

EE312: Aggregate Supply and Aggregate Demand :Classical Model

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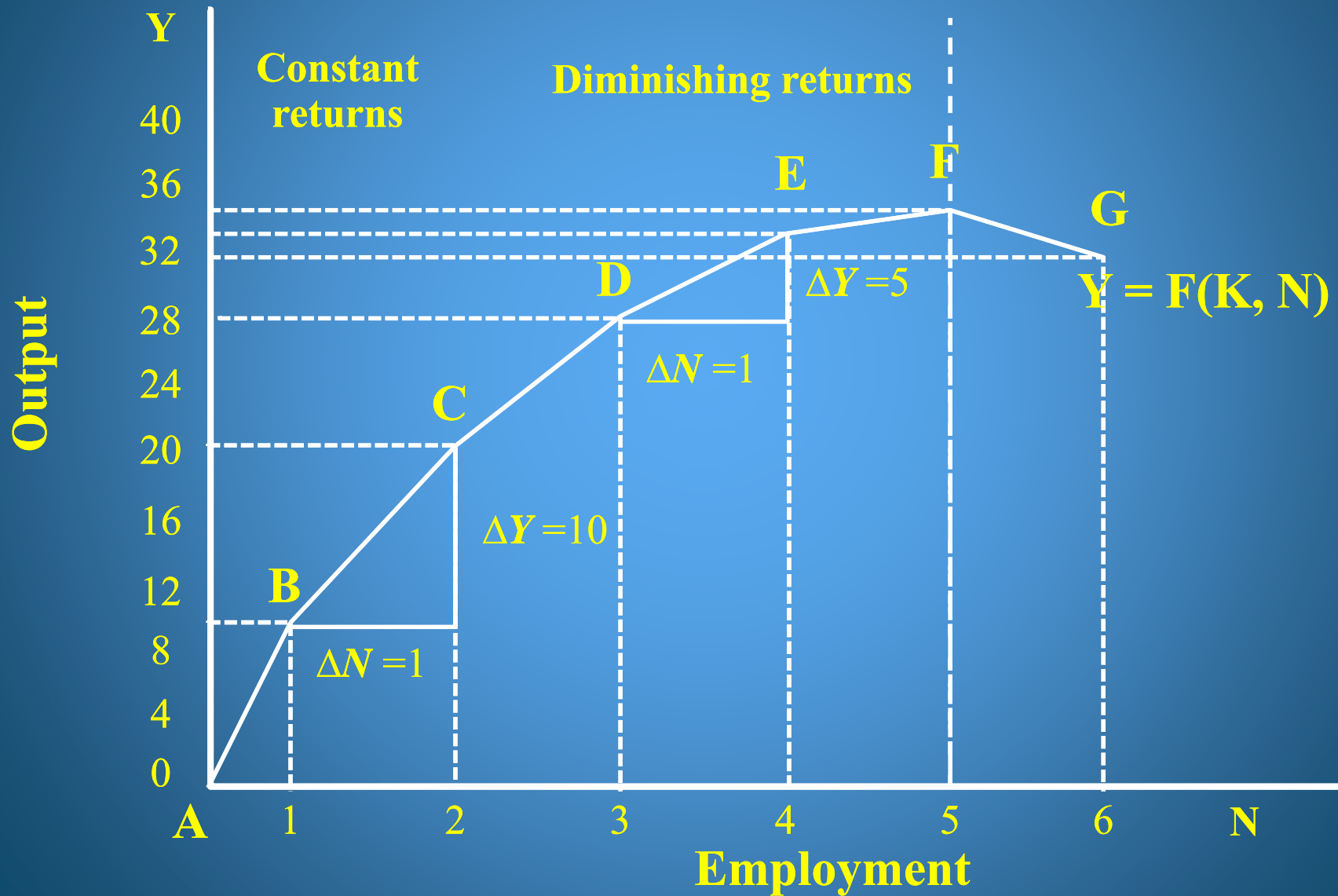
Classical Macroeconomics

- Aggregate Supply
(from production and employment)
- Aggregate Demand
(from Quantity Theory)

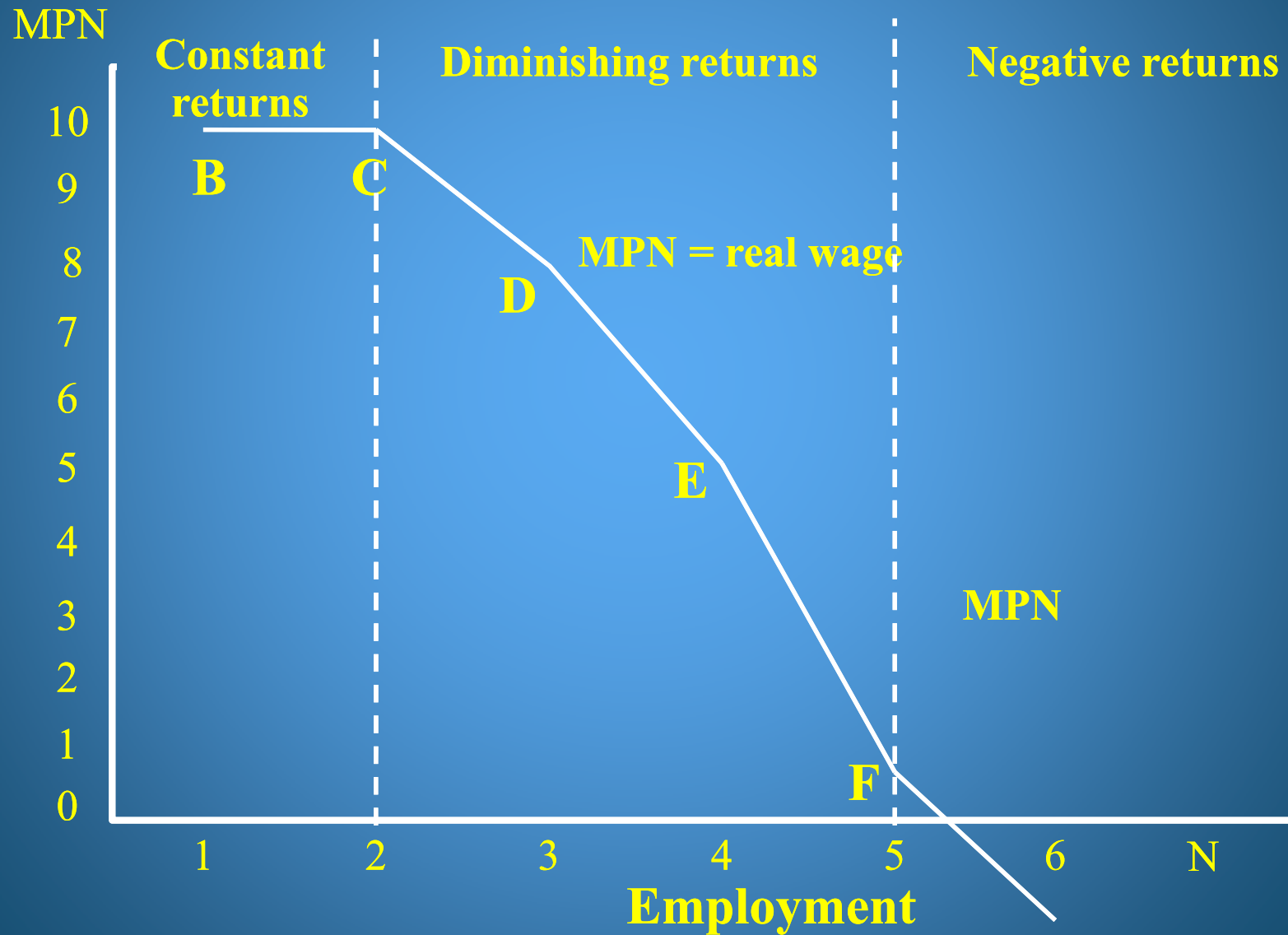
The Relationship Between Output, Fixed Capital Stock, and Labor

	<i>N = Labor</i>	<i>Y = Output</i>	$\Delta Y / \Delta N$ $= MPN$	
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 $W = 16/\text{day}$

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

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

or $MC = W/MPN$

In competitive market: Marginal revenue = Price

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

$$MC = W/MPN = P$$

$$W/MPN = P$$

$$W/P = MPN$$

or $MC = W/P = MPN$

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

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

Example: Profit Maximization Employment

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

If price $P = 3$ then $MPN \times P = (8 \times 3) = 24 > W (=16)$

Since $MPN \times P > W$ firm should increase employment.

If price $P = 1$ then $MPN \times P = (8 \times 1) = 8 < W (=16)$

Since $MPN \times P < W$ firm should decrease employment.

When price $P = 2$ then $MPN \times P = (8 \times 2) = 16 = W (=16)$

Since $MPN \times P = W$ firm stays in equilibrium.

With profit maximization, firm hires labor at the point

where $MPN \times P = W$

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 ($N \uparrow$).

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

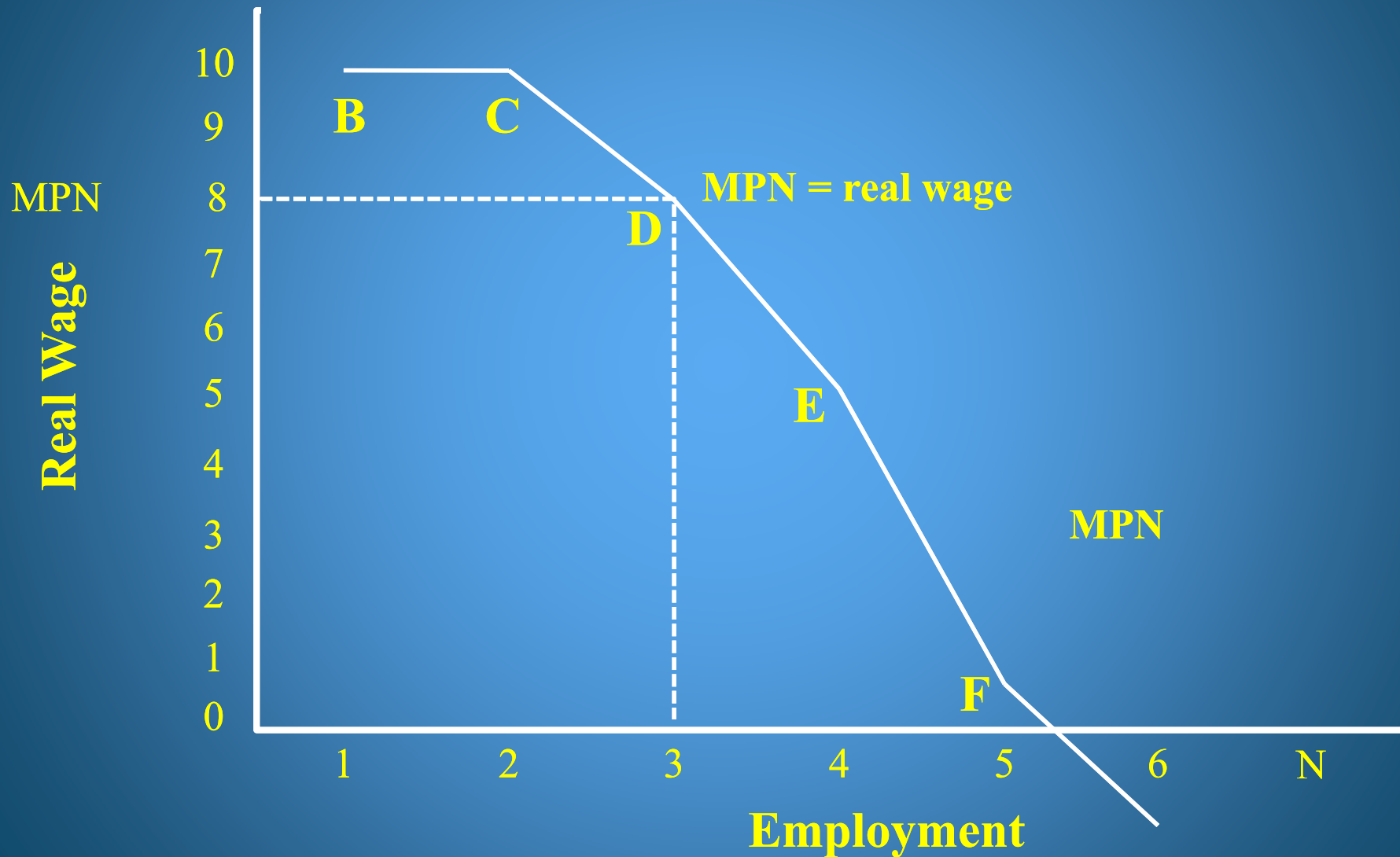
With $W/P = 9.41$ if firm hires $N = 3$

where $MPN = 8$, then $MPN < W/P$ or $MPN < MC$.

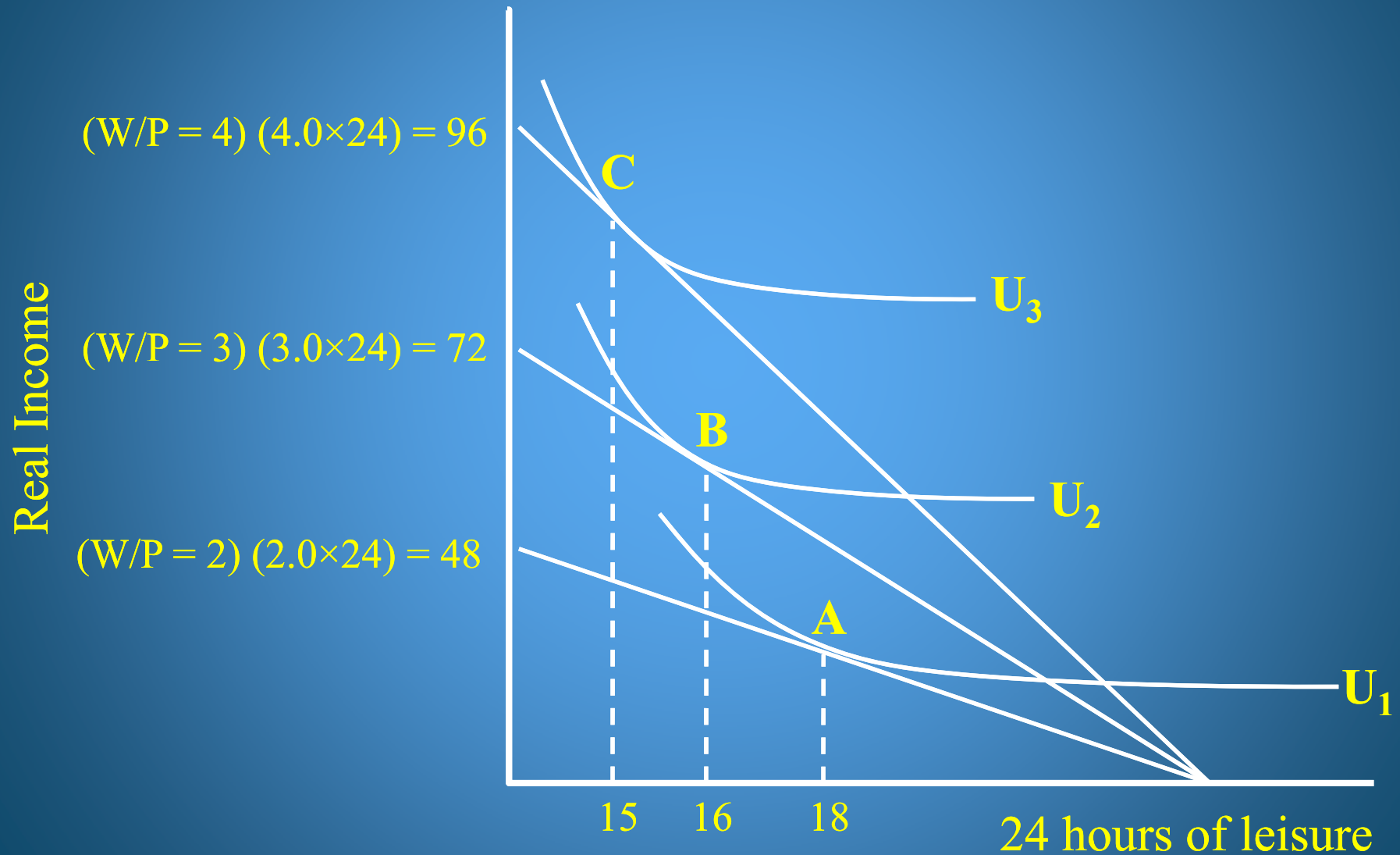
It is not profitable for firm to hire $N = 3$, but firm should hire less labor.

When $MPN < W/P$, firm will decrease employment ($N \downarrow$).

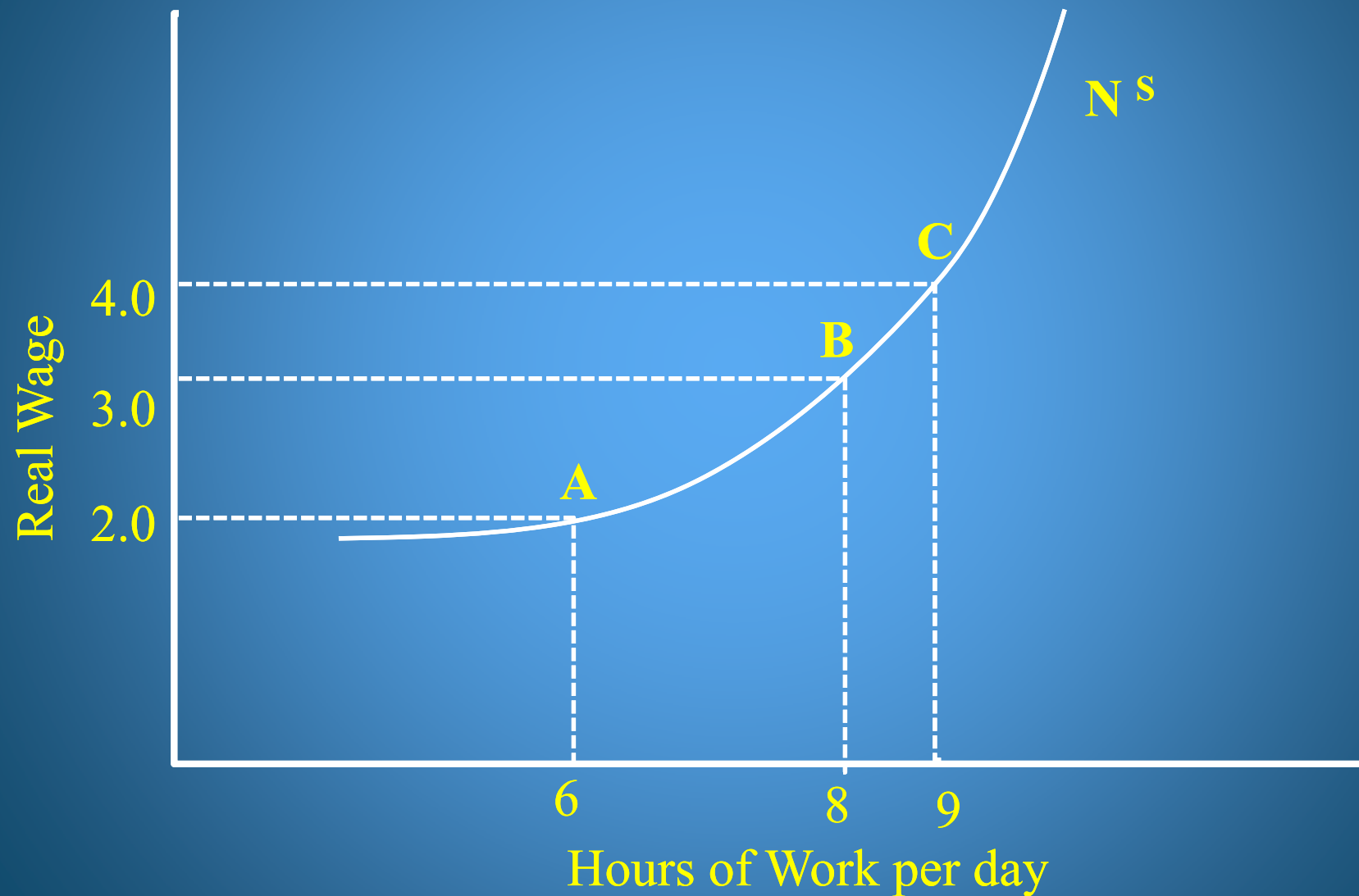
Firm's Demand for Labor



Income-leisure Trade-Off



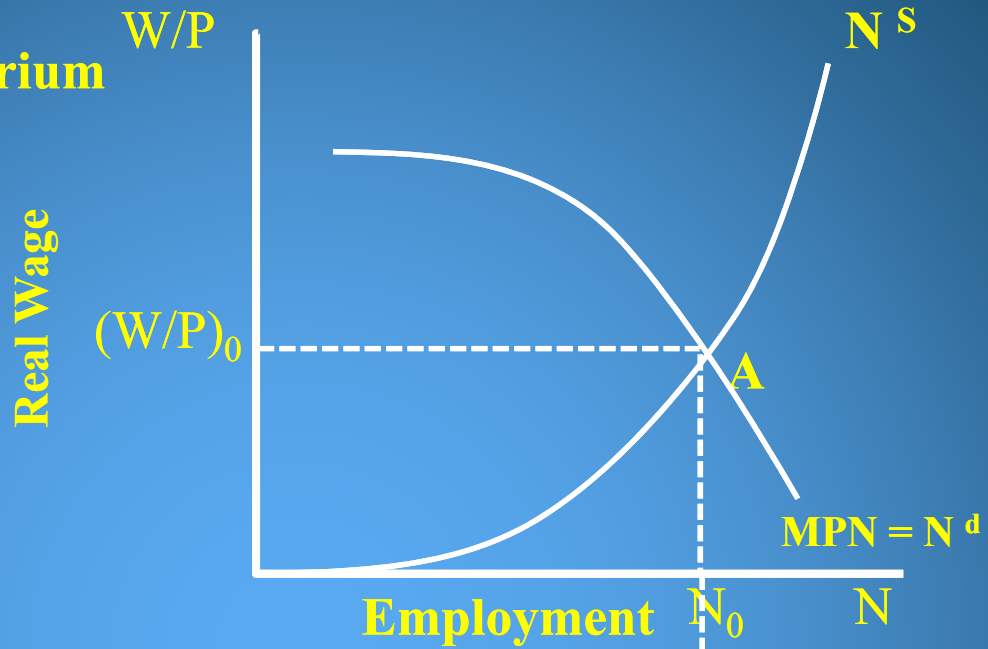
W/P Labor Supply Curve



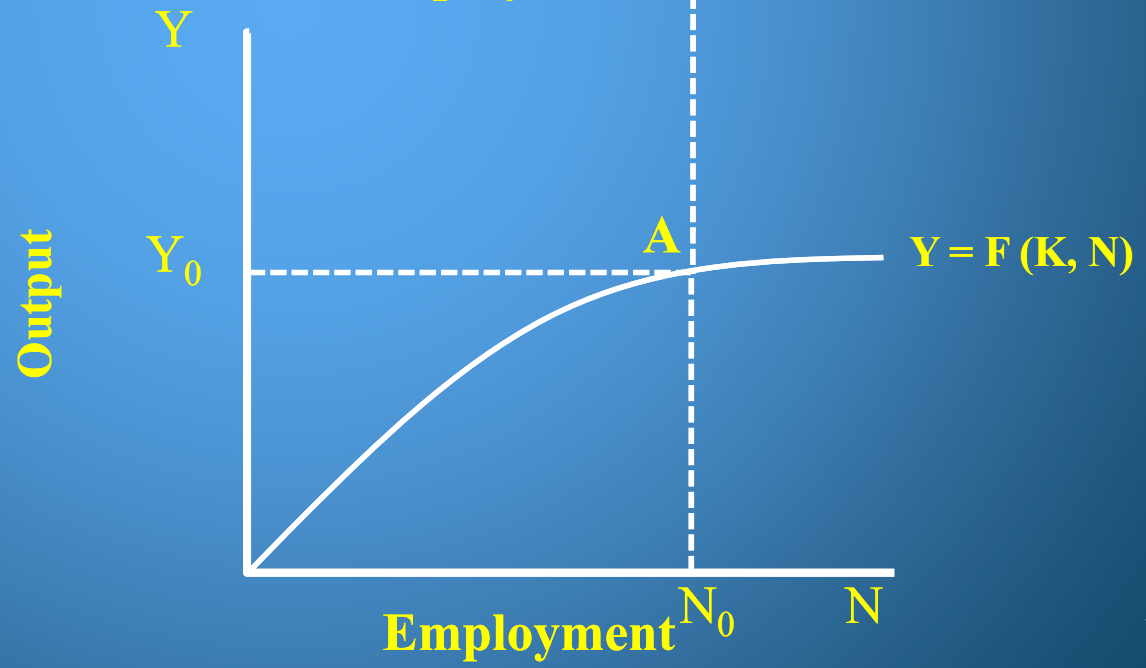
Assumptions in the Classical model

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

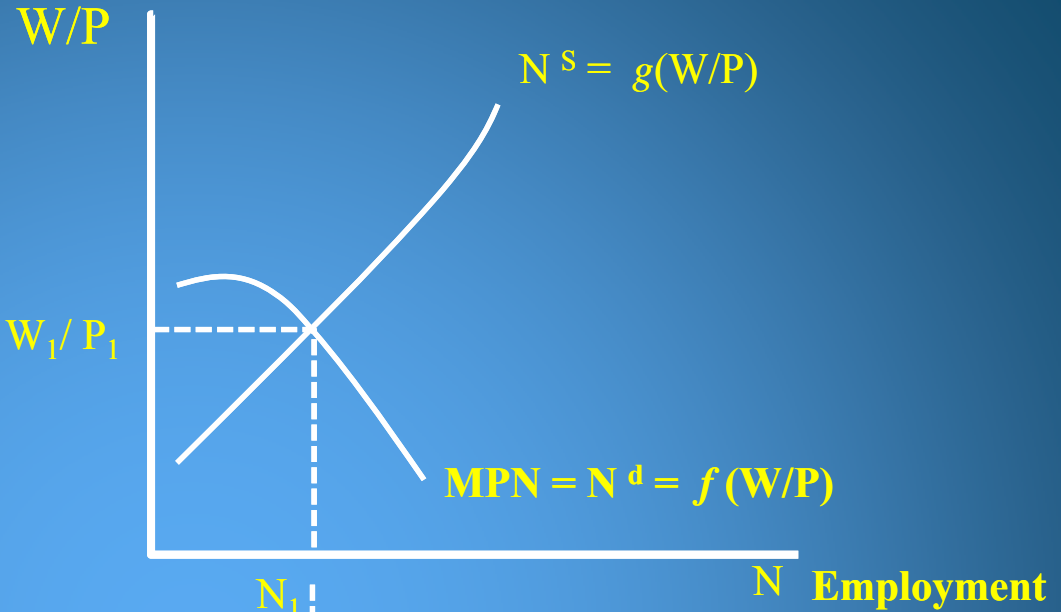


b. Output Equilibrium

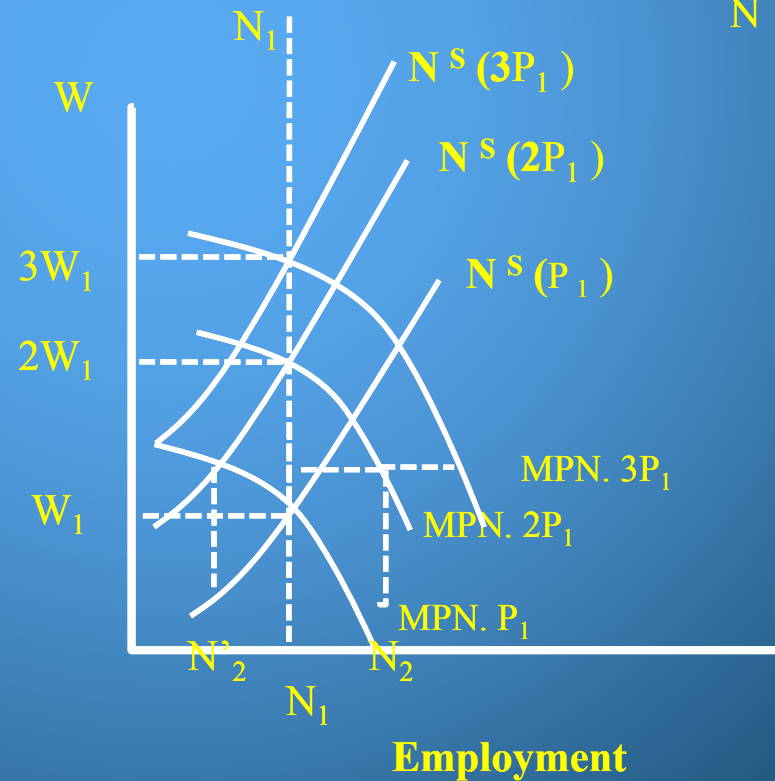


a. Labor Supply and Demand as Function of the Real Wage

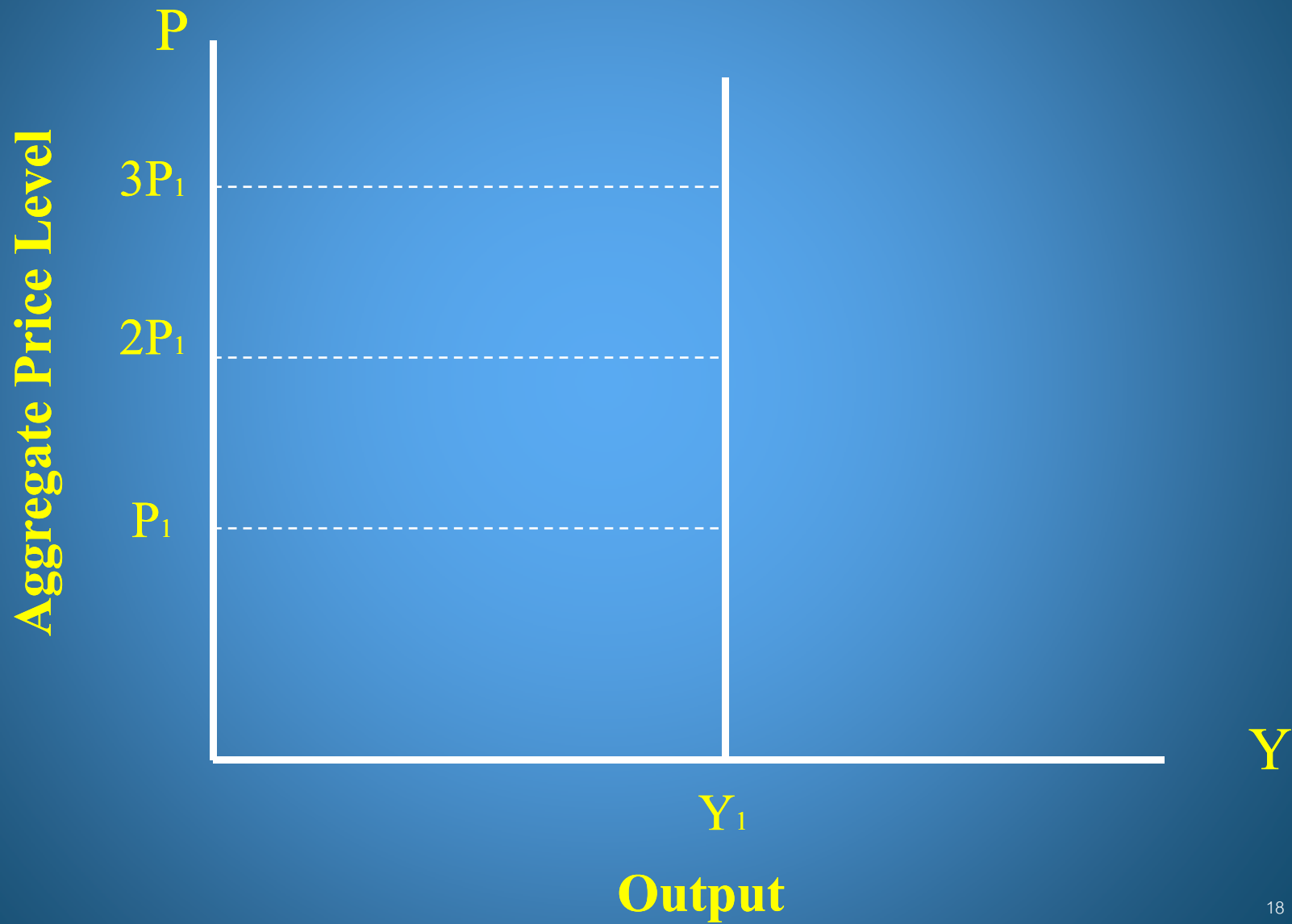
$$3W_1/3P_1 = 2W_1/2P_1 = W_1/P_1$$



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= $(P \times T) / M_s$
- $= 3,600 / 300$
- $V = 12$

Another expression of the equation of exchange focuses on income transactions

$$MV = PY$$

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

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

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

Quantity Theory of Money

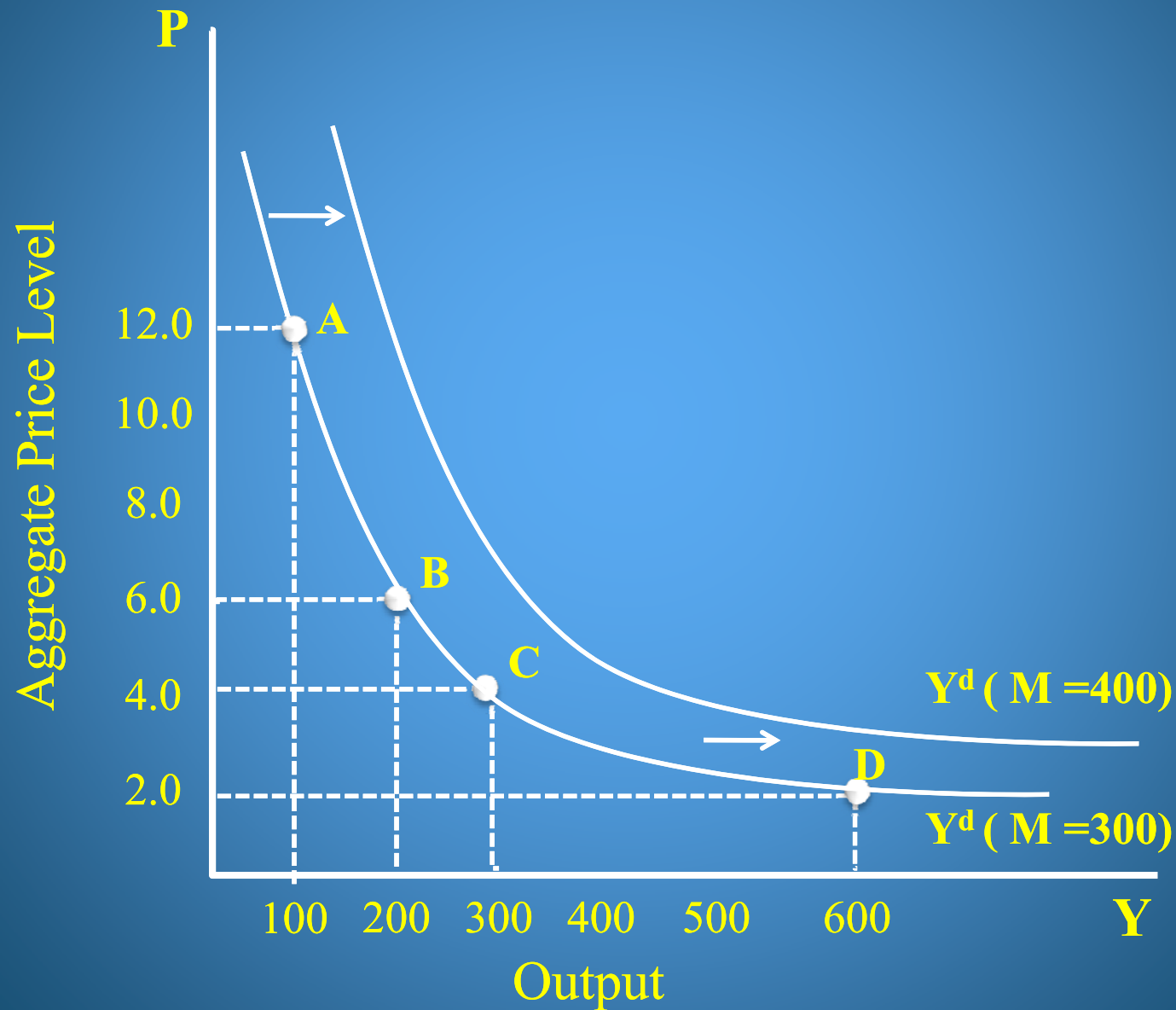
Cambridge Approach

$$M^d = kPY$$

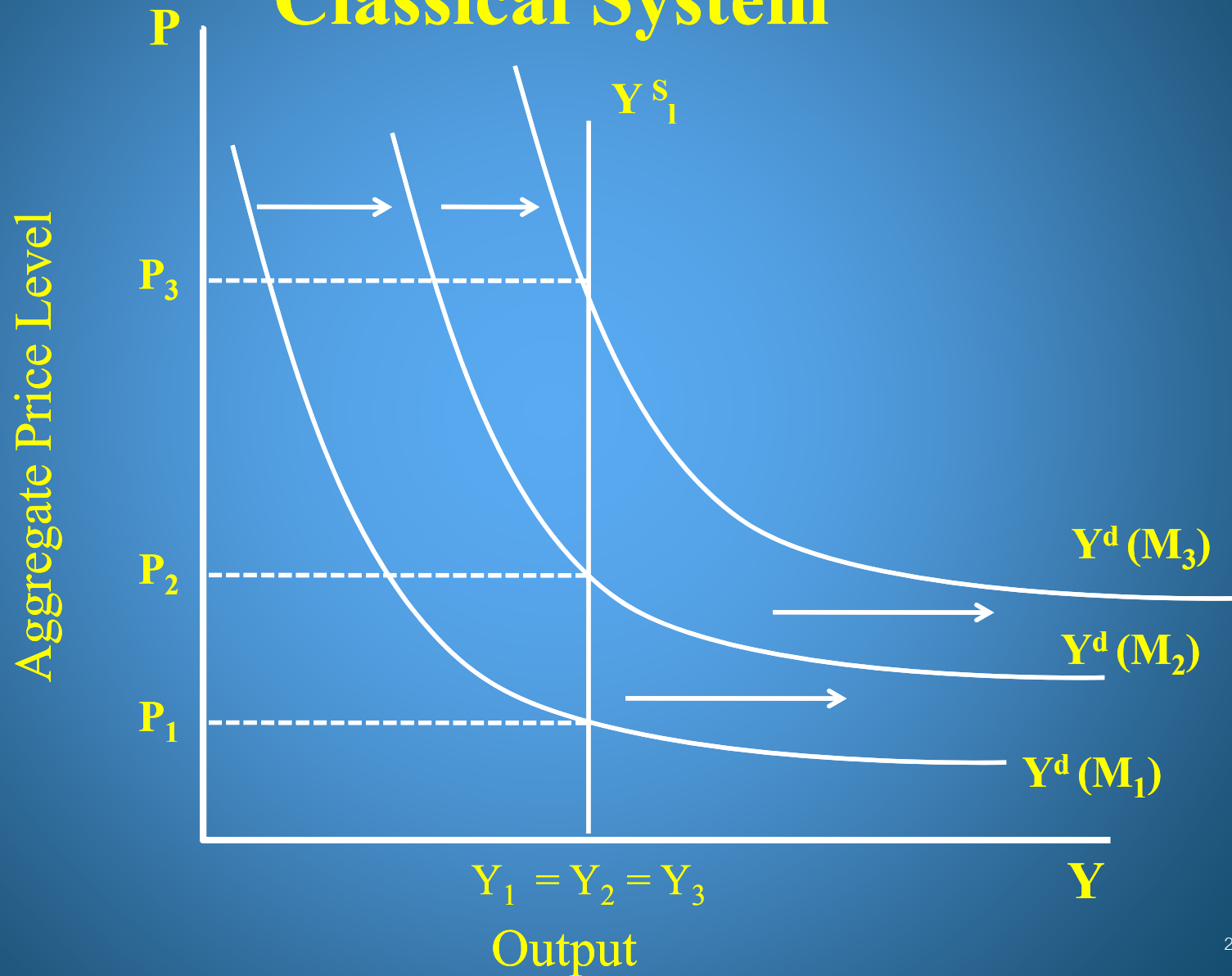
$$M = M^d = kP\bar{Y}$$

$$M \frac{1}{k} = P\bar{Y}$$

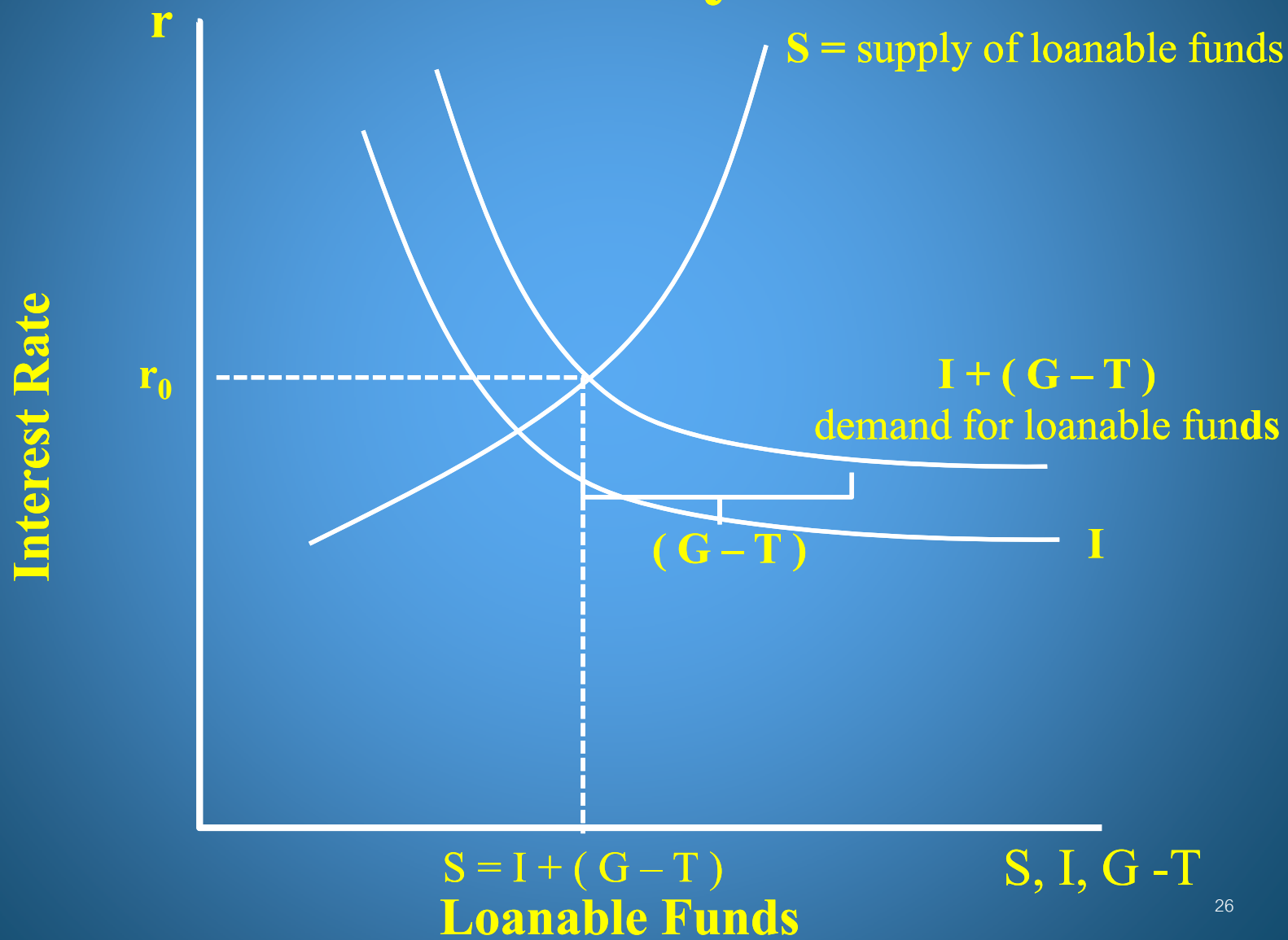
Classical Aggregate Demand Curve



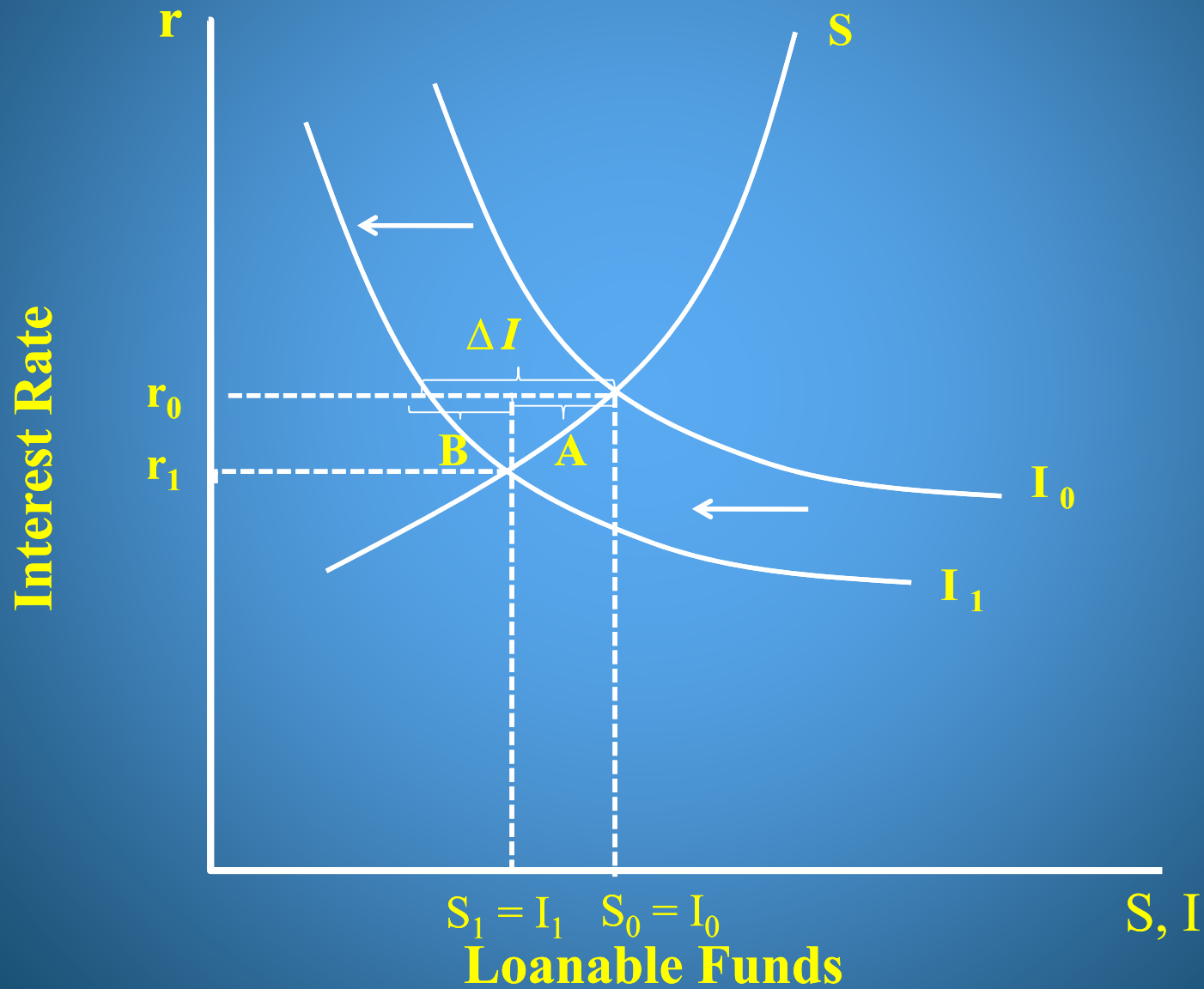
Aggregate Supply and Demand in the Classical System



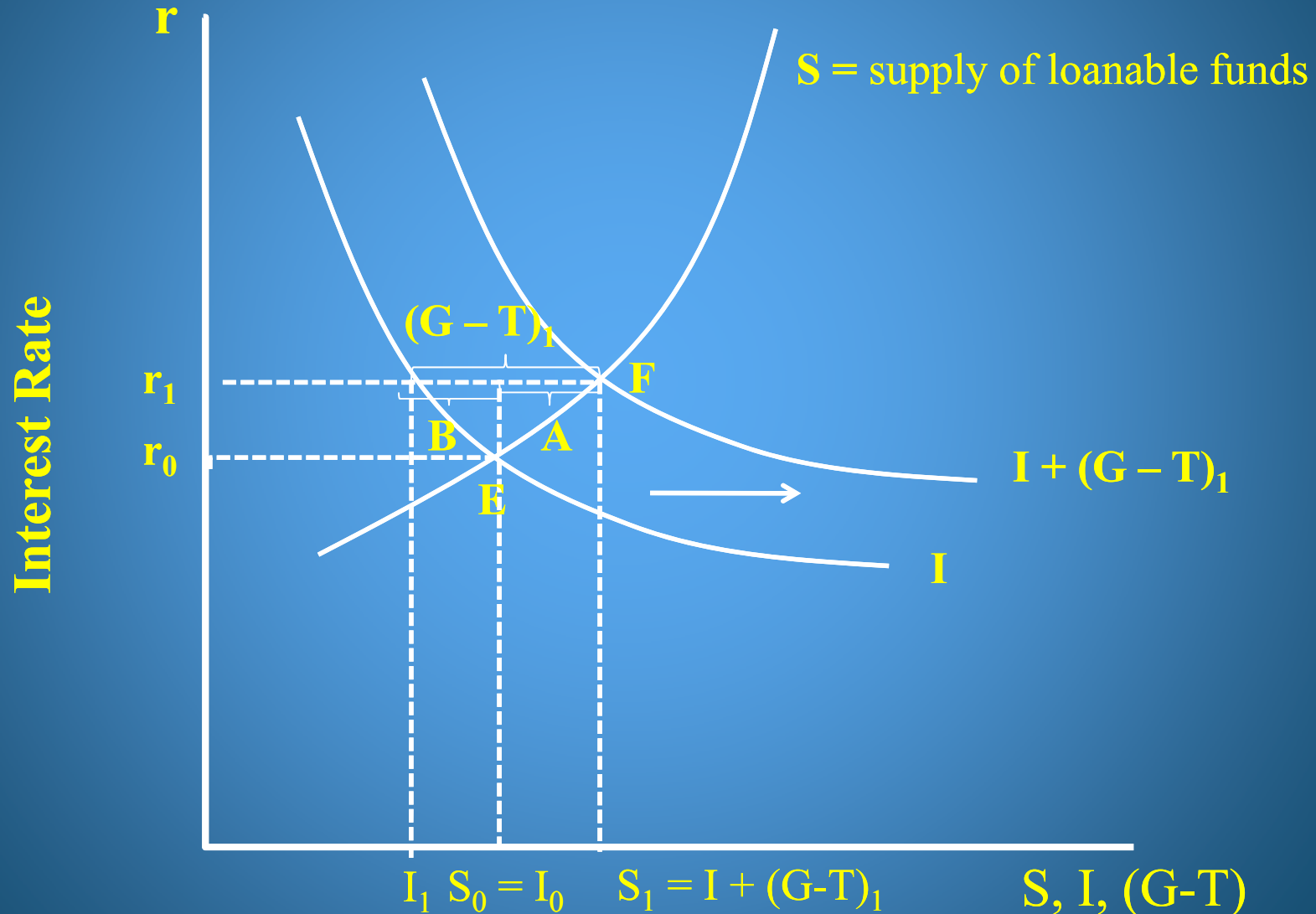
Interest Rate Determination in the Classical System



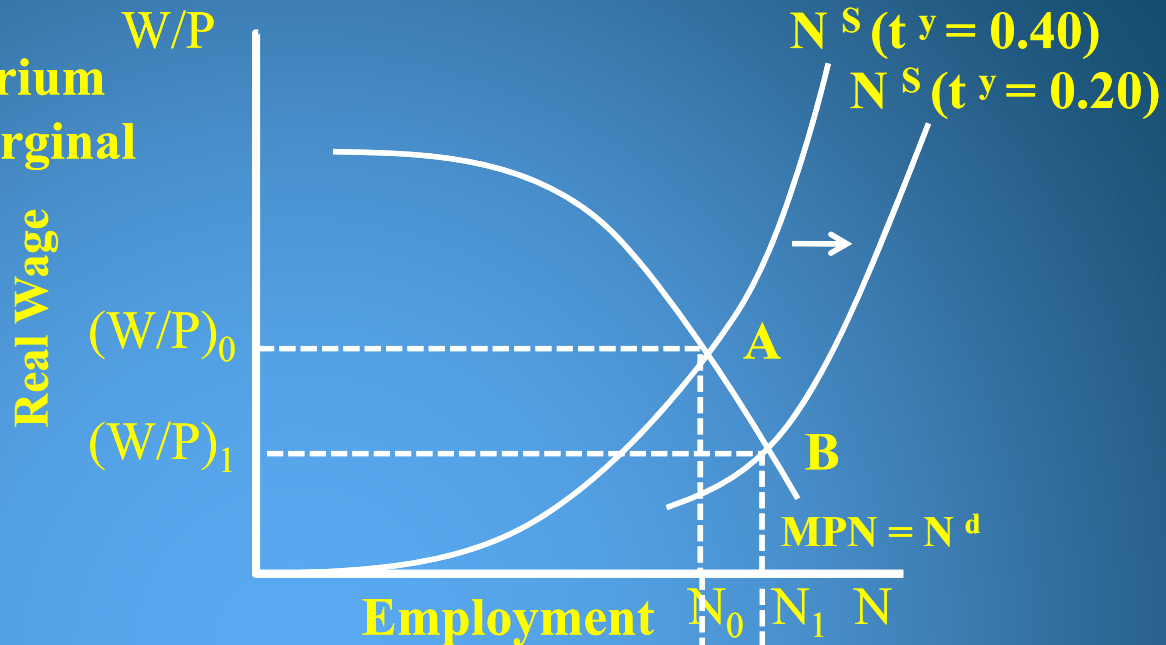
Autonomous Decline in Investment Demand



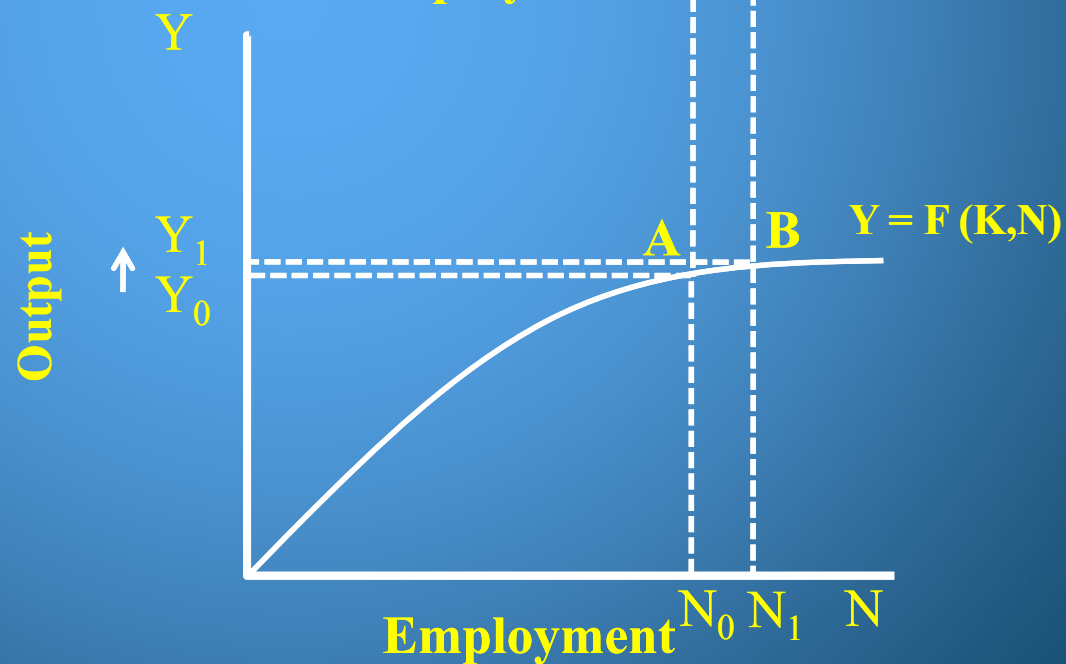
Effect of an Increase in Government Spending in the Classical Model



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



b. Production Function



c. Aggregate Supply and demand

