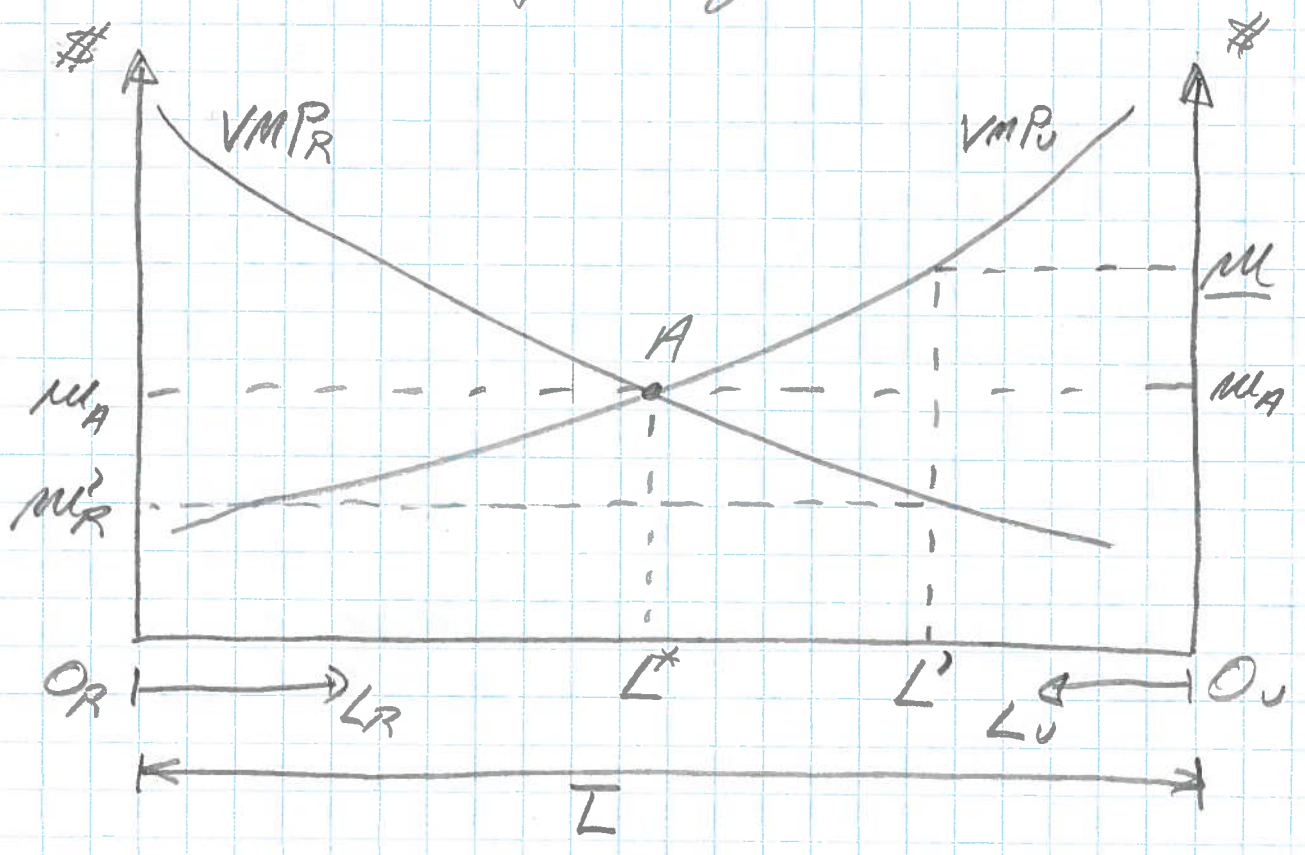


10.6) Minimum wage and the misallocation of factors among sectors.

Suppose L = the total labor force size.

The economy is divided in two sectors, RURAL and URBAN, each with decreasing returns to labor. In the following figure, the efficient allocation of labor between sectors is represented by point A where the following two conditions are respected:

- $VMP_R = VMP_U$: Equal values of marginal product
- $L_R + L_U = L$: Labor force size constraint.



10.66

In a competitive and freely mobile labor market, wages are equalized between sectors and equal to the VMPs. The equilibrium wage is thus w_A .

MINIMUM WAGE:

If a minimum wage is imposed in the URBAN sector equal to $\underline{w} > w_A$, then the labor force hired in the urban sector must respect the following condition

$$VMP_U = \underline{w}$$

The minimum urban wage causes the urban labor force hire to decrease by size L^*L as firms will not hire workers whose marginal product is below the minimum wage rate.

Consequently, the labor force hire in the rural sector increases by L^*L which leads to a drop in the rural wage rate to w_R .

The minimum urban wage causes a misallocation of labor among sectors since it leads to an equilibrium where the marginal product values are not equal.

10.7) The marginal product of labor in sector 1 is

$$\frac{d}{dL_1} (L_1^{1/2}) = \frac{L_1^{-1/2}}{2} = \frac{1}{2\sqrt{L_1}}$$

The average product in sector 2 is

$$\frac{L_2^{1/2}}{L_2} = \frac{1}{\sqrt{L_2}}$$

Since workers are free to move between the sectors, the allocation of workers must respect the following condition:

$$\frac{1}{2\sqrt{L_1}} = \frac{1}{\sqrt{L_2}}$$

i.e., the marginal product value in sector 1 equals the average product value in sector 2. (Note that we assume that prices are equal to 1 for both goods.)

Inserting the labor constraint $L_2 = \bar{L} - L_1$ gives:

$$\frac{1}{2\sqrt{L_1}} = \frac{1}{\sqrt{\bar{L} - L_1}} \Rightarrow 2\sqrt{L_1} = \sqrt{\bar{L} - L_1}$$

$$\Rightarrow 4L_1 = \bar{L} - L_1 \Rightarrow \boxed{L_1 = \frac{\bar{L}}{5}} \Rightarrow \boxed{L_2 = \frac{4}{5}\bar{L}}$$

sector 1 absorbs one-fifth of the labor force while sector 2 gets four-fifths. This allocation is not efficient because the marginal product value of labor in sector 1 exceeds that of sector 2. (Can you verify that?)