

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

EE312

Macroeconomics, Stephen Williamson, Chapter 11

2015

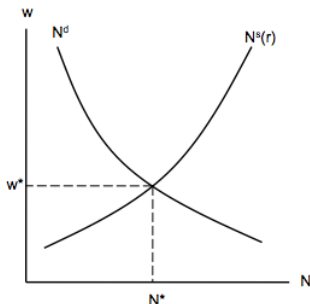
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- Real Intertemporal Model (Introduciton) (Part 1)
- The representative consumer: (Part 1)
- The representative firm : (Part 1)
- Government Sector (Part 1)
- Competitive Equilibrium (Part 2)
 - Competitive Equilibrium (introduction)
 - Equilibrium 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
- Shock Experiment (Part 3)

- 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.

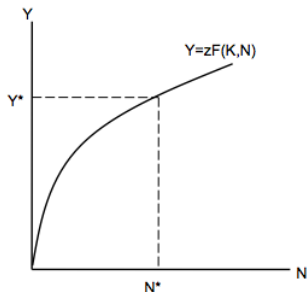
Equilibrium in the labor market

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



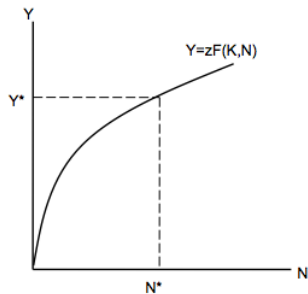
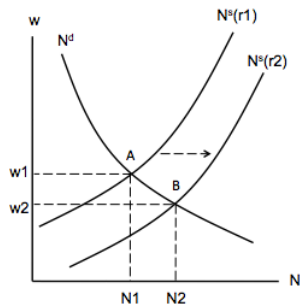
Aggregate output supplied

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



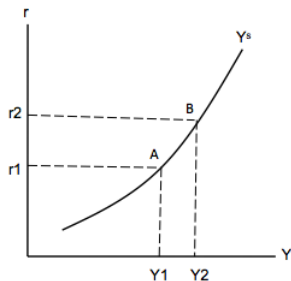
- The relationship between the real interest rate and the level of aggregate output.
- An increase in the real interest rate causes a reduction in current consumption and leisure.
 - **The labor market:** current labor supply increases.
 - **The production function:** current aggregate output increases.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



- 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.

- 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.

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

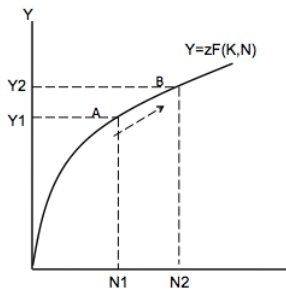
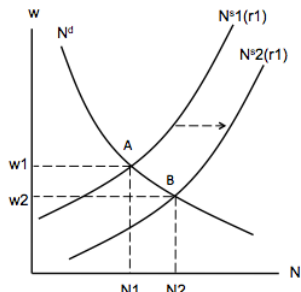
- **The labor market:**

- The labor supply curve shifts to the right.
- The real wage falls while employment increases.

- **The production function:**

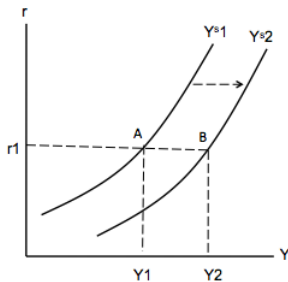
- More labor input increases production.
 - Output increases, given r .
- The output supply curve shifts to the right.

A decrease in lifetime wealth



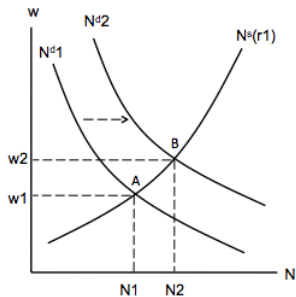
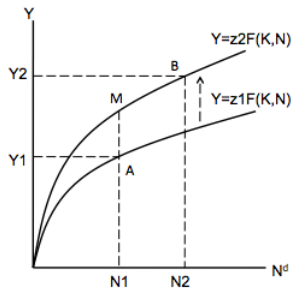
Rising output supply for lower w

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



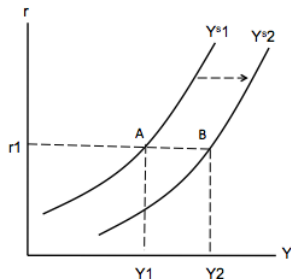
- An increase in total factor productivity or current capital stock.
 - Marginal product of labor (MPN) increases.
 - The production function shifts up;
 - The labor demand curve shifts to the right.
 - Employment increases with the real wage.
 - Output increases, given the real interest rate. T
- The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

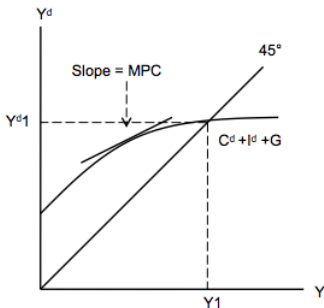


Total current demand for goods

- 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.

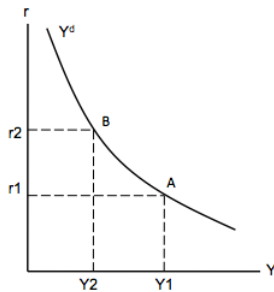
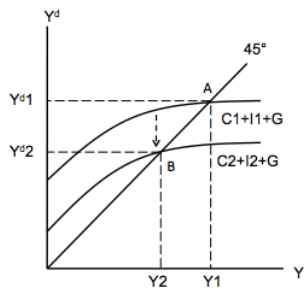
$$Y^d = C^d(r) + I^d(r) + G$$

- I and G are not related to Y.
- The slope = MPC.
- Equilibrium $Y^d = Y_1$.



- 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.

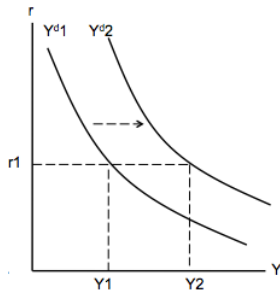
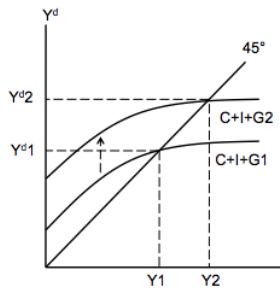
Output demand curve



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

