \frac{\Delta K}{K} \right]
\]  

(5.12)

\[
\frac{(\Delta Y)}{Y} - \frac{(\Delta N)}{N} = \frac{\Delta A}{A} + 0.3 \times \left[ \frac{\Delta K}{K} - \frac{\Delta N}{N} \right]
\]