# EE312
# Aggregate Supply and Aggregate Demand :Classical Model

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# Classical Macroeconomics

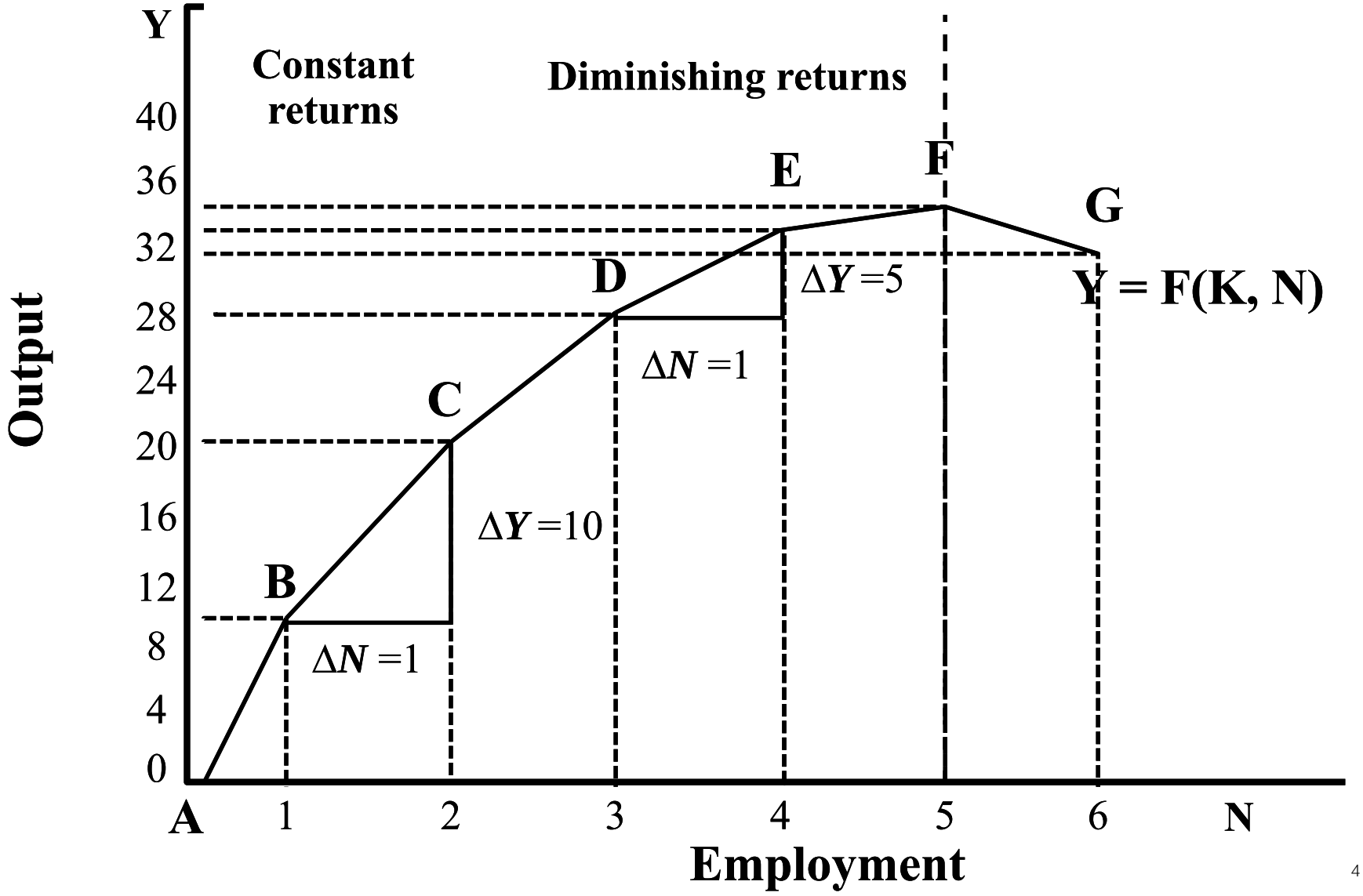
- Aggregate Supply
  (from production and employment)

- Aggregate Demand
  (from Quantity Theory)

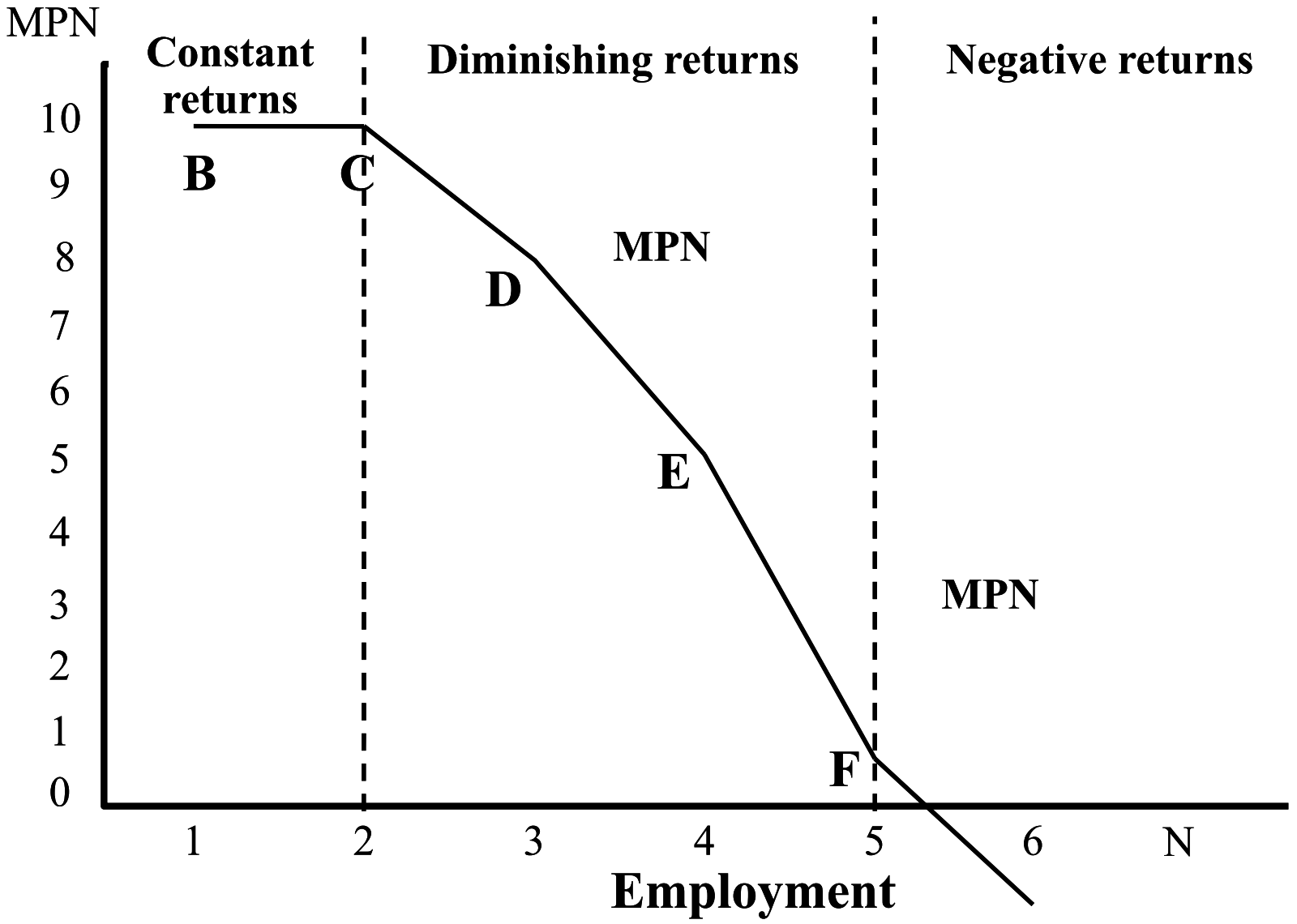
# The Relationship Between Output, Fixed Capital Stock, and Labor

| | $N = Labor$ | $Y = Output$ | $\Delta Y/\Delta N = MPN$ | |
|---|---|---|---|---|
| **A** | 0 | 0 | | |
| **B** | 1 | 10 | 10 | |
| **C** | 2 | 20 | 10 | Constant returns |
| **D** | 3 | 28 | 8 | Diminishing returns |
| **E** | 4 | 33 | 5 | |
| **F** | 5 | 34 | 1 | |
| **G** | 6 | 32 | -2 | Negative returns |

# Production Function



# Marginal Product of Labor



Employment :Profit maximizing firm hires labor up to the point where marginal cost equals marginal revenue.

Suppose W = 16/ day

$\Delta Y/\Delta N$ = 8 units = Marginal product of labor

Marginal cost of producing one more unit = 16/8 = 2

or MC = W/MPN

In competitive market: Marginal revenue = Price

At profit maximization point: $MC = MR = P$

$W/MPN = MC = P$

$W/MPN = P$

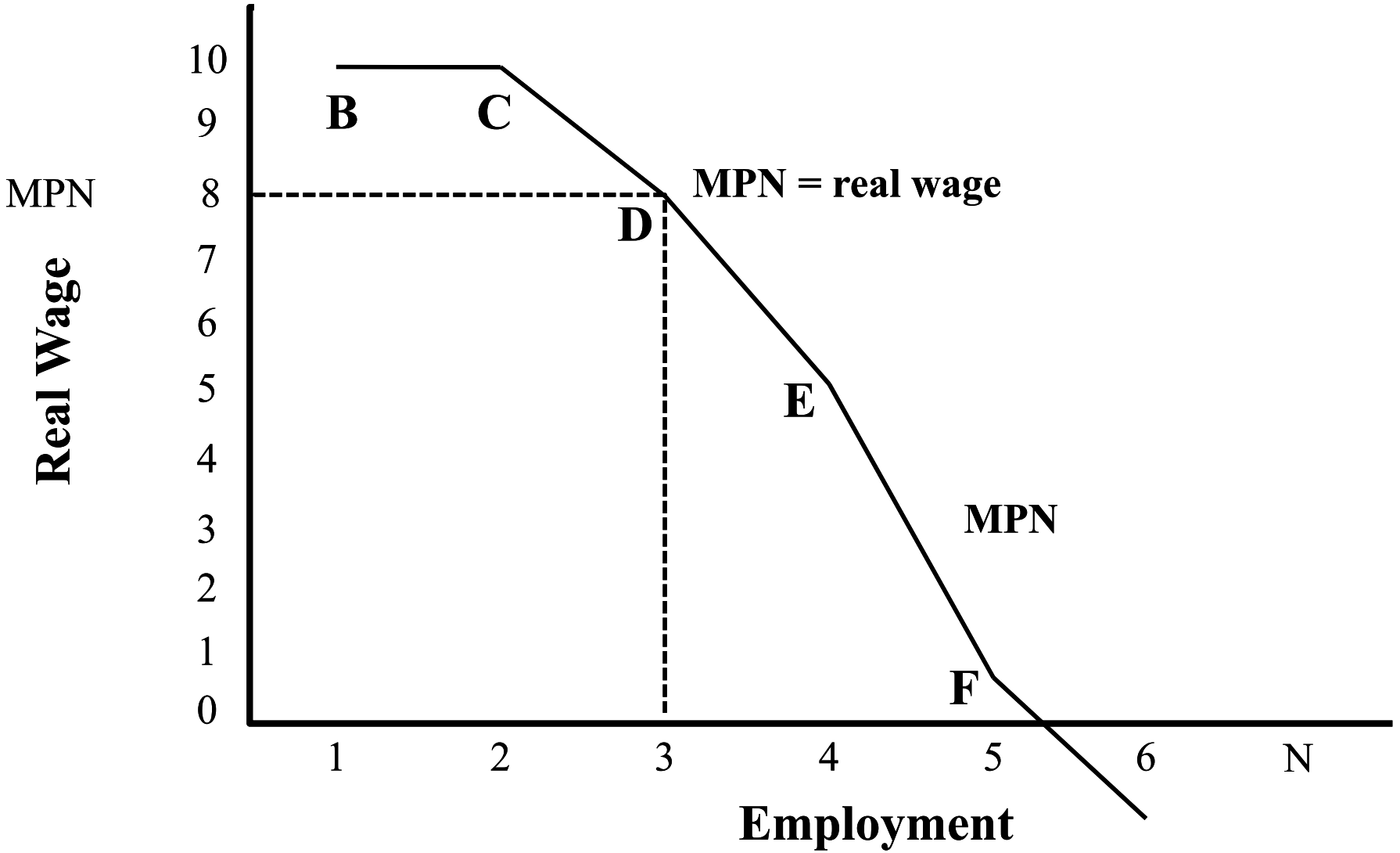
$W/P = MPN$

or $MC = W/P = MPN$

>> Real wage paid by the firm is equal to the marginal product of labor.

Demand for labor: $N^d = f(W/P)$

# Firm's Demand for Labor



# Example: Profit Maximization Employment

At point D : MPN=8 and suppose W=16

If price P = 3 then (MPN × P) = (8 × 3)= 24 > W(=16)
Since (MPN × P) > W firm should increase employment.

If price P = 1 then (MPN × P) = (8 × 1)= 8 < W(=16)
Since (MPN × P) < W firm should decrease employment.

When price P = 2 then (MPN × P) = (8 × 2) = 16= W(=16)
Since (MPN × P) = W firm stays in equilibrium.

With profit maximization, firm hires labor at the point
where MPN × P = W
Or MPN = W/P

Example (continued)

1. If W = 16 and P = 2 , then W/P = 8

   With W/P = 8 , firm hires labor = 3
   because at N = 3 , MPN = 8.

   When MPN = W/P , employment (N) is in equilibrium.

2. If W = 16 and P = 3, then W/P = 16/3 = 5.33

With W/P = 5.33 , if firm hires N = 3
where MPN = 8, then MPN > W/P or MPN > MC.

It will be worthwhile for the firm to hire more labor.

When MPN > W/P , firm will increase employment (N↑).

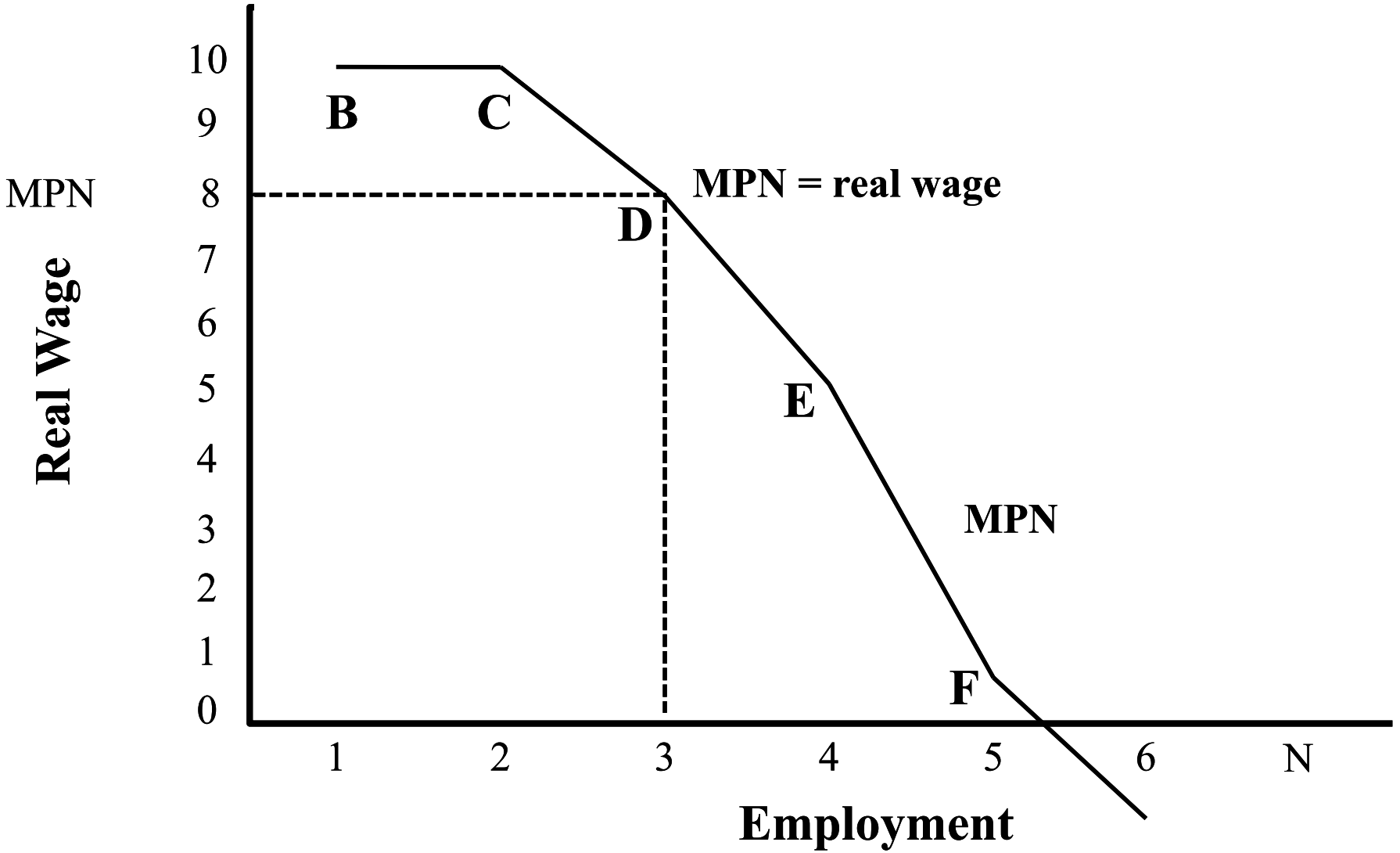
3. If W = 16 and P = 1.7 , then W/P = 16/1.7 = 9.41

With W/P = 9.41 if firm hires N = 3
where MPN = 8, then MPN < W/P or MPN < MC.

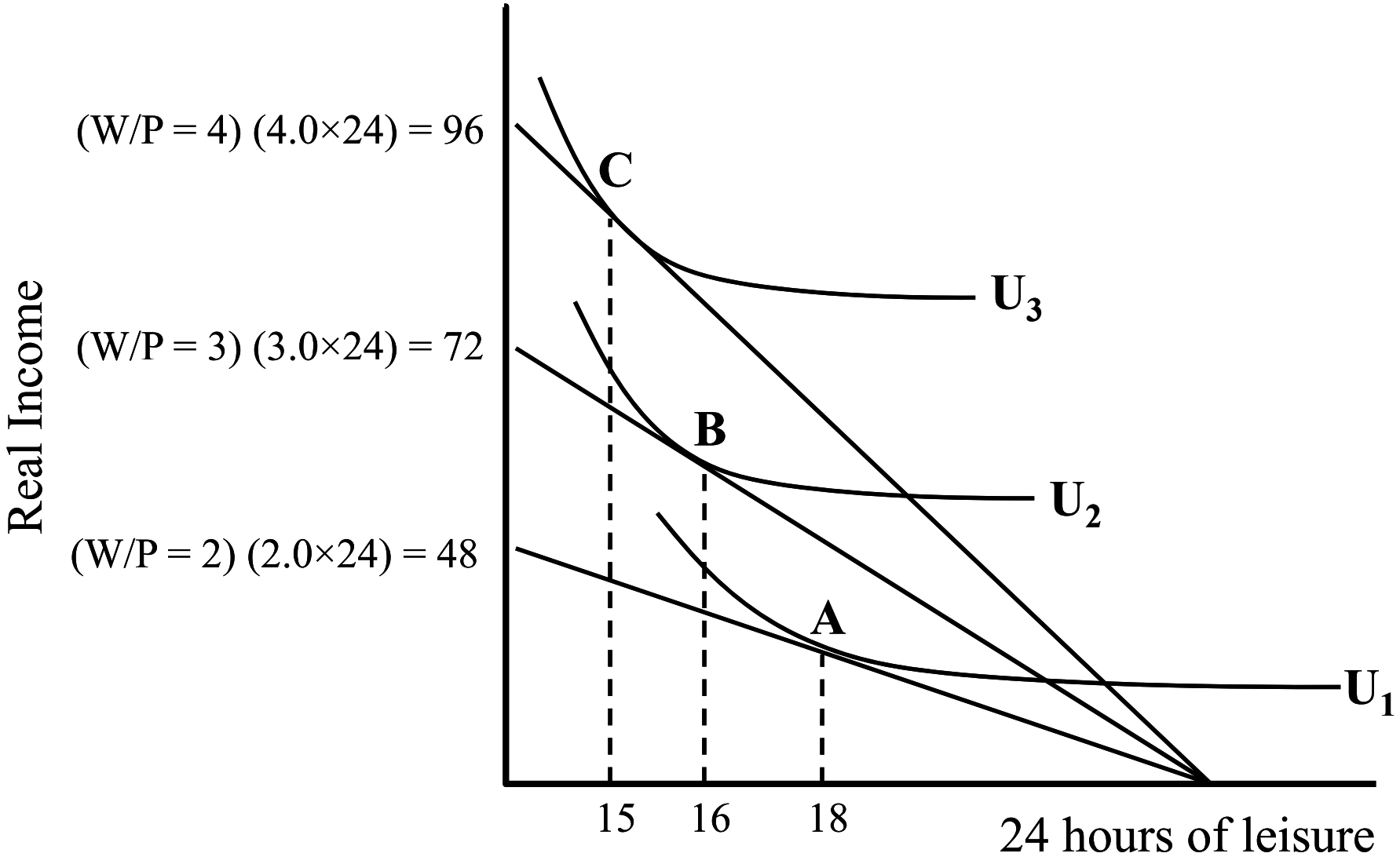
It is not profitable for firm to hire N = 3, but firm should hire less labor.

When MPN < W/P, firm will decrease employment (N↓).

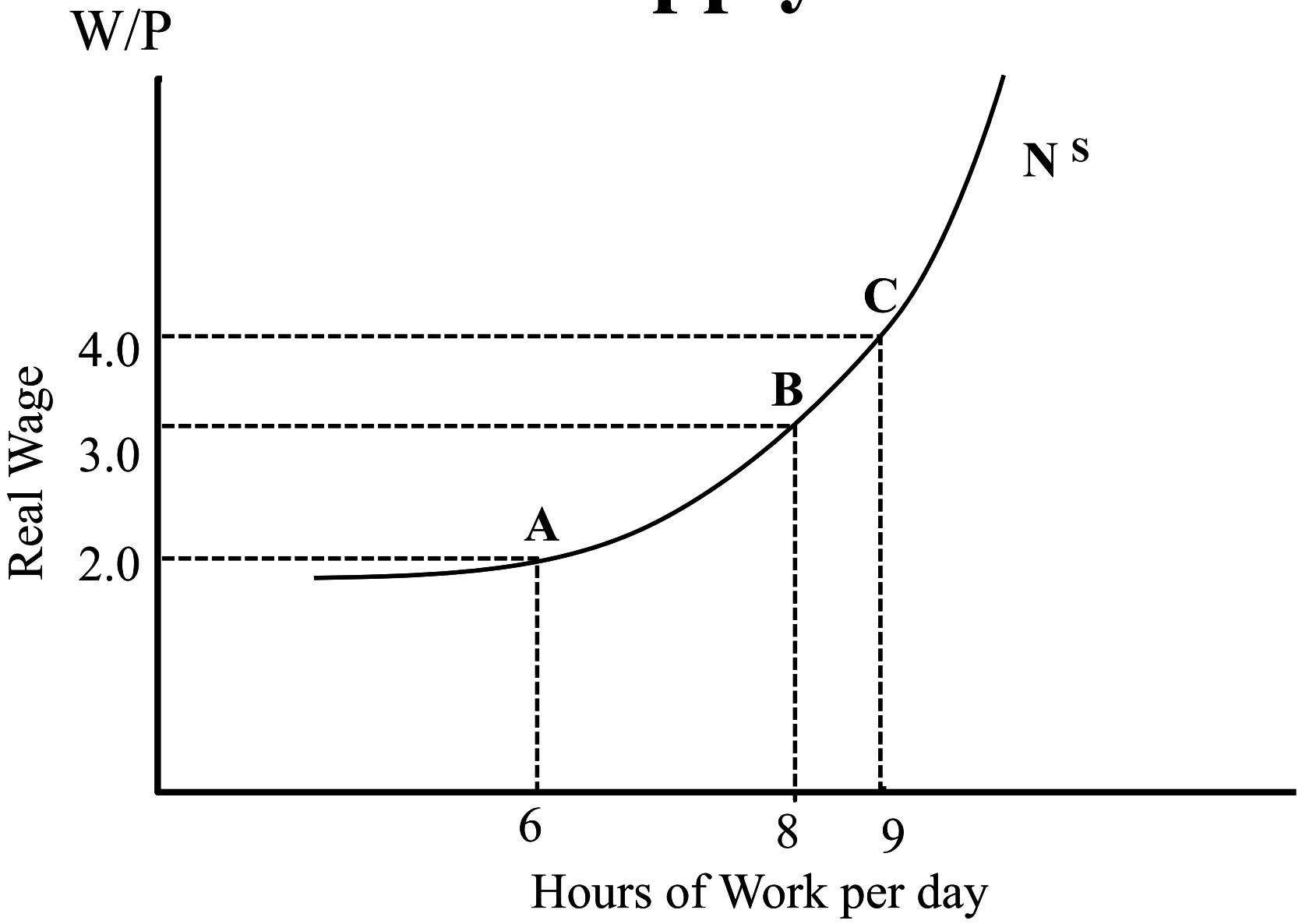
# Firm's Demand for Labor



# Income-leisure Trade-Off



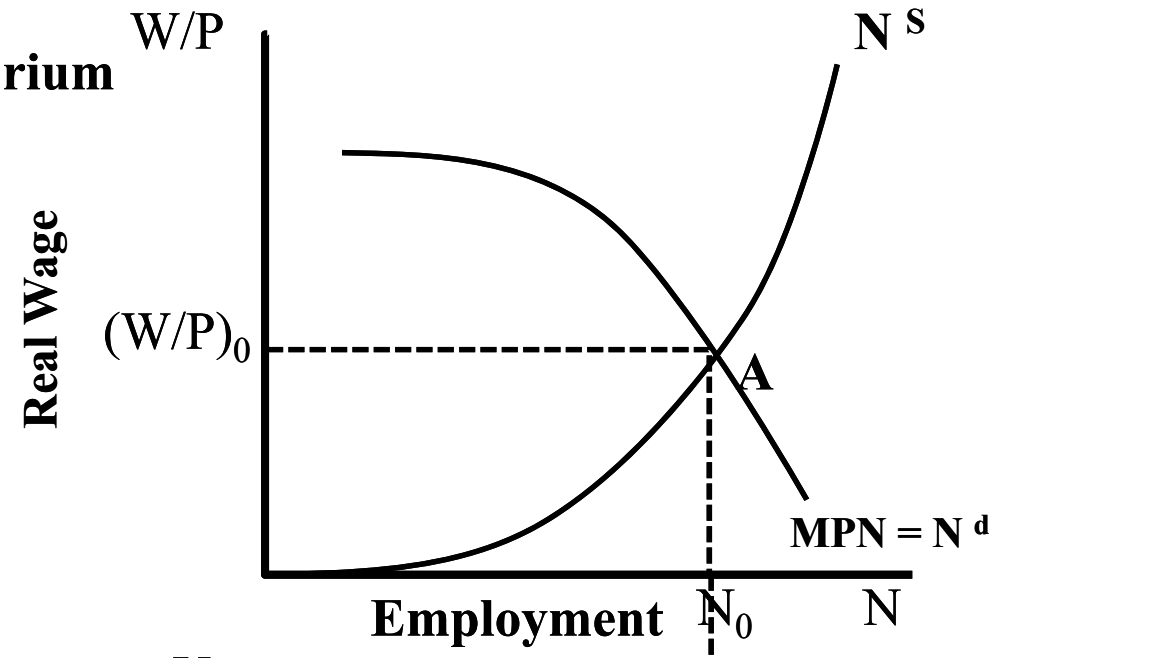
# Labor Supply Curve



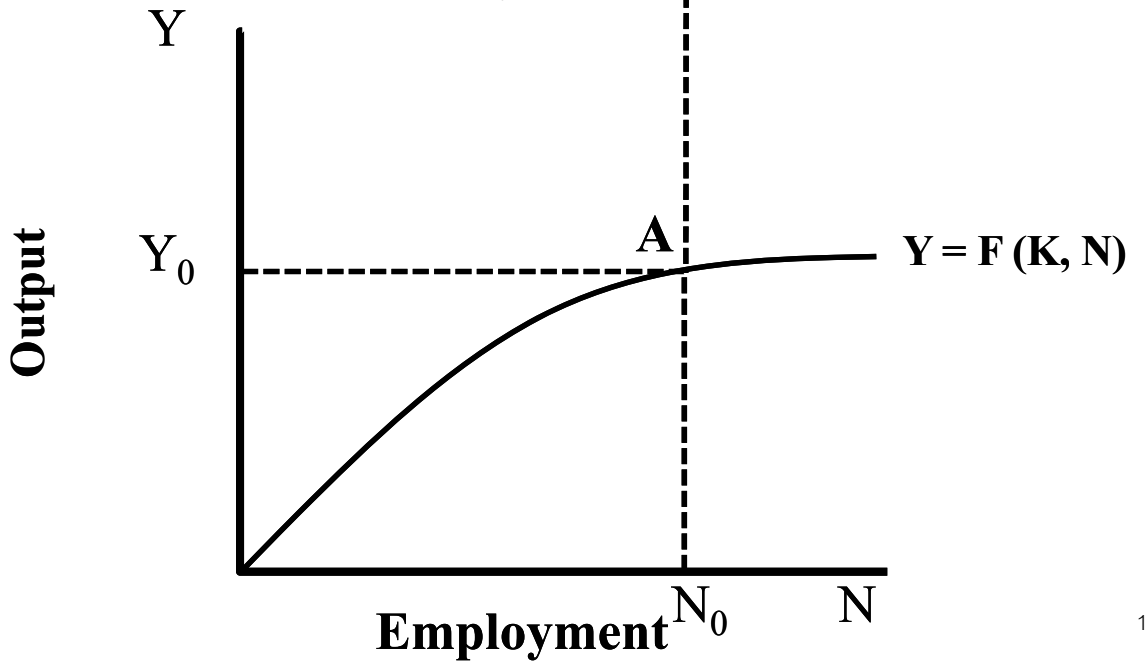
# Assumptions in the Classical model

1. Markets are perfectly competitive.
2. Producers maximize profit.
3. Consumers/workers maximize utility.
4. There is no “money illusion”.
5. Prices and wages are perfectly flexible.
6. All market participants have perfect information.

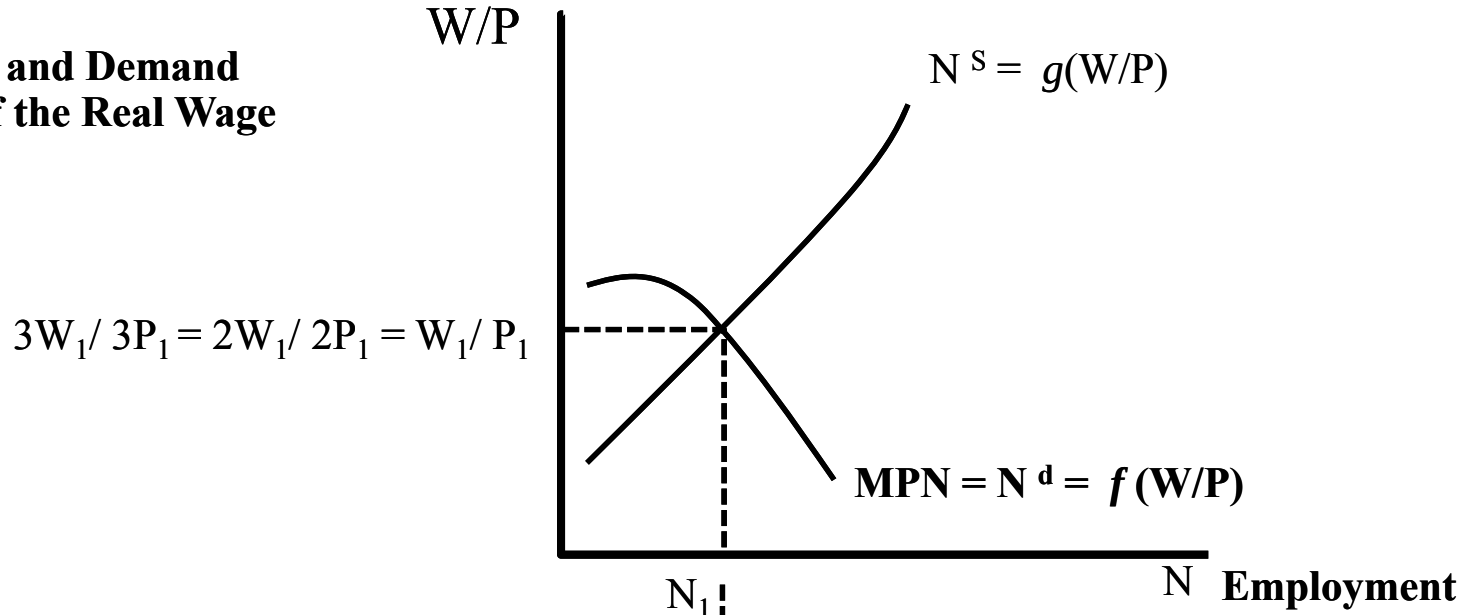
**a. Labor Market Equilibrium**



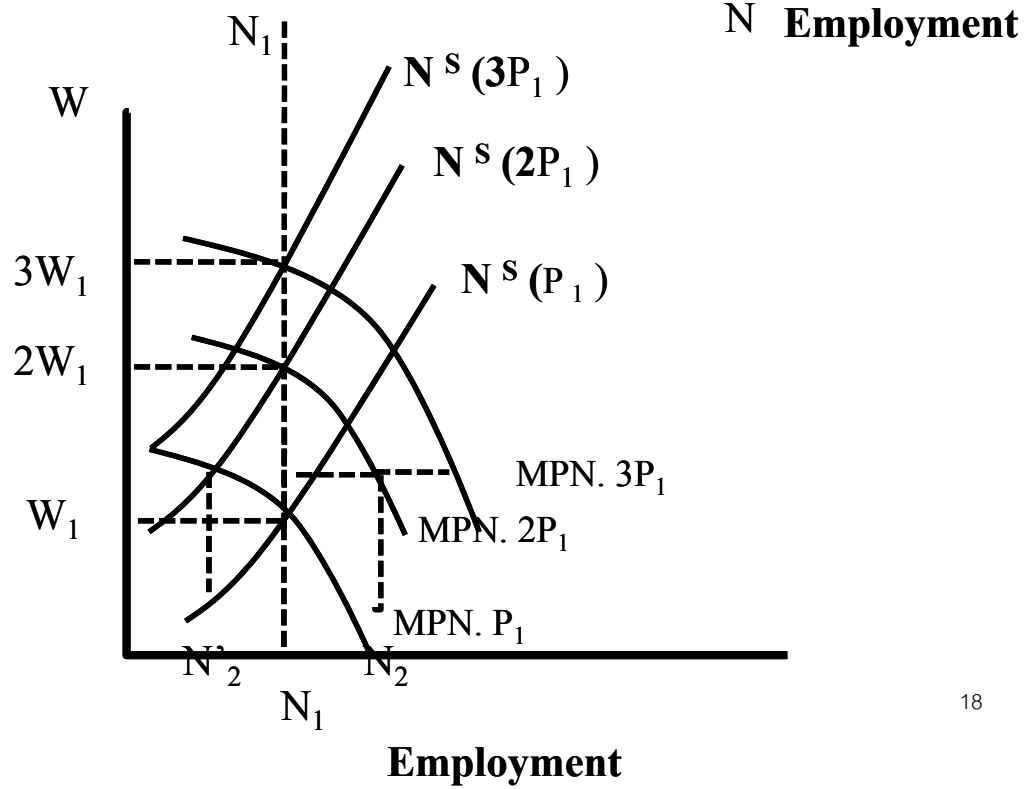

**b. Output Equilibrium**



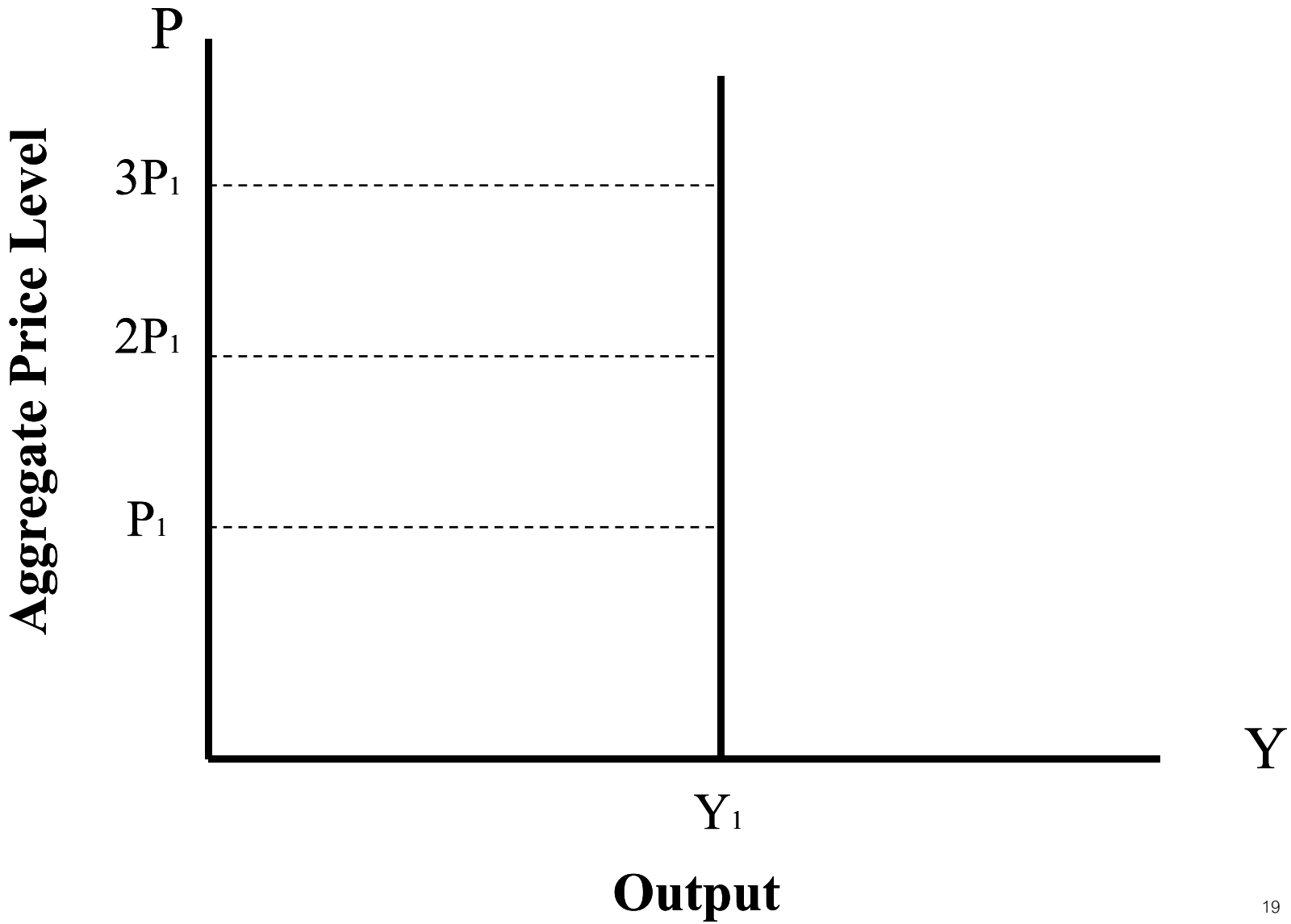
**a. Labor Supply and Demand as Function of the Real Wage**




**b. Labor Supply and Demand as Function of the Money Wage**



# Classical Aggregate Supply Curve



# Classical theory of aggregate price level determination and Aggregate Demand

- In the classical theory , the quantity of money determines aggregate demand , which in turn determines the price level.

# Quantity Theory of Money

Equation of Exchange

$$MV_T \equiv P_T T$$

$$V_T \equiv \frac{P_T T}{M}$$

# Example on velocity of money

- Over a given period, let the value of transactions equals 3,600 billion baht.
- Suppose the money supply (Ms) is 300 bb.
- Velocity= (PxT)/Ms
- = 3,600/ 300
- V = 12

# Another expression of the equation of exchange focuses on income transactions

$$MV = PY$$

$$V \equiv \frac{PY}{M}$$

$$M\bar{V} = P\bar{Y}$$

$$P = \frac{\bar{V}}{Y} M$$

# Quantity Theory of Money

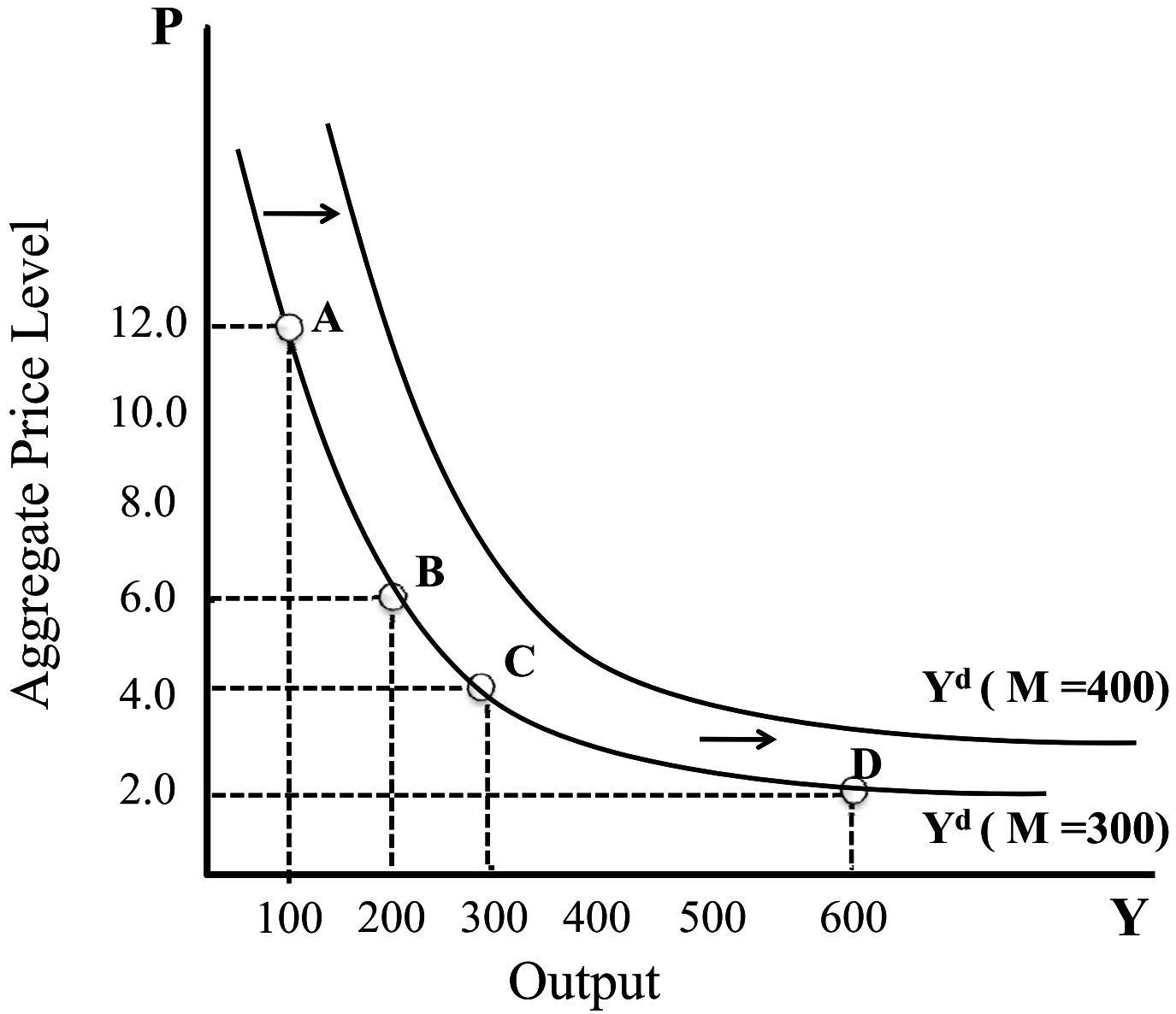
Cambridge Approach

$$M^d = kPY$$

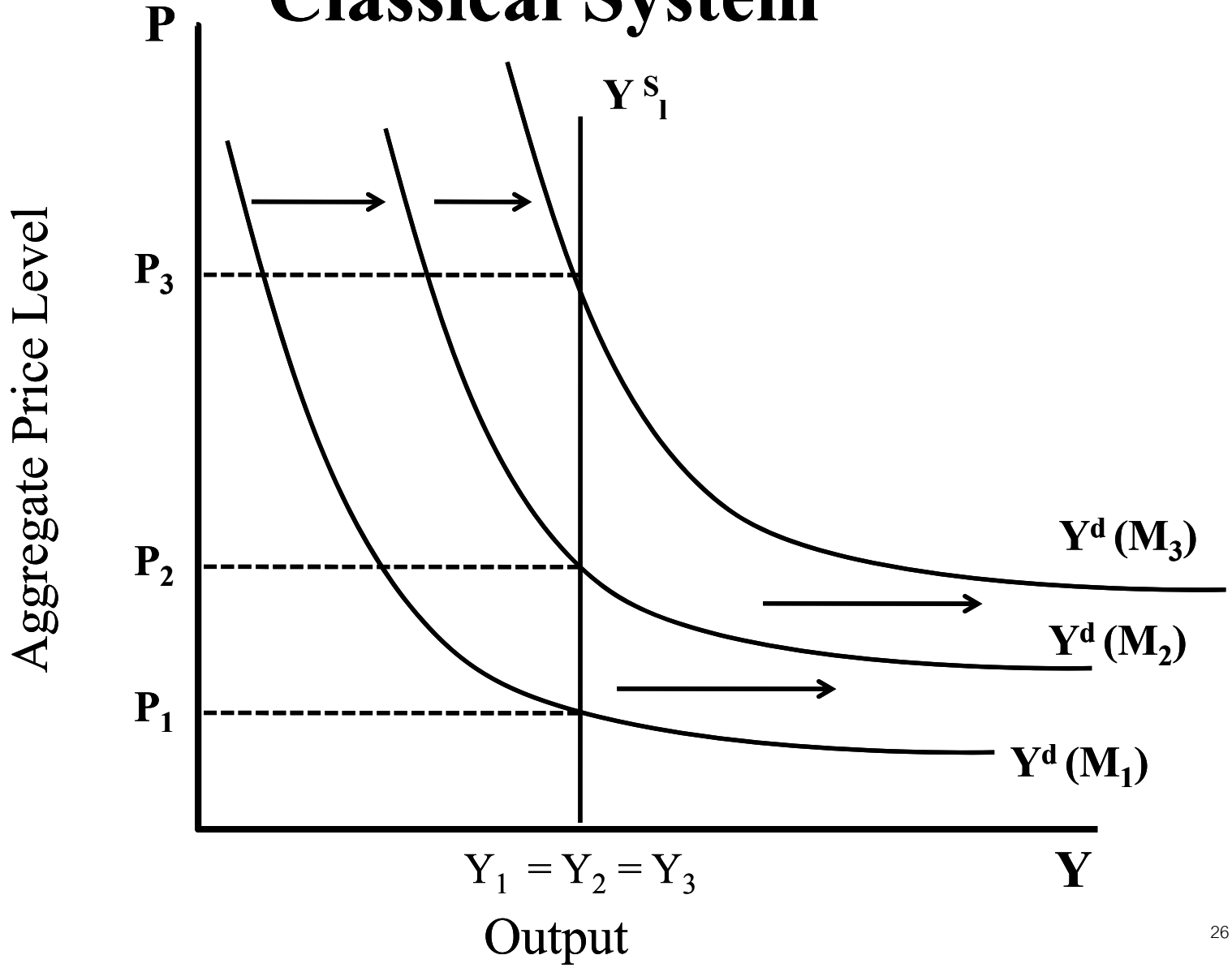
$$M = M^d = k\overline{PY}$$

$$M\frac{1}{k} = \overline{PY}$$

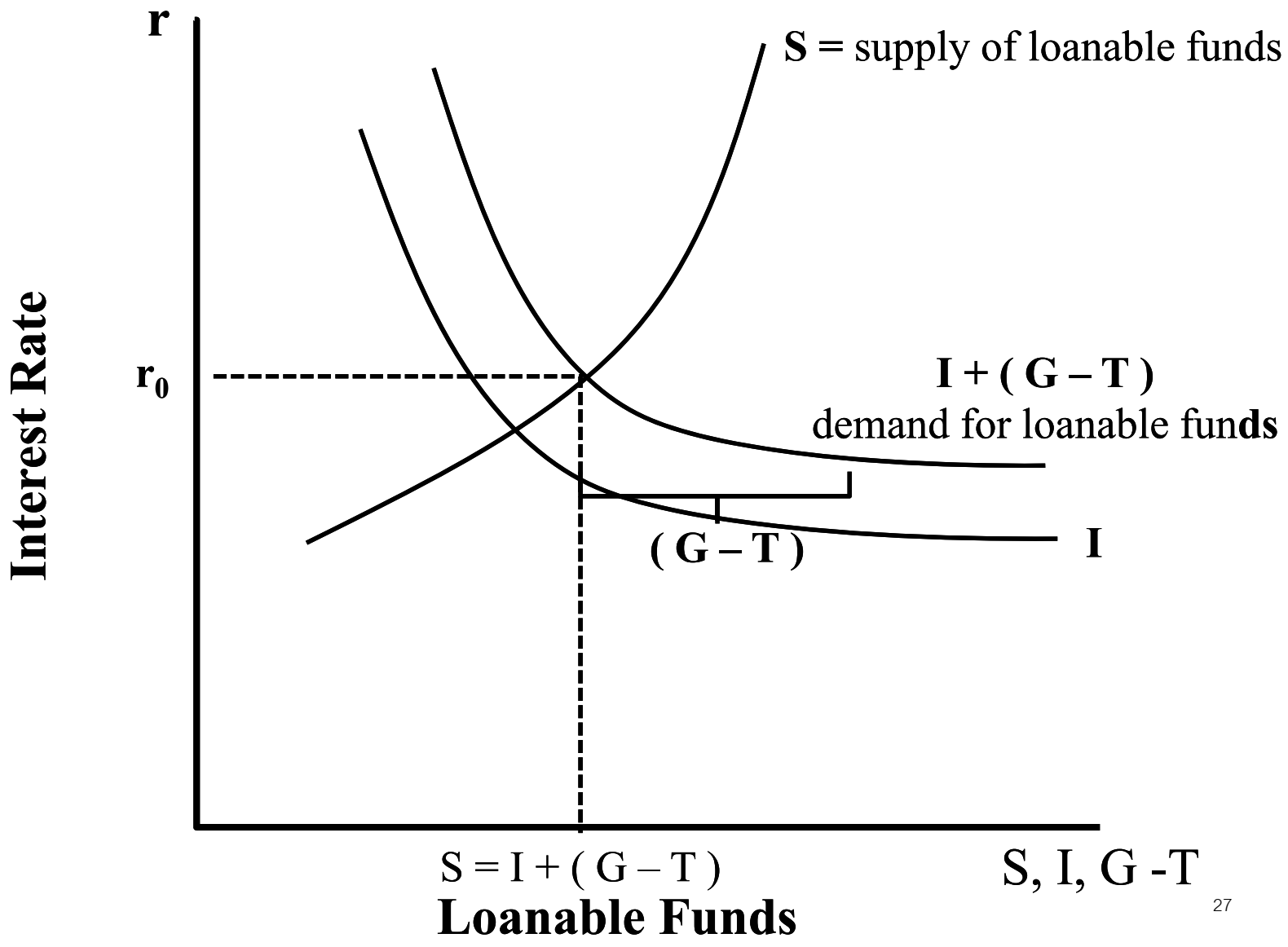
# Classical Aggregate Demand Curve



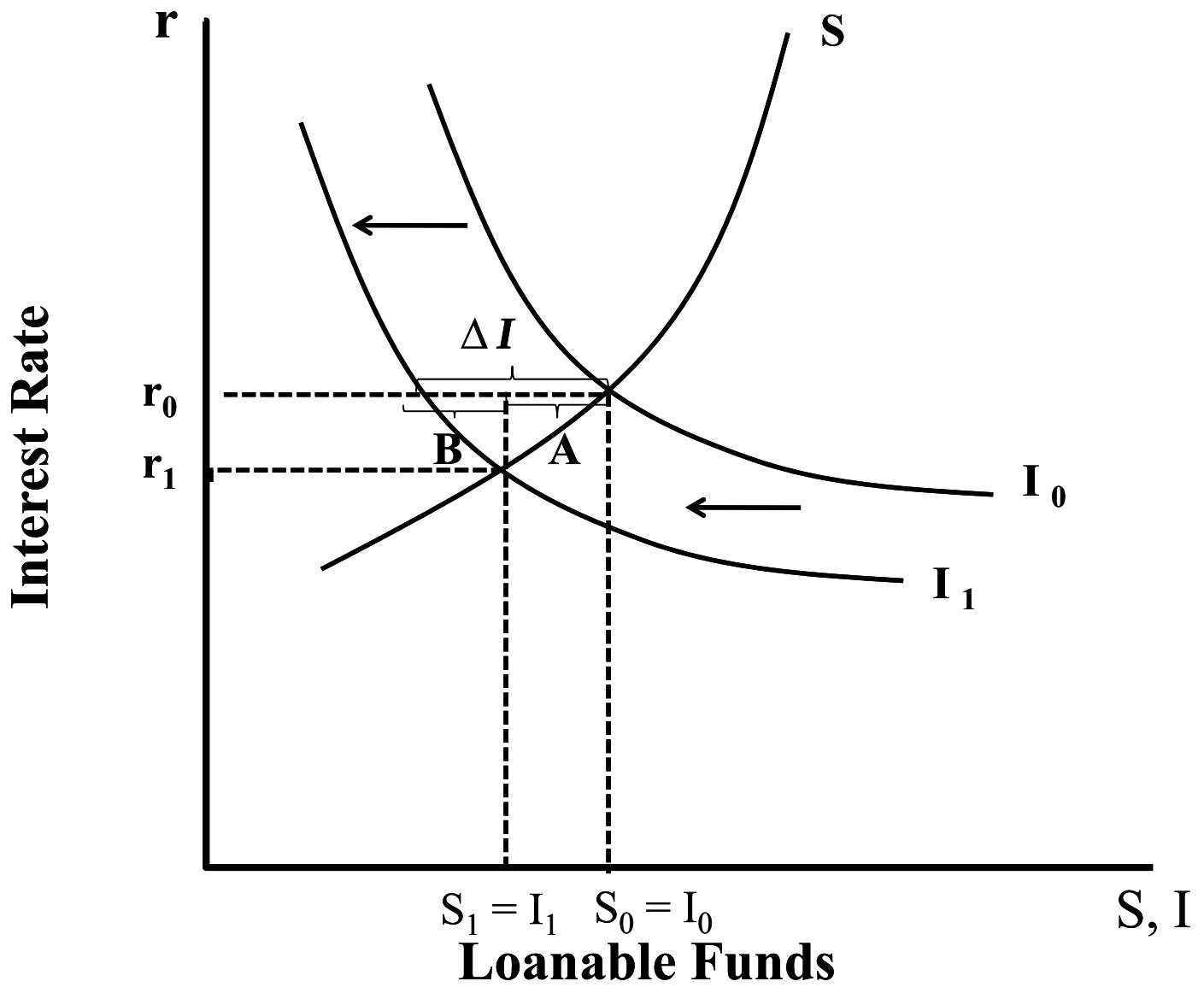
# Aggregate Supply and Demand in the Classical System



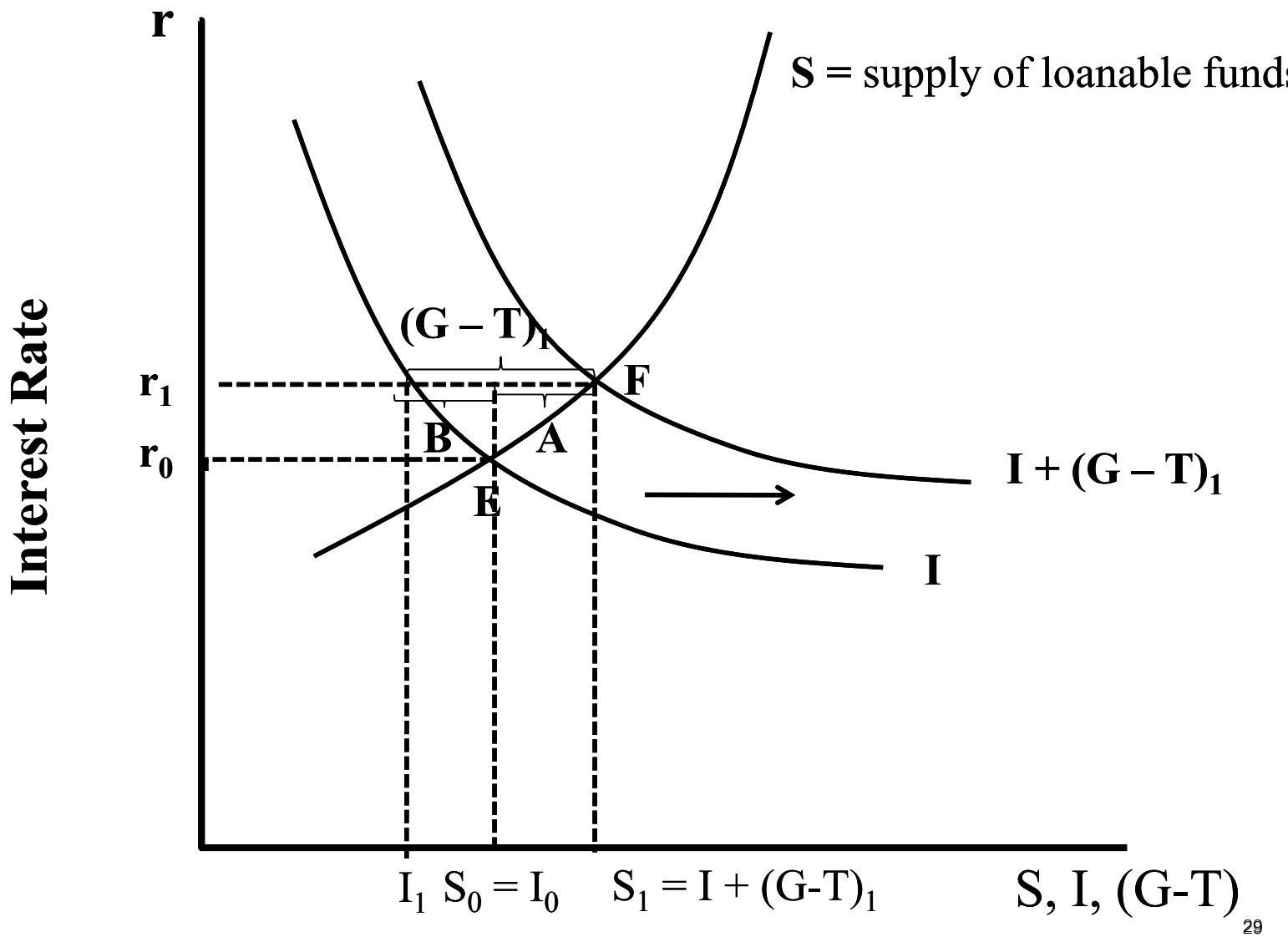
# Interest Rate Determination in the Classical System



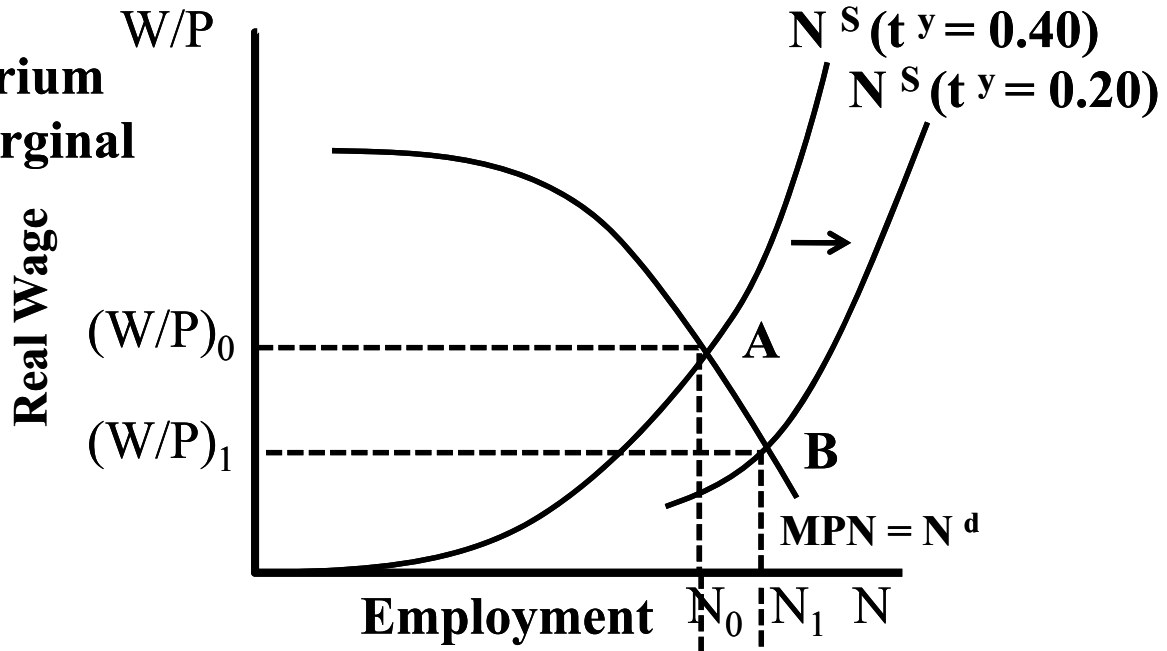
# Autonomous Decline in Investment Demand



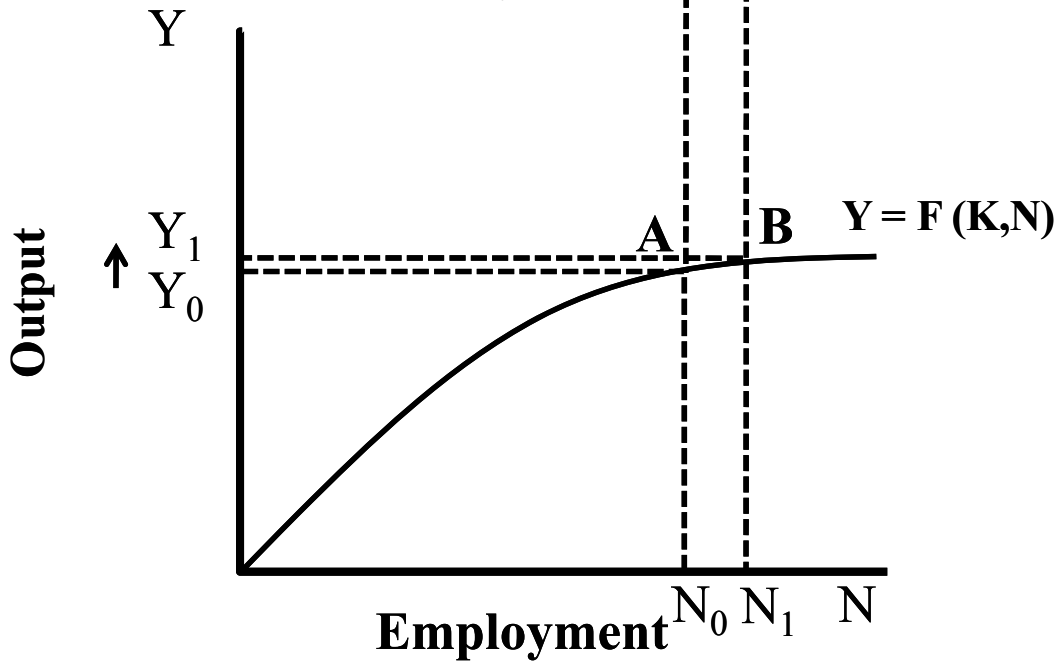
# Effect of an Increase in Government Spending in the Classical Model



**a. Labor Market Equilibrium with Changes in the Marginal Income tax Rate**




**b. Production Function**



# Classical Aggregate Supply and Aggregate Demand: Effect of a decrease in tax rate