Chapter 6 : A Real Intertemporal Model with Investment (Part 2)

EE312

Macroeconomics, Stephen Wiliamson, Chapter 11

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Outline

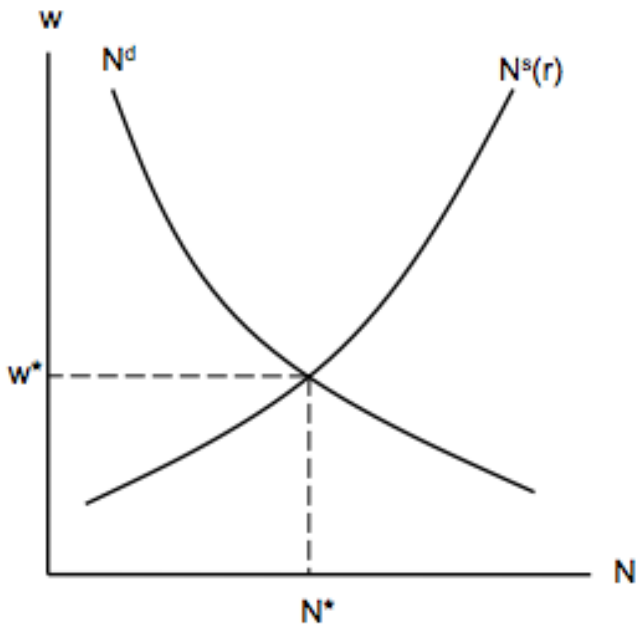
- Real Intertemporal Model (Introduciton) (Part 1)
- The representative consumer: (Part 1)
- The representative firm : (Part 1)
- Government Sector (Part 1)
- Competitive Equilibrium (Part 2)
  - Competitive Equilibrium (introduction)
  - Equilibrium in the labor market, Aggregate output supply
    - Output supply and real interest rate
    - output supply shifts
  - Total current demand for goods
    - output demand and real interest rate
    - output demand shifts
  - complete real intertemporal model
- The Credit Market (Part 3)

Competitive equilibrium

- The labor market:
  - The consumer supplies labor service.
  - The firm demands labor service.
  - The real wage and the level of employment.
- The goods market:
  - The consumer, the firm and government purchase output.
  - The firm supplies the goods.
  - The real interest rate and the level of aggregate output.

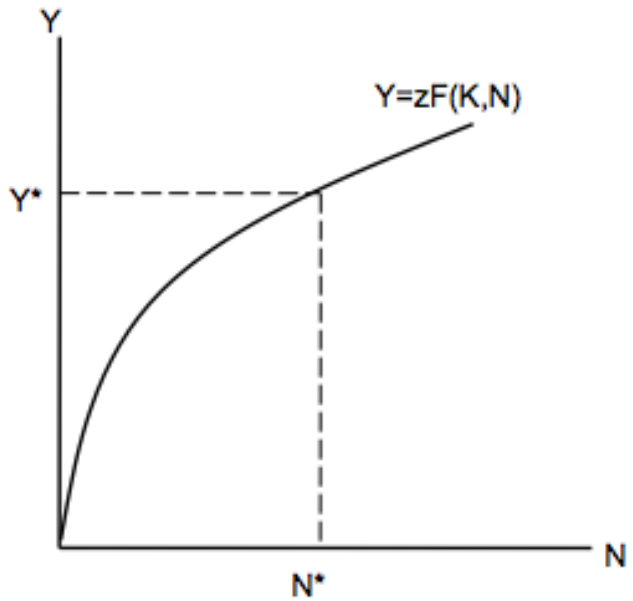
Equilibrium in the labor market

- N^s is sloped upwards with dominant substitution effect, given r.
- N^d is MPN for the firm.
- N*= equilibrium employment.



Aggregate output supplied

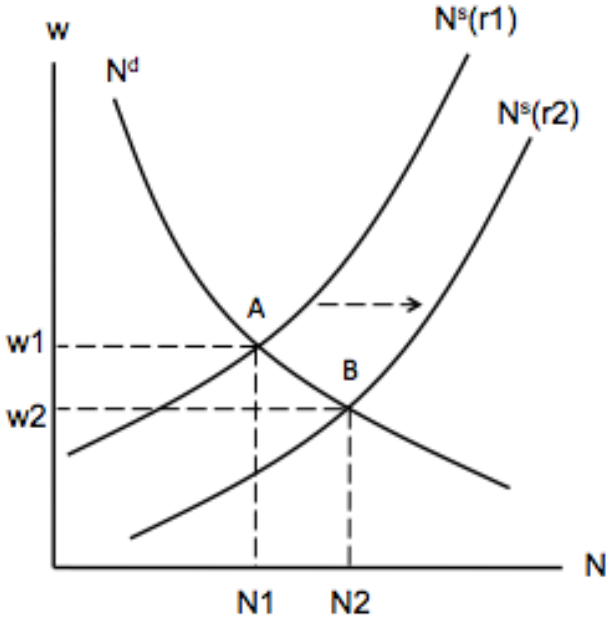
- With N* input, Y* is the quantity of aggregate output supplied, given z and K.

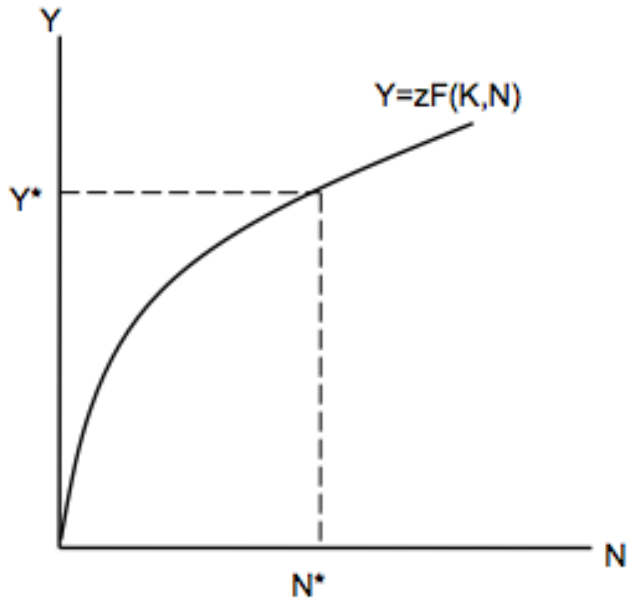


Output supply and real interest rate

- The relationship between the real interest rate and the level of aggregate output.
- An increase in the real interest rate causes a reduction in current consumption and leisure.
  - **The labor market:** current labor supply increases.
  - **The production function**: current aggregate output increases.
- The output supply curve is sloped upwards.

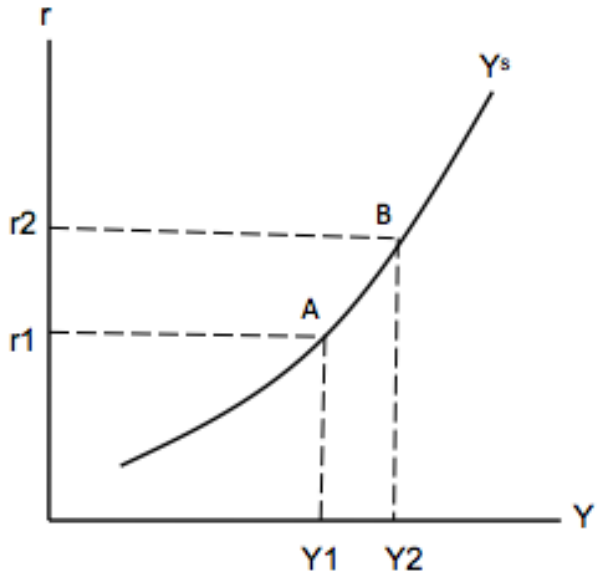
Employment and output





Output supply curve

- The higher r causes more labor supply, employment and output.
- The labor market is in equilibrium at each level of r.



Output supply shifts

- Changes in **exogenous variables** shift the output supply curve.
  - Lifetime wealth (labor supply shifts);
  - Current total factor productivity or current capital stock (labor demand and production function shifts).
- Changes in the real interest rate move along the output supply curve.

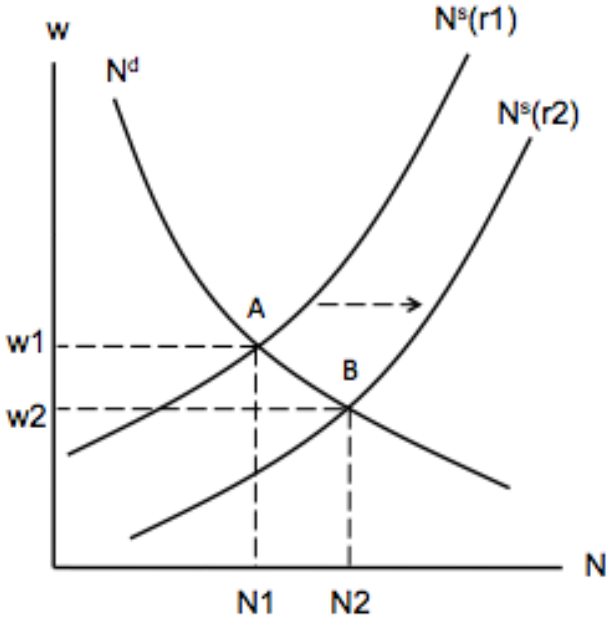
Changes in lifetime wealth

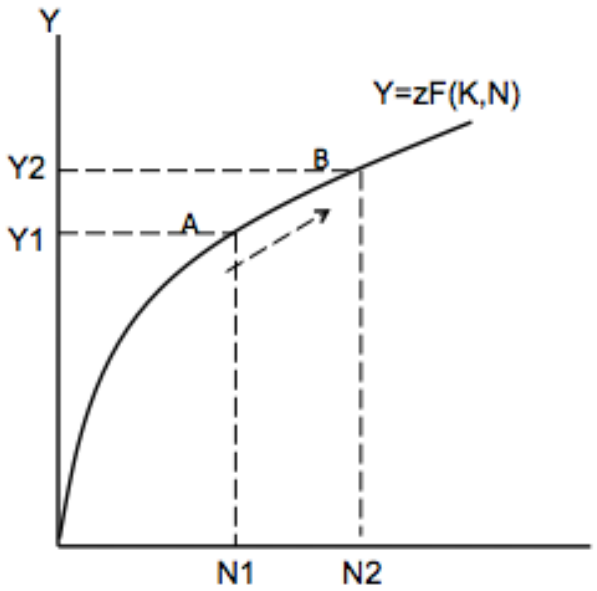
- A decrease in lifetime wealth reduces leisure (income effect) and increases labor supply, given the real wage.
  - Increases in current or future government spending reduce lifetime wealth.
  - The government PV budget constraint implies increases in the PV of taxes.

$$G + \frac{G'}{1+r} = T + \frac{T'}{1+r}$$

- **The labor market:**
  - The labor supply curve shifts to the right.
  - The real wage falls while employment increases.
- **The production function**:
  - More labor input increases production.
  - Output increases, given r.
- The output supply curve shifts to the right.

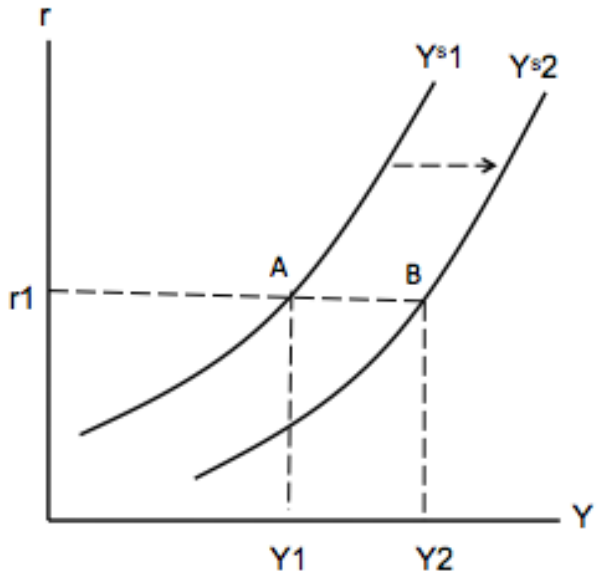
A decrease in lifetime wealth





Rising output supply for lower we

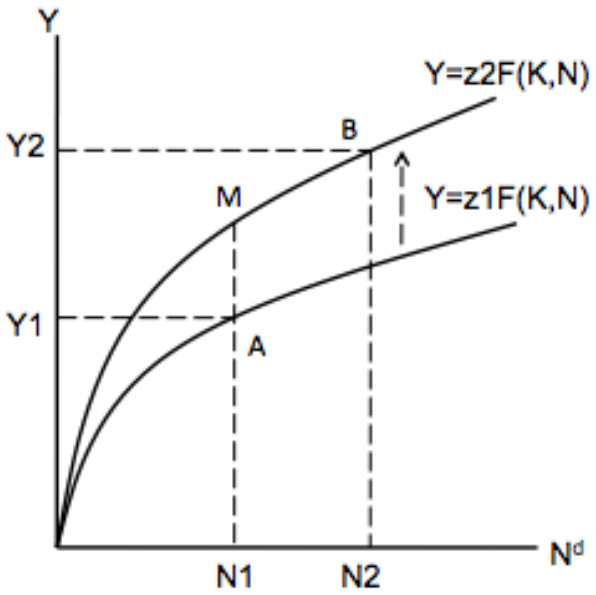
- Output supply increases, given r, when lifetime wealth decreases and labor supply increases.

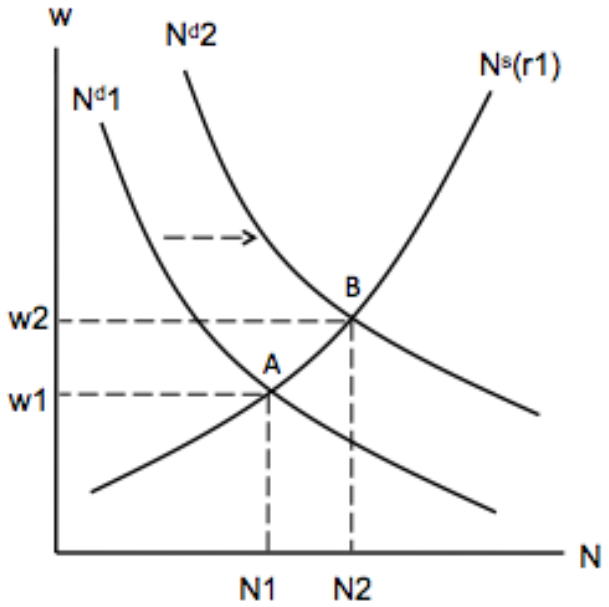


Changes in z or current K

- An increase in total factor productivity or current capital stock.
  - Marginal product of labor (MPN) increases.
  - The production function shifts up;
  - The labor demand curve shifts to the right.
  - Employment increases with the real wage.
  - Output increases, given the real interest rate. T
- he output supply curve shifts to the right.

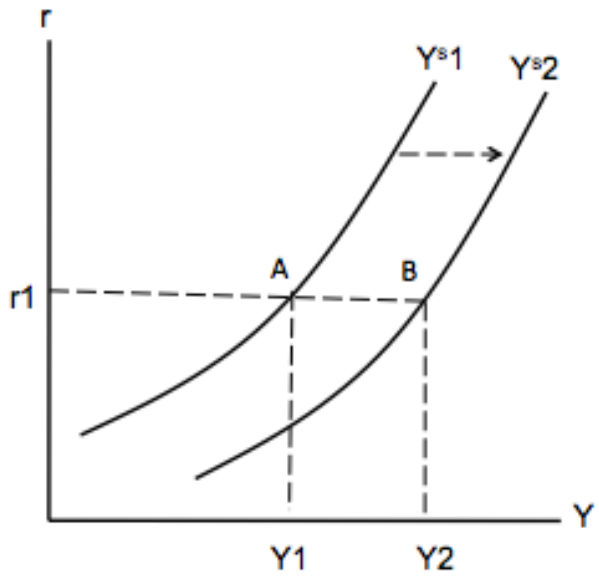
An increase in z or K





Rising output supply for higher z, K

- Higher z or K raises labour demand and the real wage.
- Rising employment and output supply, given r.

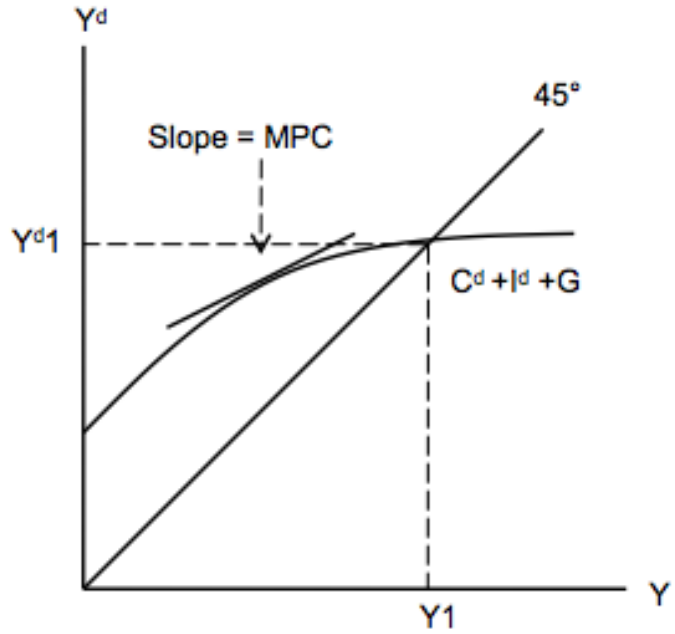


Total current demand for goods

- Total current demand for goods (Y^d) equals the sum of:
  - The consumer's demand for consumption goods (C^d);
  - The firm's demand for investment goods (I^d);
  - The government purchases of current goods (G).
- C^d and I^d are negatively related to the real interest rate.

$$Y^d = C^d(r) + I^d(r) + G$$

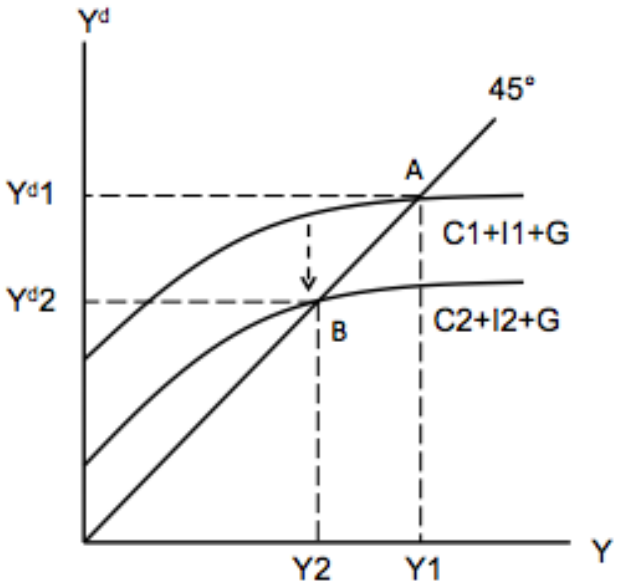
- I and G are not related to Y.
- The slope = MPC.
- Equilibrium Y^d = Y1.

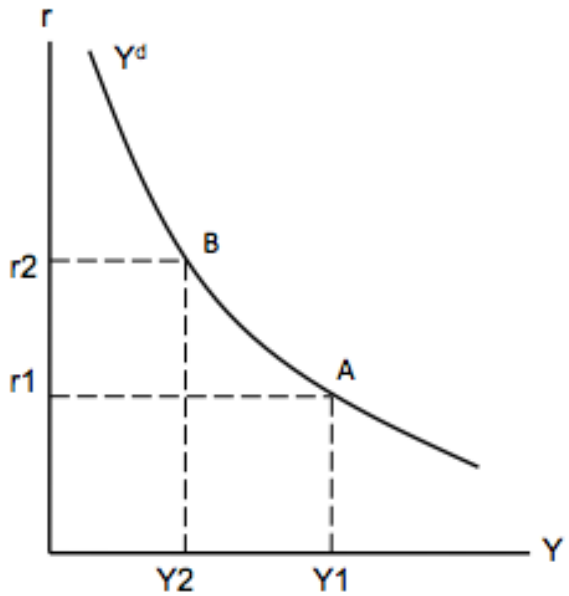


Output demand and real interest rate

- An increase in the real interest rate causes a reduction in demand for current output.
  - Shifts towards future consumption: falling demand for current consumption goods.
  - Lower optimal investment: higher opportunity cost of capital.
- The output demand curve is sloped downwards.

Output demand curve

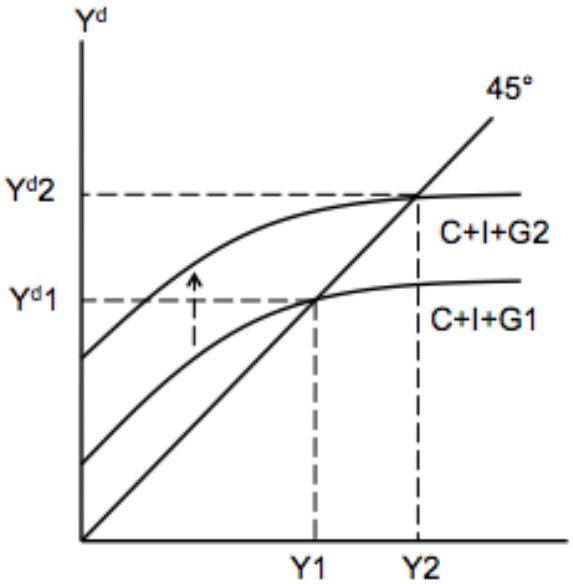


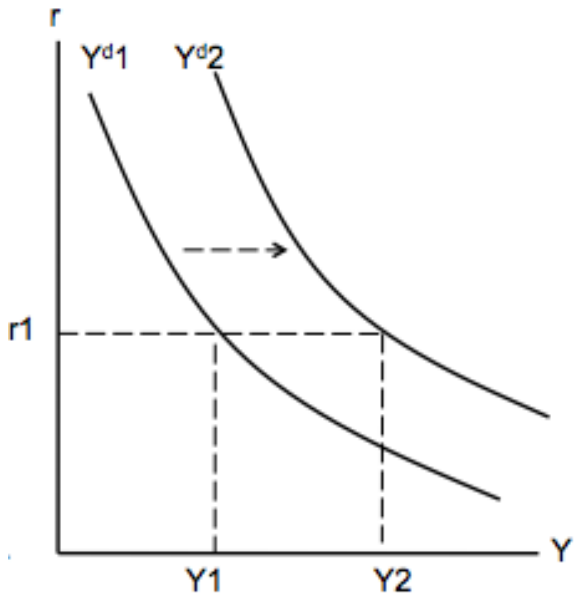


Rightward shifts in output demand curve

- An increase in current government purchases (G);
- A decrease in the PV of taxes (T or T');
- An increase in future income (Y');
- An increase in future total factor productivity (z') or a decrease in current capital stock (K).
- Higher future MP'_K and rising current I^d.

An increase in government spending





Complete real intertemporal model