# Ch. 3: Productivity, Output and Employment

- 3.1 The Production Function
- 3.2 The Demand for Labour
- 3.3 The Supply of Labour
- 3.4 Labour Market Equilibrium
- 3.5 Unemployment

# Economic Analysis

- Main objective of macroeconomics: to understand **how** the economy works
- **Goals:**
- 1) analyse factors affecting long-run performance (eg, input quantity and quality)
- 2) develop a theoretical model with **key assumptions**

# 3.1 The Production Function

- How much output can an economy produce?
- Production Function: $Y = AF(K,N)$
- For Canada, a reasonable relationship is:
  $Y = AK^{0.3} N^{0.7}$
- A: TFP 1950-1970: 2.0% annual growth
  1980-97: 0.8%

# Shape of the Production Function

- Hold one factor constant,  graph Y vs the other factor
- Properties:
- 1) upwards sloping
- 2) the slope is decreasing

# Marginal Productivity

- MPK (MPN): the increase in output due to an increase in one unit of K (N)
- Formula:
- Properties:
- 1) MPK (MPN) is positive
- 2) MPK (MPN) declines as K (N) increases (diminshing MP)

# Supply Shocks

- A supply shock refers to a change in the production function
- Examples: drought, inventions, changes in **other** factor supplies (oil, ores, etc.)

# 3.2 Demand for Labour

- Capital stock is long-lived - little short-run variation
- Labour is much more variable - think of lay-offs and overtime
- Assumptions for analysis:
- 1) Workers are identical
- 2) The labour market is perfectly competitive - firms and workers are price takers
- 3) Firms maximize profits - demand for N depends on profit maximization
- 4) Capital stock is fixed

# Labour Demand Curve

- Firms are concerned with costs and benefits of hiring workers
- Firms maximize profits where: MPN = w = W/P - the real wage  OR where MRPN = W - see Cobb-Douglas example
- Higher wages would imply less labour demanded
- The labour demand curve is downward sloping
- **Aggregation - ND Curve**

# Shifts

- Technological improvement
- Weather-related catastrophe that destroys some K
- Such events will change the marginal productivity of workers - go back to the production function

# 3.3 The Supply of Labour

- Individuals are concerned with costs and benefits of working
- What are an indivduals alternatives to working? Costs? Benefits?
- Leisure: all ‘off-the-job’ activities
- Is there a price of leisure?

# The Labour Supply Curve

- **Individuals**
- Upward sloping
- Shifts:
- 1) Wealth
- 2) Expectations about future real wages
- **Aggregation - NS curve**
- Shifts:
- 1) Population
- 2) Labour force participation

# 3.4 Labour Market Equilibrium

- Classical model of the labour market: real wages adjust quickly when labour supply and labour demand aren’t equal
- Equilibrium in the classical model: **Full-employment**
- Full-employment output - the level of output when aggregate employment is at the full-employment level - $Y^* = AF(K, L^*)$
- See Applications for the impact of shocks

# 3.5 Unemployment

- The classical model cannot explain unemployment
- Issues:
- 1) Measurement
- 2) Labour Force Status
- 3) Duration of Unemployment
- 4) Types of Unemployment
- 5) The Natural Rate of Unemployment

# Measuring Unemployment

- Statistics Canada surveys
- Categories in survey:
- 1) Employed
- 2) Unemployed
- 3) Not in the Labour Force (didn't work, didn't look for work)
- Unempl.Rate = 2/(1+2) May '98: 8.3%
- Part. Rate = (1+2)/(1+2+3) 65.2%
- Employment Ratio = 1/(1+2+3) 59.8%

# Duration of Unemployment

- What are the effects of a long spell of unemployment?
- Canada:
- 1) most spells are short ( 2 months or less)
- 2) most unemployed at a point in time are in the midst of a long spell
- How is this possible?

# Unemployment at Full-Employment Level of Output?

- Types of unemployment that always exist:
- 1) Frictional - due to searching for suitable matches
- 2) Structural - chronic unemployment - due to low skill levels, or skills that are no longer in demand
- The Natural Rate of Unemployment - the level of unemployment at the ‘full-employment’ level - 1960s: 5%, 1980s: 8%
- Cyclical Unemployment: due to business cycles - can be negative!