Midterm Review 2

Week 6

House Keeping

- Midterm Exam: February 21

- What to bring:
- Student ID
- Pencil
- Calculator (Non-web communicating)
- Parscore answer sheet (large pink one)

- What NOT to have open:
- Phone
- Notes
- Books

Productivity

- The standard of living depends on the economy's ability to produce goods and services
- Productivity is an economic measure of output (e.g. quantity, revenue, etc.) per unit of input (e.g. labor, capital, etc.)
- Productivity measures may be examined collectively (across the whole economy) or viewed industry by industry to examine trends in labor growth, wage levels and technological improvement

Productivity and GDP

- Many economists measure and track productivity as a clue for predicting future levels of GDP growth
- The productivity measure commonly reported through the media is based on the ratio of GDP to total hours worked in the economy during a measuring period
- The Bureau of Labor Statistics (BLS) publishes data on productivity quarterly

Determinants of Productivity

- Physical Capital (K)
  e.g. A company can increase its productivity simply by assigning more machines to employees
- Human Capital (H)
  e.g. A car dealership can increase its sales by training all the salespersons
- Natural Resources (N)
  e.g. OPEC member countries produce about 40 percent of the world's crude oil
- Technological Change (A)
  e.g. The invention of 3D printers

Returns to Scale

- Production function: $Y = AF(K, L)$
  Increasing Returns to Scale (IRS): $AF(tK, tL) > tY$
  Constant Returns to Scale (CRS): $AF(tK, tL) = tY$
  Decreasing Returns to Scale (DRS): $AF(tK, tL) < tY$

- Cobb-Douglas production function
  $$Y = AL^{\beta}K^{\alpha} \text{ where } \alpha + \beta = 1,\ 0 < \alpha, \beta < 1$$
  Cobb-Douglas production functions display CRS

Interest Rate and Inflation

- Nominal Interest Rate (i)
  - The rate of interest before adjustment for inflation
- Real Interest Rate (r)
  - The rate of interest an investor, saver or lender receives (or expects to receive) after allowing for inflation
- Inflation Rate (π)
  - Explains the sustained increase in the general price level of goods and services in an economy over a period of time, resulting in a loss of value of currency

Relationship Among the Nominal Interest Rate, Real Interest Rate, and Inflation Rate

- Theoretical equation:

$$1 + r = \frac{1 + i}{1 + \pi}$$

- When π is "small enough," we approximate this with the *Fisher Approximation*:

$$r \approx i - \pi$$

Present Value and Future Value

- Present Value: The present discounted stream of payments, incomes, etc.
  i.e. Money today needed to have same value as given in the future

$$PV = d_0 + \frac{d_1}{1+i} + \frac{d_2}{(1+i)^2} + \cdots + \frac{d_t}{(1+i)^t}$$

- Future Value: The future compounded stream of incomes
  i.e. Money a year from now to have same value as today

$$FV = d_0(1+i)^t + d_1(1+i)^{t-1} + \cdots + d_t$$

Savings and Investment

- Recall the GDP formula (*Savings are not included to avoid double counting*):

$$Y = C + I + G + NX$$

- Assume that we are in a closed economy (NX = 0), then savings equals investment in the aggregate:

$$\Rightarrow Y = C + I + G$$
$$\Leftrightarrow Y - C - G = I$$
$$\Rightarrow S = I$$

- Everything you did not spend on consumption/investment becomes part of you savings

Private vs. Public Savings

Let's decompose savings into two parts:

$$S = I$$

From the GDP formula, we know that:

$$I = Y - C - G$$

Now, let's add and subtract taxes T:

$$\Rightarrow I = \underbrace{(Y - C - T)}_{\text{Private Savings}} + \underbrace{(T - G)}_{\text{Public Savings}}$$

- This means that total investment (savings) in the economy equals to the sum of private savings and public savings.

Three Categories of Labor

- Employed are the people who:
  - worked as paid employees
  - worked in their own business
  - worked as unpaid workers in a family members business
  - Both full-time and part-time workers are counted
- Unemployed are those who were not employed, were available for work, and had tried to find employment during the previous four weeks.
- Not in the labor force are those who fit into neither categories:
  - full-time students
  - homemakers
  - retired people

UR and LFPR

- Unemployment Rate (UR): percentage of the labor force that is unemployed

$$Unemployment\ rate = \frac{Number\ of\ unemployed}{Labor\ force}$$

- Labor Force Participation Rate (LFPR): percentage of the adult population that is in the labor force

$$Labor\ force\ participation\ rate = \frac{Labor\ force}{Adult\ population}$$

Minimum Wage

- The lowest remuneration that employers may legally pay to workers
- In other words, the price floor below which workers may not sell their labor
- Causes unemployment (particularly among unskilled or inexperienced workers)

Review Questions

1. Which of the following would be considered an investment expenditure?

A) The Smith's buy a home that was built in 1990.
B) The federal government pays the salary of a captain in the Air Force.
C) Jack's Boat Storage buys a new boat lift.
D) Chairs-R-Us buys a used lathe to manufacture chairs.

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D) Chairs-R-Us buys a used lathe to manufacture chairs.

Answer: C Answers A and D are used goods, while B is a transfer payment from the government. Answer C is a purchase of capital equipment, hence the correct answer.

Review Questions

2. Which of the following production functions exhibits increasing returns to scale?

A. $F(K, L) = K^2 L$

B. $F(K, L) = 10K + 5L$

C. $F(K, L) = \sqrt{KL}$

D. $F(K, L) = K/L$

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Answer: A $F(tK, tL) = (tK)^2(tL) = t^3 F(K, L)$ The remaining answers are all constant returns to scale (easy to verify)

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What is the present value if the project instead pays cash flows of 100 million dollars per year for each of the next five years?

$$Answer : PV = \frac{100}{1.11} + \frac{100}{1.11^2} + \frac{100}{1.11^3} + \frac{100}{1.11^4} + \frac{100}{1.11^5} = 369.9 \ million$$

Review Questions

4. Workers at a car-manufacturing plant in Flint, MI are laid off because the economy is weak and GM cars aren't selling well. GM isn't sure when the plant will reopen. What type of unemployment describes the workers' situation?

A. Cyclical unemployment
B. Full unemployment
C. Structural unemployment
D. Frictional unemployment

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Answer is A because of business cycles.

Review Questions

5. Using the table above, the unemployment rate is:

	In Millions
Civilian population	210
People incapable of working	50
People not looking for work	60
Employed workers	95

A. 3 percent
B. 5 percent
C. 7 percent
D. 9 percent

Review Questions

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	In Millions
Civilian population	210
People incapable of working	50
People not looking for work	60
Employed workers	95

A) 3 percent

B) 5 percent

C) 7 percent

D) 9 percent

Answer: B Labor force$= 210 - 50 - 60 = 100$ million
Unemployed$= 100 - 95 = 5$ million

Review Questions

6. The total population (aged 16 and older) of Pageland is 48 million. Of this total, 4 million are unemployed and 36 million currently hold jobs. What are the rates of unemployment and labor force participation of Pageland?

A) The rate of unemployment is 11 percent, and the labor force participation rate is 83 percent.

B) The rate of unemployment is 10 percent, and the labor force participation rate is 75 percent.

C) The rate of unemployment is 10 percent, and the labor force participation rate is 83 percent.

D) The rate of unemployment is 11 percent, and the labor force participation rate is 90 percent.

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B) The rate of unemployment is 10 percent, and the labor force participation rate is 75 percent.

C) The rate of unemployment is 10 percent, and the labor force participation rate is 83 percent.

D) The rate of unemployment is 11 percent, and the labor force participation rate is 90 percent.

Answer: C Labor force$= 4 + 36 = 40$ million $UR = 4/40 = 10$ percent, $LFPR = 40/48 = 83$ percent