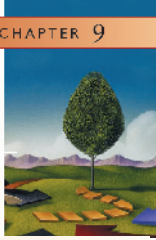


Macroeconomics: Principles & Applications

CHAPTER 9

Economic Growth and Rising Living Standards

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Meaning and Importance of Economic Growth

- **Economic growth**
 - A rise in living standards
- **Average standard of living**
 - Total output (real GDP) per person
- **High real GDP per capita**
 - Associated with a higher quality of life
- **Very low GDP per capita**
 - Lower quality of life for most people

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Table 1: Some indicators of economic well-being in rich & poor countries, 2006

Country	GDP per Capita (U.S. Dollars)	Under-5 Mortality (per 1,000 live births)	Life Expectancy at Birth	Adult Literacy Rate	Percent of Population living on <\$2 per day
Rich Countries					
United States	\$43,986	7	78.0	>99%	...
United Kingdom	\$32,651	5	79.2	>99%	...
France	\$31,980	5	80.4	>99%	...
Japan	\$31,951	4	82.4	>99%	...
Germany	\$31,766	5	79.3	>99%	...
Italy	\$28,828	4	80.4	98.8%	...
Poor Countries					
Pakistan	\$2,361	99	64.9	54.2%	60.3%
Cambodia	\$1,519	143	58.6	75.6%	68.1%
Ghana	\$1,247	59	59.4	64.2%	53.6%
Sierra Leone	\$ 630	282	42.1	37.1%	76.1%
Niger	\$ 512	256	56.2	29.0%	95.6%
DR-Congo	\$ 201	205	46.1	67.2%	79.5%

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Meaning and Importance of Economic Growth

- **Small growth rates in GDP**
 - Matter over time
- **Small differences in GDP growth rate**
 - Matter over time
- **The rule of 70**
 - If a variable is growing by X percent per year
 - It will double in approximately 70/X years

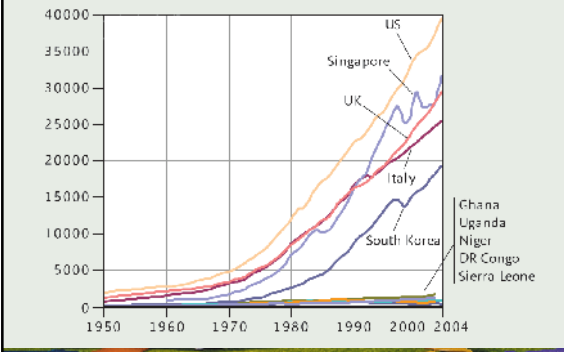
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Meaning and Importance of Economic Growth

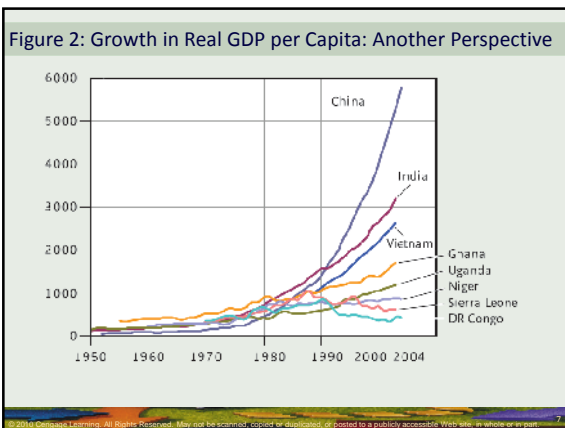
- **Growth prospects**
 - A country that was once poor can become rich
 - 1970s - South Korea and Singapore began growing rapidly
 - 1980s – China, India, Vietnam started experiencing economic growth
 - 1990s – Ghana, Uganda began growing steadily

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Figure 1: Real GDP per Capita, Selected Countries



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What Makes Economies Grow?

- **Determinants of real GDP**
 - Labor productivity
 - Average hours
 - Employment population ratio
 - Size of the population

What Makes Economies Grow?

- **Labor productivity**
 - Output produced by the average worker in an hour
 - Output per hour = total output / total hours worked
- **Average hours**
 - Total hours / total employment

What Makes Economies Grow?

- **Employment–population ratio (EPR)**
 - Percentage of the population that is working
 - Total employment / Population
- **Real GDP = Productivity × Average Hours × EPR × Population**

$$\frac{\text{Total output}}{\text{Total hours}} \times \frac{\text{Total hours}}{\text{Total employment}} \times \frac{\text{Total employment}}{\text{Population}} \times \text{Population}$$

$$= \frac{\text{Total output}}{\text{Total hours}} \times \frac{\text{Total hours}}{\text{Total employment}} \times \frac{\text{Total employment}}{\text{Population}} \times \text{Population}$$

= Total output (Real GDP)

What Makes Economies Grow?

- **Growth equation**
 - Percentage growth rate of real GDP per capita = the sum of the growth rates of productivity, average hours, and the employment–population ratio

$$\% \Delta \text{ Real GDP per capita} \approx \% \Delta \text{ Productivity} + \% \Delta \text{ Average Hours} + \% \Delta \text{ EPR}$$

Table 2: Factors Contributing to Growth in U.S. Real GDP

Annual Percentage Growth in Real GDP Due to Growth in:	1953 to 1973	1973 to 1995	1995 to 2008	2008 to 2014 (projected)
EPR	0.2	0.4	0.0	-0.3
Average Hours	-0.3	-0.3	-0.2	0.1
Productivity	2.1	1.3	2.3	2.1
Total	2.0	1.4	2.1	1.9

Growth in Employment Population Ratio (EPR)

- **Employment-population ratio**
 - Increases only when total employment rises at a faster rate than the population
- **Greater total employment**
 - With a given population
 - Increase in the EPR
 - Rise in real GDP per capita

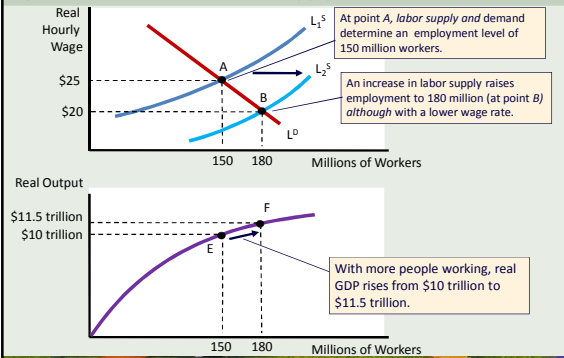
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Growth in Employment Population Ratio (EPR)

- **Causes for total employment to rise**
 - Higher labor demand
 - Higher labor demand
- **Higher labor supply**
 - Higher employment
 - Lower market wage
 - Higher GDP

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Figure 3: An Increase in Labor Supply



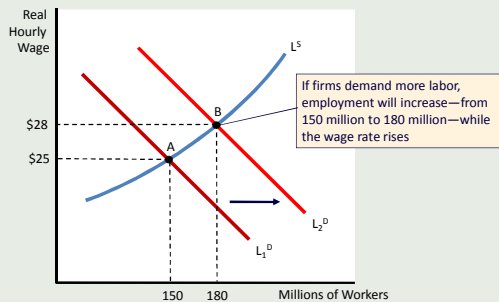
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Growth in Employment Population Ratio (EPR)

- Higher labor demand
 - Higher employment and
 - Higher market wage
 - Higher GDP
- Countries experienced increases in the EPR
 - Simultaneous increase in labor demand and supply
 - Labor demand increasing faster than labor supply
 - Wage rate – increase
 - Employment – increase

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Figure 4: An Increase in Labor Demand



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Growth in Employment Population Ratio (EPR)

- Government policy and the EPR
 - Increase the growth of labor supply
 - Cut in income tax rates
 - Increase the reward for working
 - Cut in certain benefit programs
 - Increase the hardship of not working
 - Increase the growth of labor demand
 - Increase the skills of the workforce
 - Subsidize employment more directly

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Growth in Employment Population Ratio (EPR)

- **Government policy**
 - Can increase EPR (create economic growth) temporarily
 - While EPR is rising
 - But significant, sustained economic growth
 - Would require significant, sustained growth in the EPR, which is not realistic

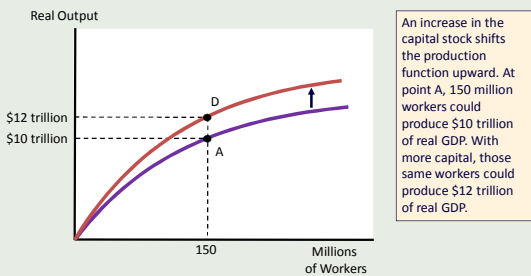
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Productivity Growth: Increases in Capital Stock

- **Rising productivity**
 - The most important determinant of long-run economic growth
 - By increasing the capital stock
- **Capital per worker**
 - Total capital stock divided by total employment
- **A rise in capital per worker**
 - Causes labor productivity to rise

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Figure 5: Capital Accumulation and the Production Function



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Productivity Growth: Increases in Capital Stock

- **How fast the capital stock rises?**
 - Rate of planned investment spending in the economy
- **Capital stock - Stock variable**
 - A variable measuring a quantity at a moment in time
- **Planned investment - Flow variable**
 - A variable measuring a process over some period of time

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Productivity Growth: Increases in Capital Stock

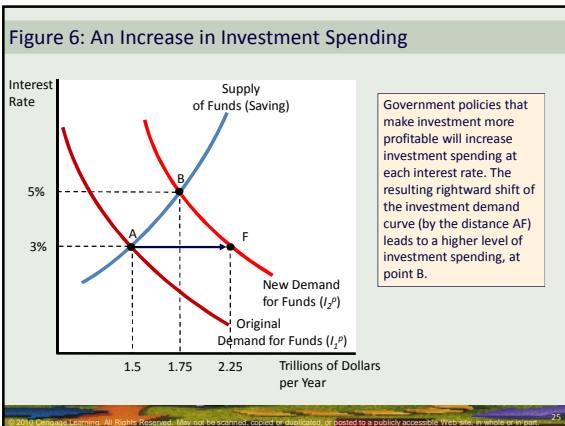
- **A higher rate of investment spending**
 - Faster growth in capital per worker
 - Faster growth in productivity
 - Faster growth in the average standard of living
 - For a given rate of depreciation and given total employment

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Government – seeking to increase investment

1. **Target businesses: Increase incentive to invest**
 - Lower corporate profit tax
 - Investment tax credit
- **Corporate profits tax**
 - A tax on the profits earned by corporations
- **Investment tax credit**
 - A reduction in taxes for firms that invest in new capital

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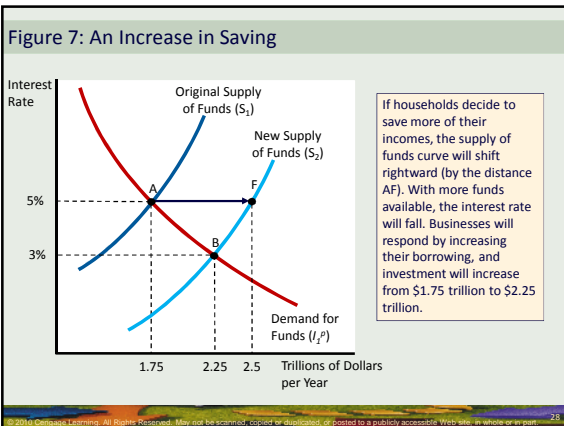
Government – seeking to increase investment

2. Target households: Increase incentive to save

- Decrease capital gains tax rate
- Switch to a consumption tax
- Alter transfer system (social safety net)
- More funds available for investment

Government – seeking to increase investment

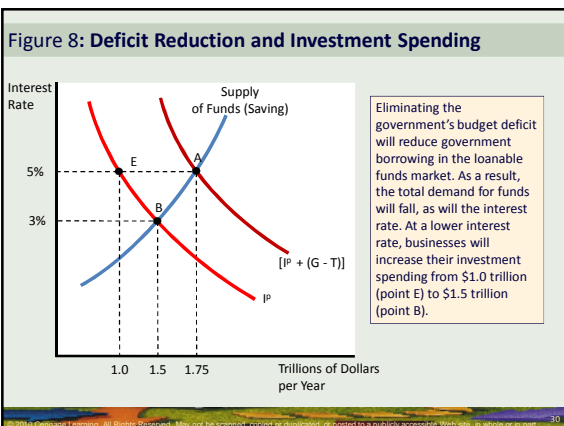
- Capital gains tax
 - Tax on profits earned when a financial asset is sold at more than its acquisition price
- Consumption tax
 - Tax on the part of their income that households spend



Government – seeking to increase investment

3. **Decrease in the budget deficit**

- Tends to reduce interest rates and increase investment
- Thus speeding the growth in the capital stock
- **Impact of deficit reduction on economic growth**
 - Depends on which government programs are cut



Productivity Growth: Increases in Capital Stock

- **An increase in human capital**
 - Increases output
 - Causes production function to shift upward
 - Can raise productivity and living standards
- **Increase rate of investment in human capital**
 - Decrease budget deficit
 - Lower interest rates
 - Cheaper for households to borrow for college loans and training programs

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Productivity Growth: Increases in Capital Stock

- **Increase rate of investment in human capital**
 - Change in the tax system
 - Increases the incentive for households to save
 - Cheaper for households to borrow for college loans and training programs
 - Income tax reductions
 - Increase the profitability of human capital to households
 - Increase households rate of investment in their own skills and training

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Productivity Growth: Increases in Capital Stock

- **Limits to growth from new capital**
 - Diminishing returns
 - Depreciation
 - Harder and harder to increase capital per worker out of ongoing investment spending
 - Thus, increases in the capital stock alone cannot create permanent high rates of economic growth

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Productivity Growth: Technological Change

- **Technological change**
 - Invention or discovery of new inputs, new outputs, or new production methods
- **Produce capital embodying a new technology**
 - Increase in production
 - From increasing the amount of capital, holding technology constant
 - From the new, productivity-enhancing technology that comes with that capital

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Productivity Growth: Technological Change

- **The faster the rate of technological change**
 - The greater the growth rate of productivity
 - The faster the rise in living standards
- **Discovery-based growth**
 - Economic growth
 - Primarily in advanced countries
 - Based on technological change from new discoveries

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Productivity Growth: Technological Change

- **In rich countries**
 - Sustained growth in productivity & living standards
 - Arises from discovery-based growth
 - Without a continual supply of new ideas
 - Growth in living standards would soon slow and ultimately come to a halt

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Productivity Growth: Technological Change

- **New ideas**
 - Are not subject to diminishing returns
 - Do not depreciate over time
 - There are no logical or mathematical limits to productivity growth from new discoveries
- **Government and discovery-based growth**
 - Research and developing spending
 - Institutional infrastructure and innovation

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Productivity Growth: Technological Change

- **Economic growth in poor countries**
 - Very low capital per worker
 - Little implementation of new technology
- **Catch-up growth**
 - Economic growth, primarily in less-advanced countries
 - Based on increasing capital per worker from low levels
 - And adopting technologies already used in more advanced countries

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Productivity Growth: Technological Change

- **Poor countries**
 - Sustained growth in productivity and living standards
 - Is largely catch-up growth
 - Start with very low capital per worker
 - Catching up to the higher levels of rich countries yields large productivity gains
 - Technological change can occur rapidly
 - By copying and adapting technologies already in use in richer countries

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Productivity Growth: Technological Change

- **China: remarkable economic growth**
 - Government
 - Increasingly well-defined property rights
 - Encouraged competition in the marketplace
 - Root out corrupt bureaucrats and judges
 - Invested in education
 - Specialization and export
 - Encouraged multinational corporations to come
 - Enabled and encouraged its young people to study abroad and come back with new skills and ideas

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Growth Policies: A Summary

- **Fiscal policies**
 - Changes in government purchases or net taxes
 - In the long run
 - Cannot change total output through a change in total spending
 - Demand-side effects
 - Can change total output by altering the quantity of resources available for production
 - Supply-side effects

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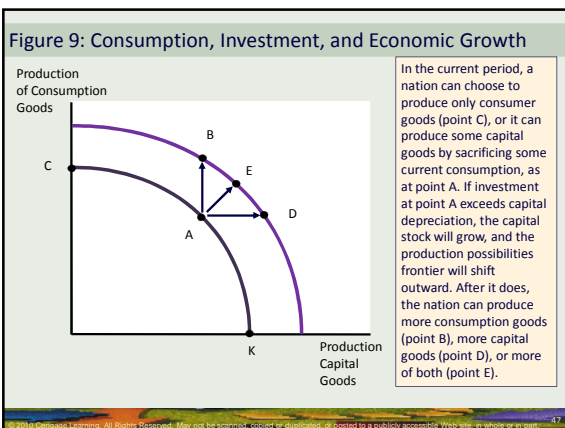
Growth Policies: A Summary

- **Supply-side effects**
 - Macroeconomic policy effects on total output
 - That work by changing the quantities of resources available
- **A single policy**
 - Can have competing effects on growth

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The Costs of Economic Growth

- **Greater investment**
 - In physical capital, human capital, and R&D
 - Faster economic growth and higher living standards in the future
 - Fewer consumer goods to enjoy in the present



The Costs of Economic Growth

- **Achieving social goals**
 - Sacrifice of some economic growth along the way
- **Achieving faster economic growth**
 - Some compromise on other things we care about

Using the Theory

Barriers to catch-up growth in poorest countries

- Why aren't all poor countries enjoying rapid catch-up growth?
 - Extremely low output per capita
 - High population growth rates
 - Poor institutions poor infrastructure
 - Interact to create a vicious circle of continuing poverty

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Table 4: Growth in Selected Poor Countries

Selected Poor Countries Where Living Standards Are:	Average Annual Growth Rate of Output per Capita	
	1975–1990	1990–2005
Growing		
Ghana	0.6%	2.0%
Uganda	1.6%	3.2%
Bangladesh	1.1%	2.9%
Stagnating or Deteriorating		
Niger	-2.8%	-0.5%
Sierra Leone	2.8%	1.4%
DR Congo	-4.6%	-5.2%

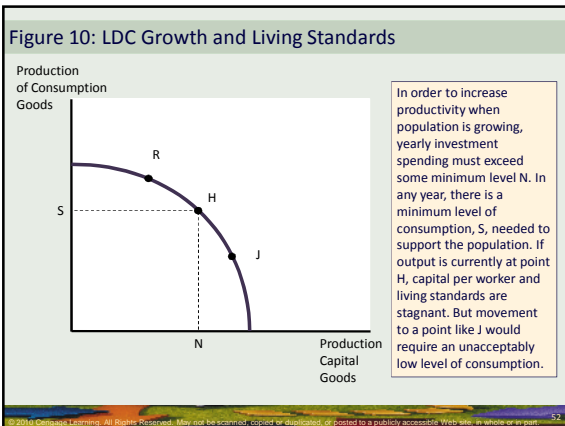
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Using the Theory

Barriers to catch-up growth in poorest countries

- Poorest countries
 - Are too poor to increase living standards by exploiting the normal tradeoff between consumption and capital production
 - If they cannot reduce consumption below current levels
 - They cannot raise capital production enough to increase productivity over time

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Using the Theory

Barriers to catch-up growth in poorest countries

- Break out of the vicious circle of poverty
 - Brute force
 - Target the wealthy
 - Decrease population growth
 - Foreign assistance

