Demand for Labor Problems

Class Lectures: 4,5,6,7 & Class Notes

Basic Labor Market with Immigration and Min Wages

Class Lectures: 2,3,4,5,8 & Class Notes

Grad Level: Generalized/Parameterized equations

$$w = A - Bh^d \ldots(1)$$

$$w = C + Dh^s \ldots(2)$$

$$w^* = A - Bh^* \ldots(1.1)$$

$$w^* = C + Dh^* \ldots(2.1)$$

$$\exists\ w = w^*\ \ni\ h^d = h^s = h^*$$

$$w^* = A - Bh^*$$

$$w^* = A - B\left(\frac{A-C}{B+D}\right)$$

$$w^* = \frac{AD + BC}{B+D}$$

$$A - Bh^* = C + Dh^*$$

$$\Rightarrow h^* = \frac{A-C}{B+D}$$

Questions on Elasticity of Labor Demand and Elasticity of Labor Supply

$$\left|\eta^d\right| = \frac{\partial h^d / h^d}{\partial w / w} = \frac{w}{h^d} \times \frac{\partial h^d}{\partial w} = \frac{\%\Delta h^d}{\%\Delta w}$$

$$\eta^s = \frac{\partial h^s / h^s}{\partial w / w} = \frac{w}{h^s} \times \frac{\partial h^s}{\partial w} = \frac{\%\Delta h^s}{\%\Delta w}$$

- Given the equations of demand and supply can you find expressions for elasticity of labor?
- Given the equations of demand and supply can you find expressions for elasticity of labor supply?
- Can you find numerical values of elasticity of demand and supply in Baseline, Case 1, Case 2, Case 3 and Case 4 above?

$A \geq 0 \quad B \geq 0$

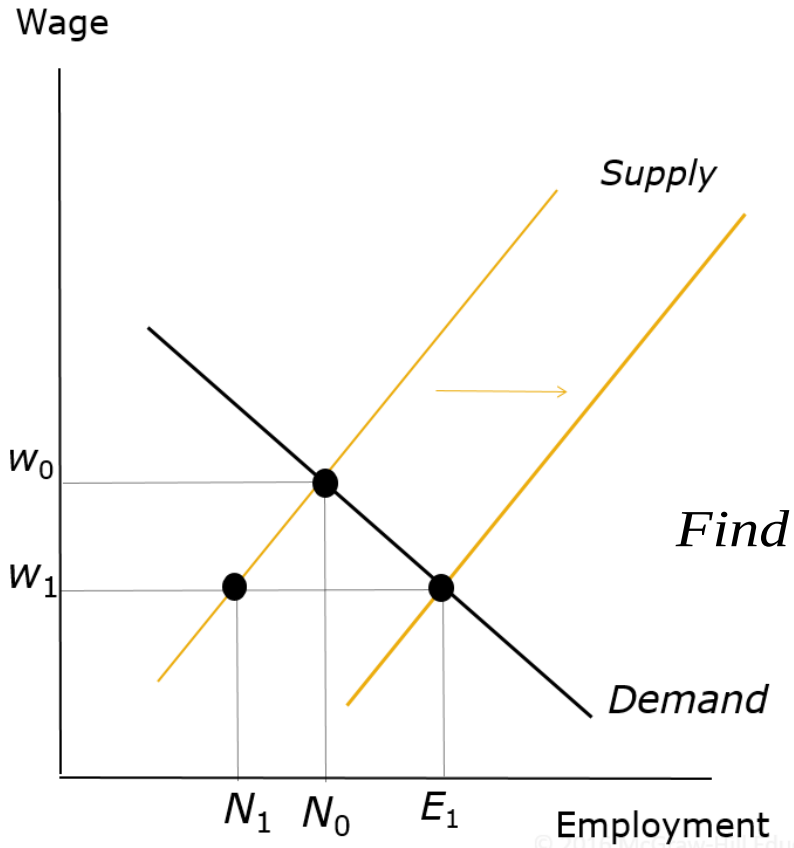
$C \geq 0 \quad D \geq 0$

$$w = A - Bh^d \ldots(1)$$

$$w = C + Dh^s \ldots(2)$$

$$\exists\ w = w_0\ \ni\ h^d = h^s = N_0$$

$$Find\ \ Parametric\ \ \text{exp}ressions\ \ for\ \ w_0\ \&\ N_0$$



Suppose **K** (legal & naturalized) immigrants move into this industry from a foreign city.

$$w = C - K + Dh^s \ldots(3)$$

$$\exists\ w = w_0\ \ni\ h^d = h^s = E_1$$

$$Find\ \ Parametric\ \ \text{exp}ressions\ \ for\ \ w_1\ \ N_1\ \&\ E_1$$

Under what condition will N1-N0?

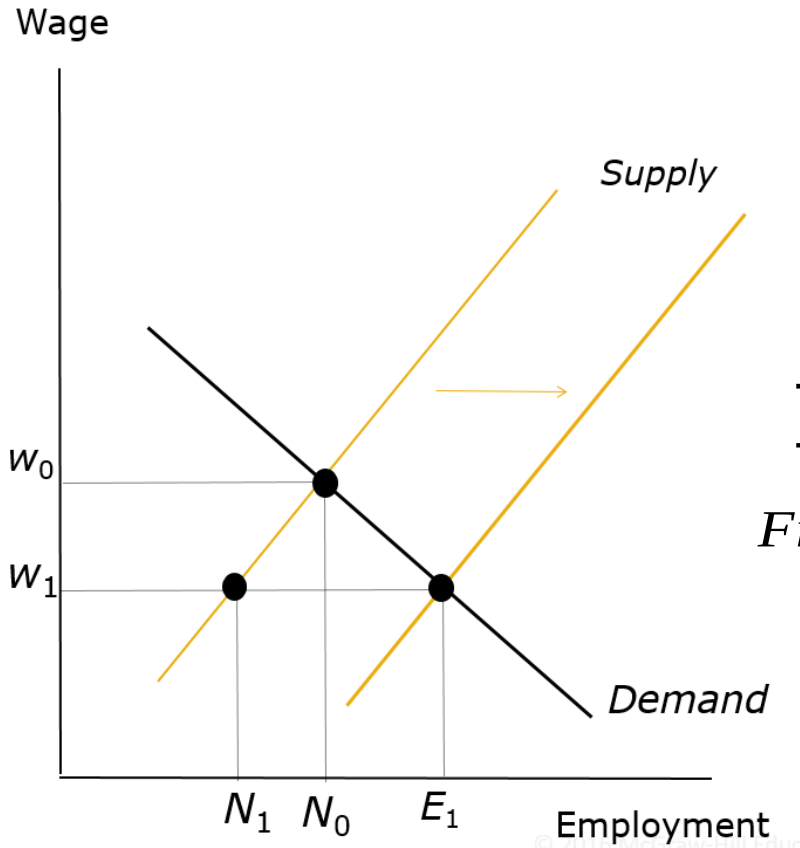
Under what condition will w1=w0?

$$A = 100 \quad B = 1$$
$$C = 20 \quad D = 1$$

$$w = A - Bh^d \ldots(1)$$
$$w = C + Dh^s \ldots(2)$$

$$\exists\ w = w_0\ \ni\ h^d = h^s = N_0$$

Find Parametric expressions for w_0 & N_0



Suppose **K=10** (legal & naturalized) immigrants move into this industry from a foreign city.

$$w = C - K + Dh^s \ldots(3)$$

$$\exists\ w = w_0\ \ni\ h^d = h^s = E_1$$

Find Numerical values for w_1 N_1 & E_1

Find Firm Surplus before and after immigration

Solutions

$$w_0 = \frac{AD + BC}{B + D}$$

$$w = A - Bh^d \ldots(1)$$

$$w = C + Dh^s \ldots(2)$$

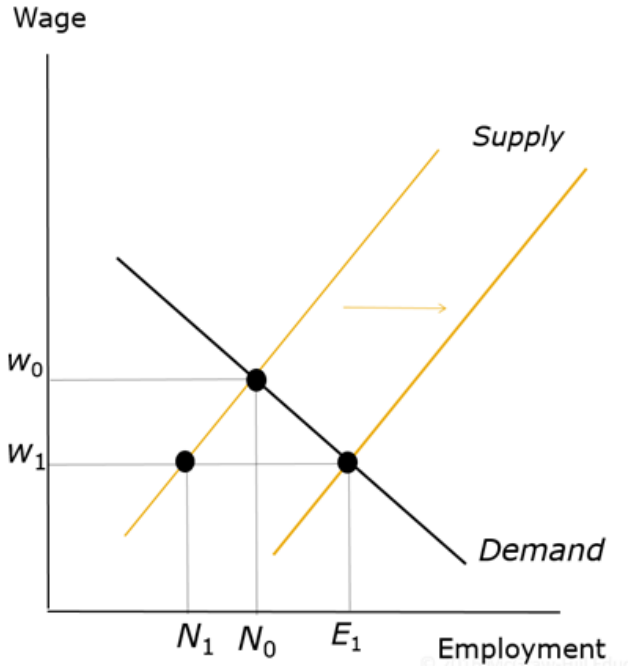
$$w = C - K + Dh^s \ldots(3)$$

$$w_1 = \frac{AD + B(C - K)}{B + D} = \frac{AD + BC}{B + D} - \frac{BK}{B + D} = w_0 - \frac{BK}{B + D}$$

$$If \;\; B = 0 \;\; then \;\; w_1 = w_0$$

$$N_0 = \frac{A - C}{B + D}$$

$$E_1 = \frac{A - (C - K)}{B + D} = \frac{A - C}{B + D} + \frac{K}{B + D} = N_0 + \frac{K}{B + D}$$



$$\frac{AD + B(C - K)}{B + D} = C + DN_1$$

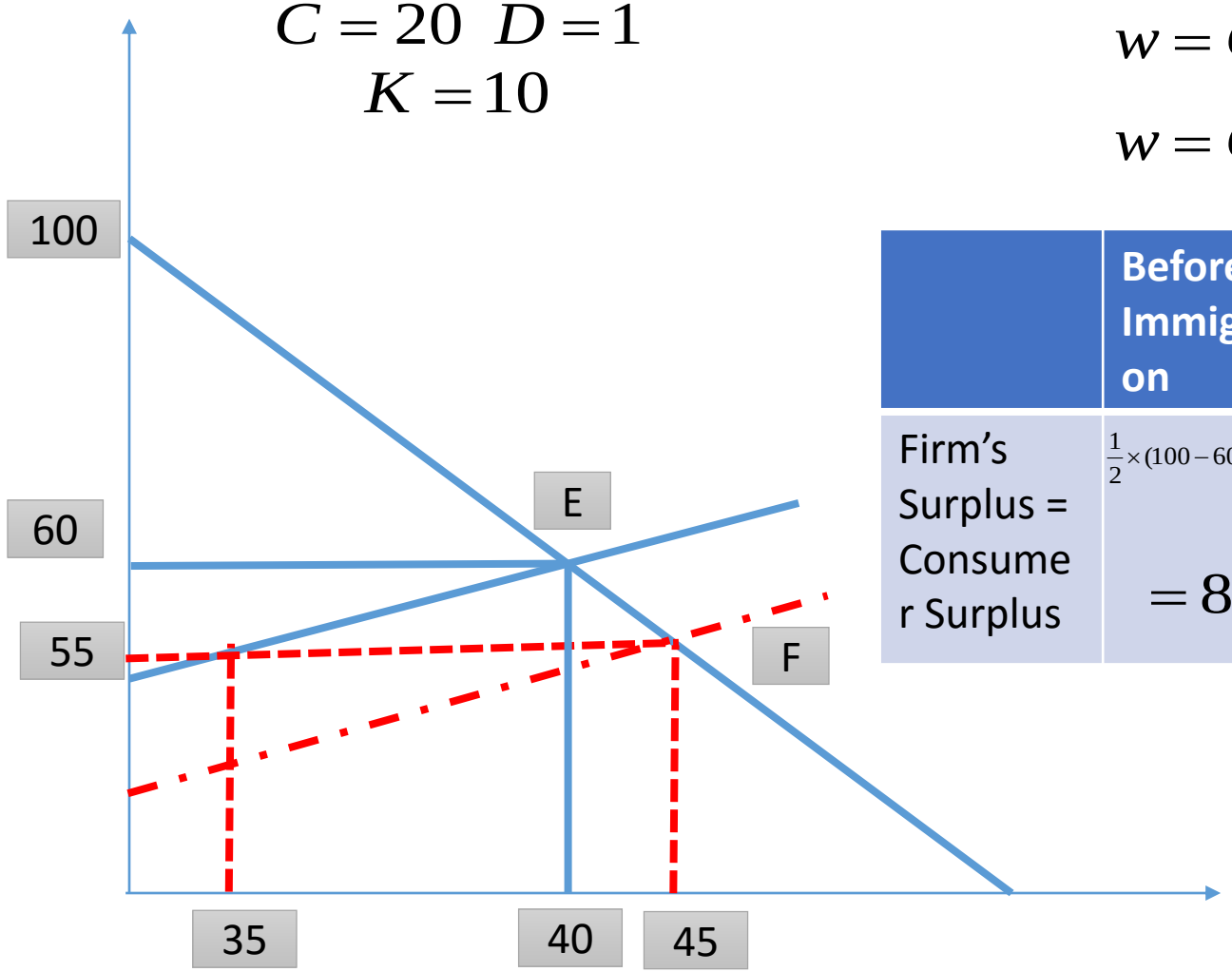
$$N_0 - \frac{BK}{D(B + D)} = N_1$$

$$If \;\; B = 0 \;\; then \;\; N_1 = N_0$$

$$A = 100 \quad B = 1$$
$$C = 20 \quad D = 1$$
$$K = 10$$

Solutions

$$w = A - Bh^d \ldots(1)$$
$$w = C + Dh^s \ldots(2)$$
$$w = C - K + Dh^s \ldots(3)$$



	Before Immigration	After Immigration	Change= After - Before
Firm's Surplus = Consumer Surplus	$\frac{1}{2}\times(100-60)\times(40)$ $= 800$	$\frac{1}{2}\times(100-55)\times(45)$ $= 1012.5$	$= 212.5$

Calculation of Firm Surplus: Consumer Surplus (B/C firms are the consumers of labor): All the area under demand curve to the equilibrium wage

industry in a US city has labor demand and supply curves estimated as

$$w = A - BE^d \ldots(1)$$

$$w = C + DE^s \ldots(2)$$

$$w^* = \frac{AD + BC}{B + D}$$

$$\overline{w} = Z$$

$$E^* = \frac{A - C}{B + D} \quad \overline{E} = \frac{A - Z}{B} \quad E_S = \frac{Z - C}{D}$$

$$Unemoplyment\ \ Rate = \frac{E_s - \overline{E}}{E_s} = ?$$

$$Under\ \ what\ \ condition\ \ is\ \ Unemployment\ \ Rate = 0$$

$$E^* = \frac{A-C}{B+D} \qquad \overline{E} = \frac{A-Z}{B}$$

$$E^* - \overline{E} = \frac{A-C}{B+D} - \frac{A-Z}{B} = \frac{BA-BC-BA+ZB-DA+ZD}{B+D}$$

$$E^* - \overline{E} = \frac{Z(B+D)-(AD+BC)}{B+D}$$

$$E^* - \overline{E} = Z - \frac{(AD+BC)}{B+D} = Z - w*$$

$$If \;\; Z = w^* \; Then \;\; E^* - \overline{E} = 0$$

$$Unemoplyment\ \ Rate = \frac{E_s - \overline{E}}{E_s} = ?$$

$$\overline{E} = \frac{A - Z}{B} \qquad E_s = \frac{Z - C}{D}$$

$$E_s - \overline{E} = \frac{Z - C}{D} - \frac{A - Z}{B} = \frac{ZB - CB - AD + DZ}{D}$$

$$\rightarrow E_s - \overline{E} = \frac{Z(B + D) - (AD + BC)}{B \times D}$$

$$\rightarrow E_s - \overline{E} = \frac{Z - \frac{(AD + BC)}{(B + D)}}{\frac{B \times D}{(B + D)}} = \frac{(B + D)(Z - w^*)}{B \times D}$$

$$Unemoplyment\ \ Rate = \frac{E_s - \overline{E}}{E_s} = \frac{\left(B+D\right)\left(Z-w^*\right)}{B \times D \times E_s}$$

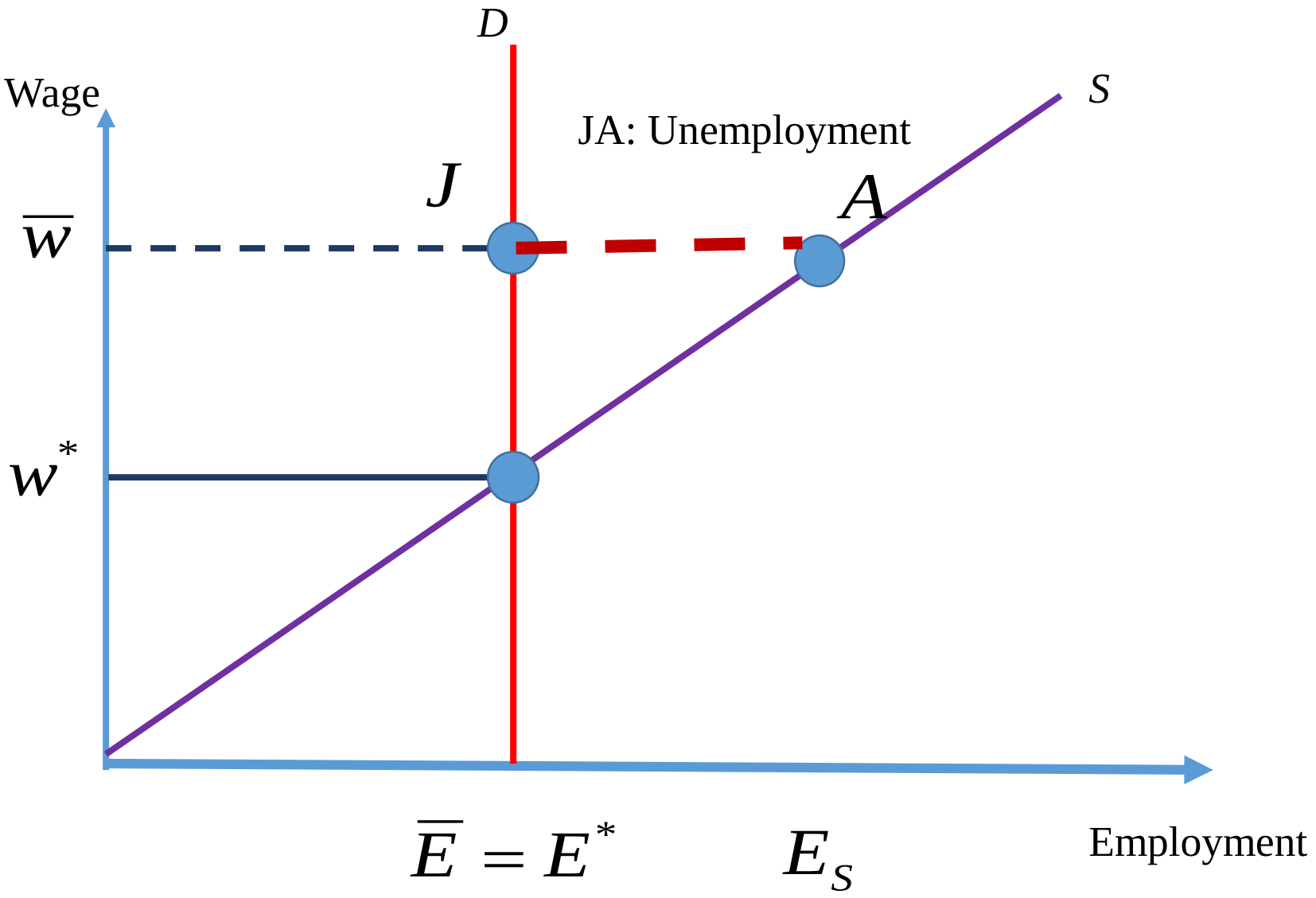
$$E_S = \frac{Z-C}{D}$$

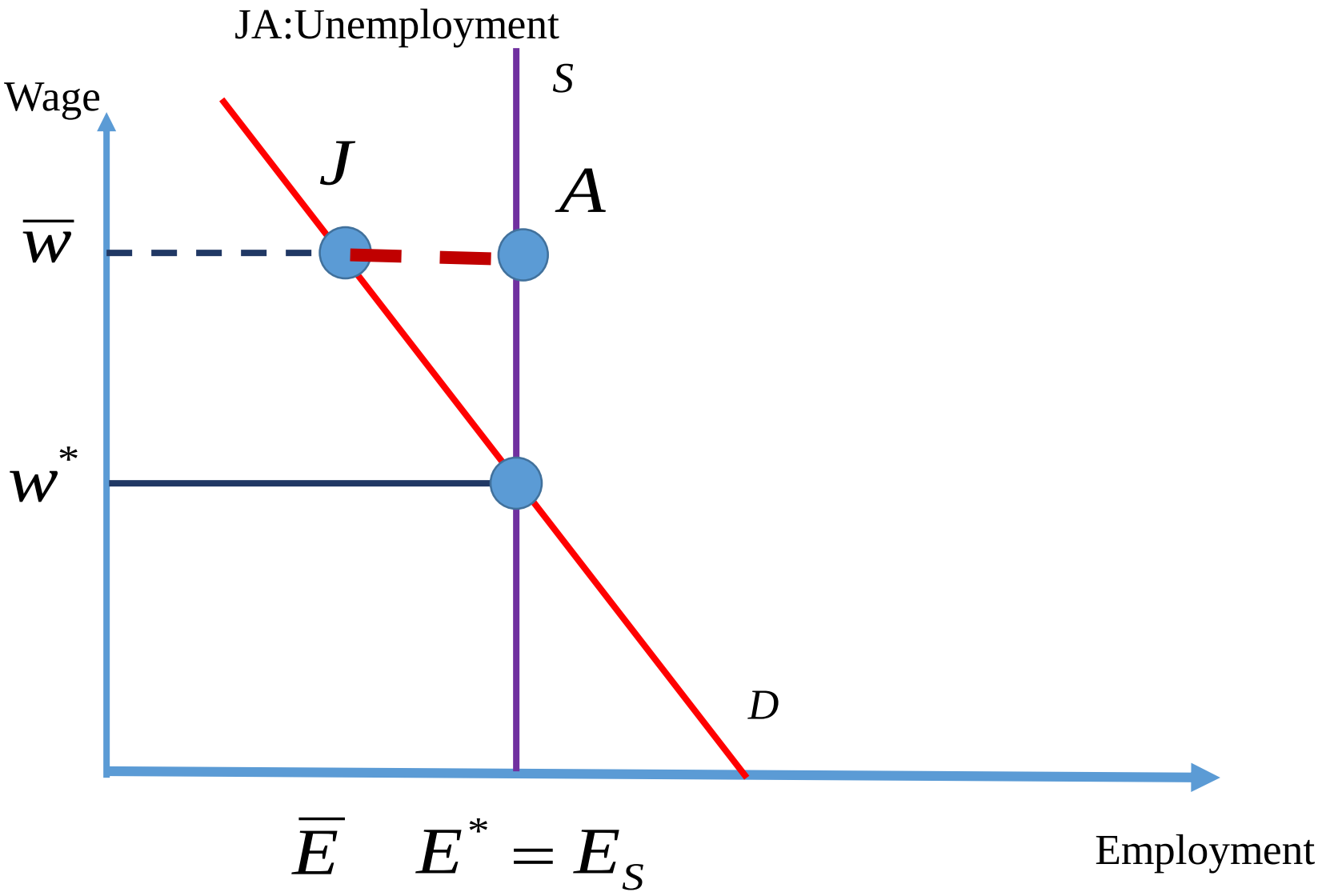
$$Unemoplyment\ \ Rate = \frac{E_s - \overline{E}}{E_s} = \frac{\left(B+D\right)\times\left(Z-w^*\right)\times D}{B \times D \times \left(Z-C\right)}$$

$$Unemoplyment\ \ Rate = \frac{\left(B+D\right)\times\left(Z-w^*\right)}{B \times \left(Z-C\right)}$$

$$Unemoplyment\ \ Rate = \frac{\left(B+D\right)\times\left(E^* - \overline{E}\right)}{B \times \left(Z-C\right)}$$

$$If\ \ Z = w^*\ Then\ E^* = \overline{E}\ \ \&\ \ Unemoplyment\ \ Rate = 0$$


D
Wage
S
JA: Unemployment
J
A
$\overline{w}$
w^*
$\overline{E} = E^*$
E_S
Employment


JA:Unemployment
Wage
S
J
A
$\overline{w}$
w^*
D
$\overline{E}$
$E^* = E_S$
Employment