

# Population Econ HW2

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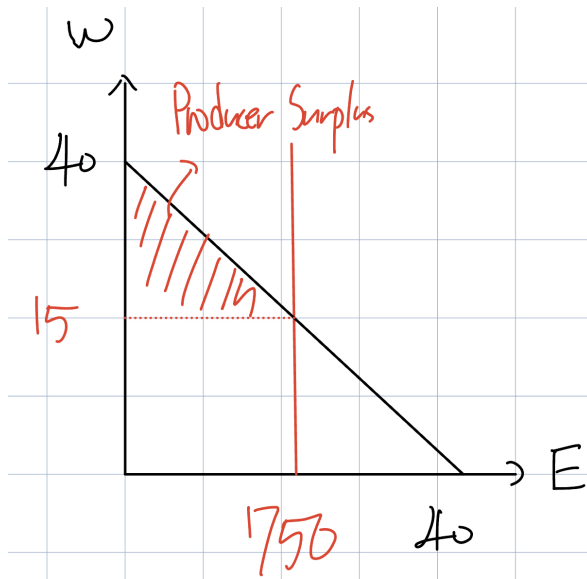
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## 1 Chapter 4

**Q1**  $E_D = 1200 - 30w$ ,  $E_S = 750$

1. Since the labor supply is perfectly in-elastically, the number of workers employed = 750
2. To find the market wage  $\Rightarrow 1200 - 30w = 750 \Rightarrow 30w = 450 \Rightarrow w = 15$
3. Producer Surplus =  $\frac{(40-15)750}{2} = 9375$

**Ans:** Employed Workers = 750, Wage = 15, Producer Surplus = 9375



**Q2**  $E_D = 1000 - 50w$

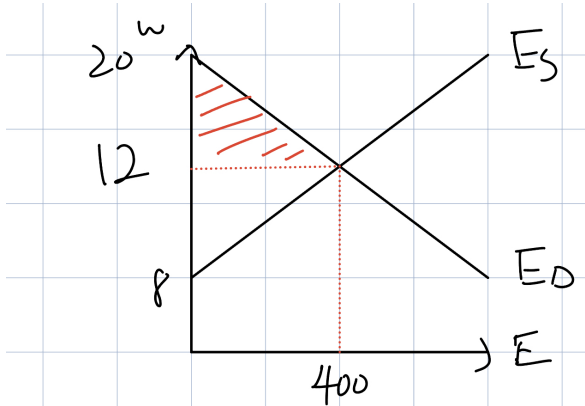
(a) When  $E_S = 100w - 800$

$\Rightarrow \text{Market Equilibrium} \Rightarrow 1000 - 50w = 100w - 800 \Rightarrow 1800 = 150w \Rightarrow w = 12$

$E = 1000 - 600 = 400$

Producer Surplus =  $\frac{(20-12)400}{2} = 1600$

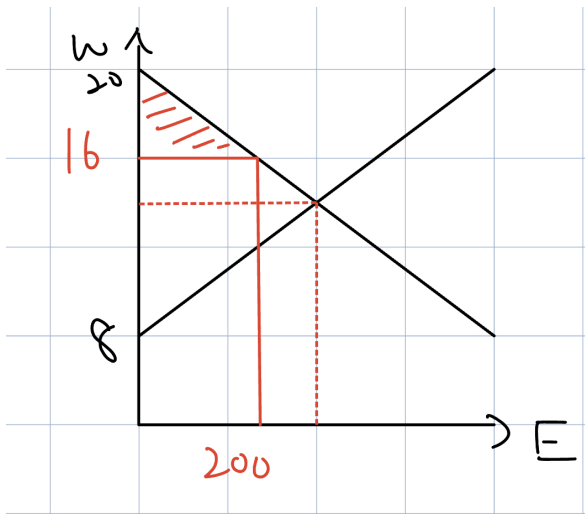
**Ans:** Wage = 12, Employed Worker = 400, Producer Surplus = 1600



(b) Impose minimum wage of 16

$E = 1000 - (50 \times 16) = 200$  Producer Surplus =  $\frac{(20-16)200}{2} = 400$

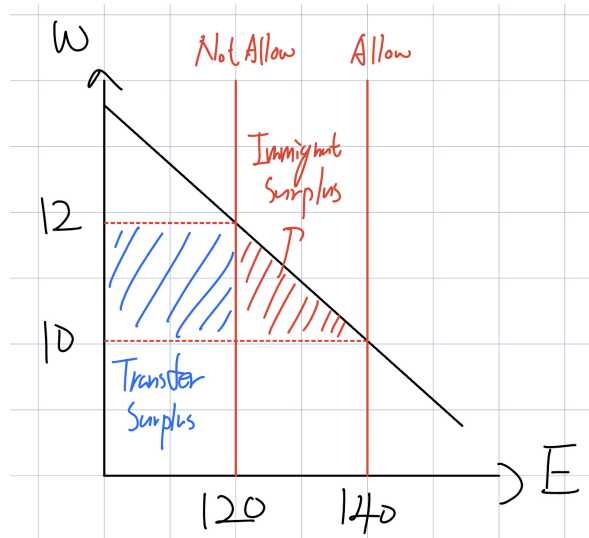
**Ans:** Wage = 16, Employed Worker = 200, Producer Surplus = 400



**Q3** Demand:  $W = 24 - 0.1E$

If Immigrants Not Allow  $\Rightarrow E = 120 \Rightarrow w = 24 - 0.1(120) = 24 - 12 = 12$

If Allow  $\Rightarrow E = 120 + 20 = 140 \Rightarrow w = 24 - 0.1(140) = 24 - 14 = 10$



$$\text{Immigrant Surplus} = 2 \times \frac{20}{2} = 20$$

$$\text{Transfer Surplus} = 2 \times 120 = 240$$

**Ans:**

Wage when immigrant are not allow = 12

Wage when immigrant are allow = 10

Immigrant Surplus = 20

Transferred Surplus = 240

## 2 Chapter 6

**Q1** Plan 1: Lifetime income =  $100000 + \frac{110000}{1.2} + \frac{90000}{(1.2)^2} = 100000 + 91666.67 + 62500 = 254166.67$

Plan 2: Lifetime income =  $(-50000) + \frac{180000}{1.2} + \frac{180000}{(1.2)^2} = (-50000) + 150000 + 125000 = 225000$

Plan 3: Lifetime income =  $(-50000) + \frac{0}{1.2} + \frac{400000}{(1.2)^2} = (-50000) + 0 + 277777.78 = 227777.78$

**Ans:** Since Plan 1 generates the largest lifetime income, choosing Plan 1 maximizes Peter's net present value of his lifetime earnings.

**Q2** MRR of Schooling for Carl

$$\text{From years 9 to 10} = \frac{20350-18500}{18500} = 0.1 = 10\%$$

$$\text{From years 10 to 11} = \frac{22000-20350}{20350} = 0.0811 \doteq 8.1\%$$

$$\text{From years 11 to 12} = \frac{23100-22000}{22000} = 0.05 = 5\%$$

$$\text{From years 12 to 13} = \frac{23900-23100}{23100} = 0.0346 \doteq 3.5\%$$

$$\text{From years 13 to 14} = \frac{24000-23900}{23900} = 0.0042 = 0.42\%$$

**Ans:**

When the discount rate is 4%  $\Rightarrow$  Quit schooling when years 12

When the discount rate is 9%  $\Rightarrow$  Quit schooling when years 10

**Q3** For low ability students  $\Rightarrow k - 20000 < 25000 \Rightarrow 25000 + 20000 > k \Rightarrow 45000 > k$

For high ability students  $\Rightarrow k - 8000 > 25000 \Rightarrow 25000 + 8000 < k \Rightarrow 33000 < k$

**Ans:**  $\Rightarrow 33000 < k < 45000$