Andrew Dickinson
EC330, Fall 2021
Due Nov 30th

Name (Print): Key

Student ID _____

Please write all answers in legible handwriting in the space provided. **3** points will be added to your score for signing your name, though those points will be deducted if the grader cannot read what you wrote on your pdf scan. For math questions, show all relevant work. **For questions with numeric answers, clearly circle or box your final answer.**

Total points possible: 25

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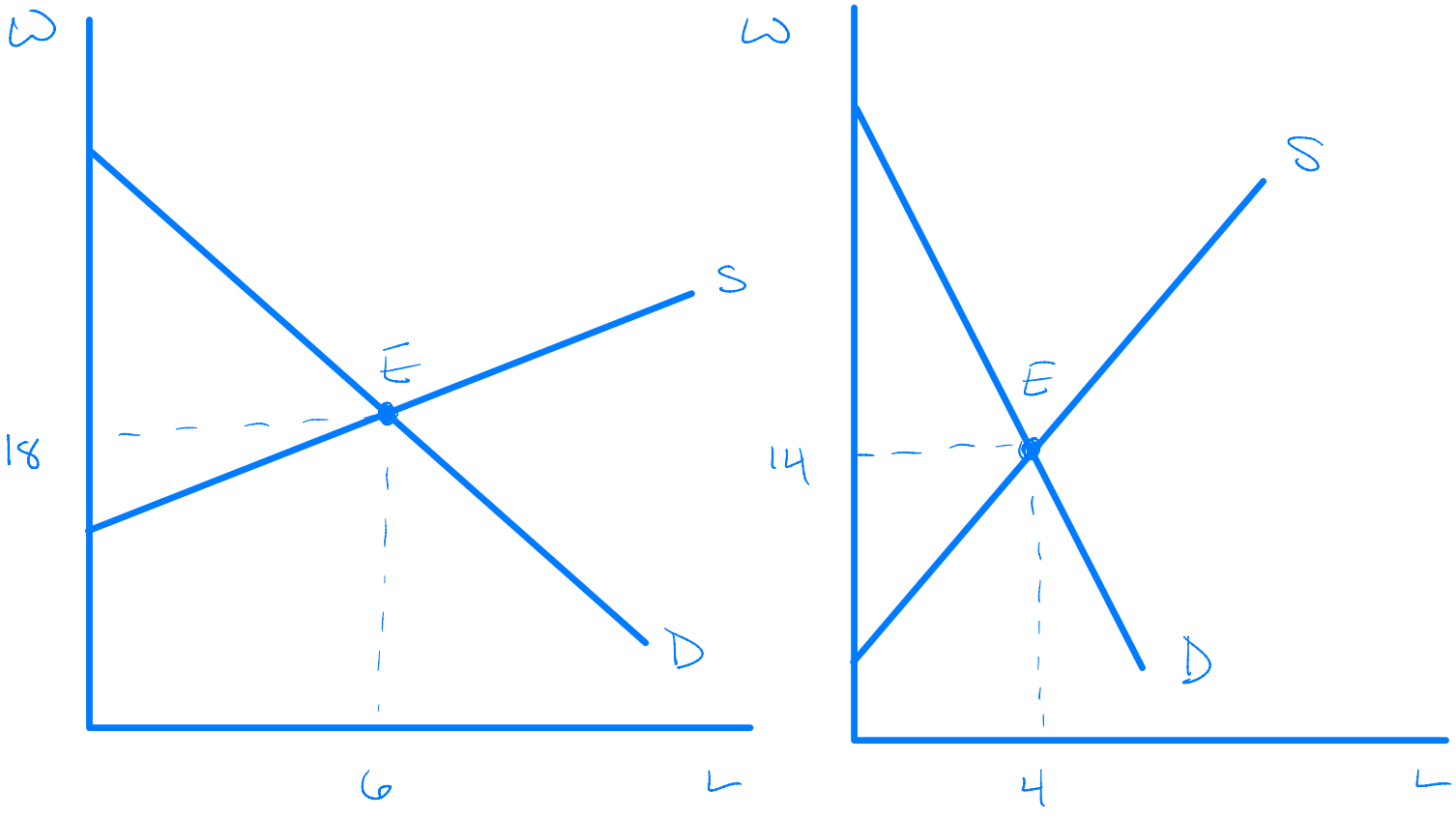
1. (8 points) **Minimum wage in Urban Labor Markets** Suppose the labor markets for Baristas in San-Fransisco (SF) & Oakland (OAK) are perfectly competitive (we will relax this later). Supply and demand in SF are parameterized by:

$$\text{Demand}: W_d^{SF} = 30 - 2 * Q_d^{SF}$$
$$\text{Supply}: W_s^{SF} = 12 + Q_s^{SF}$$

In Oakland, labor supply and demand are given by:

$$\text{Demand}: W_d^{OAK} = 30 - 4 * Q_d^{OAK}$$
$$\text{Supply}: W_s^{OAK} = 6 + 2 * Q_s^{OAK}$$

(a) (2 points) Carefully graph each cities labor market. Be sure to indicate which graph represents which labor market. Label all intercepts.



(b) (2 points) Compute the equilibrium in each city. (You must provide wages and quantities in each city.)

SF: Set Demand = Supply

$30 - 2Q = 12 + Q$

$18 = 3Q \Rightarrow Q^* = 6$

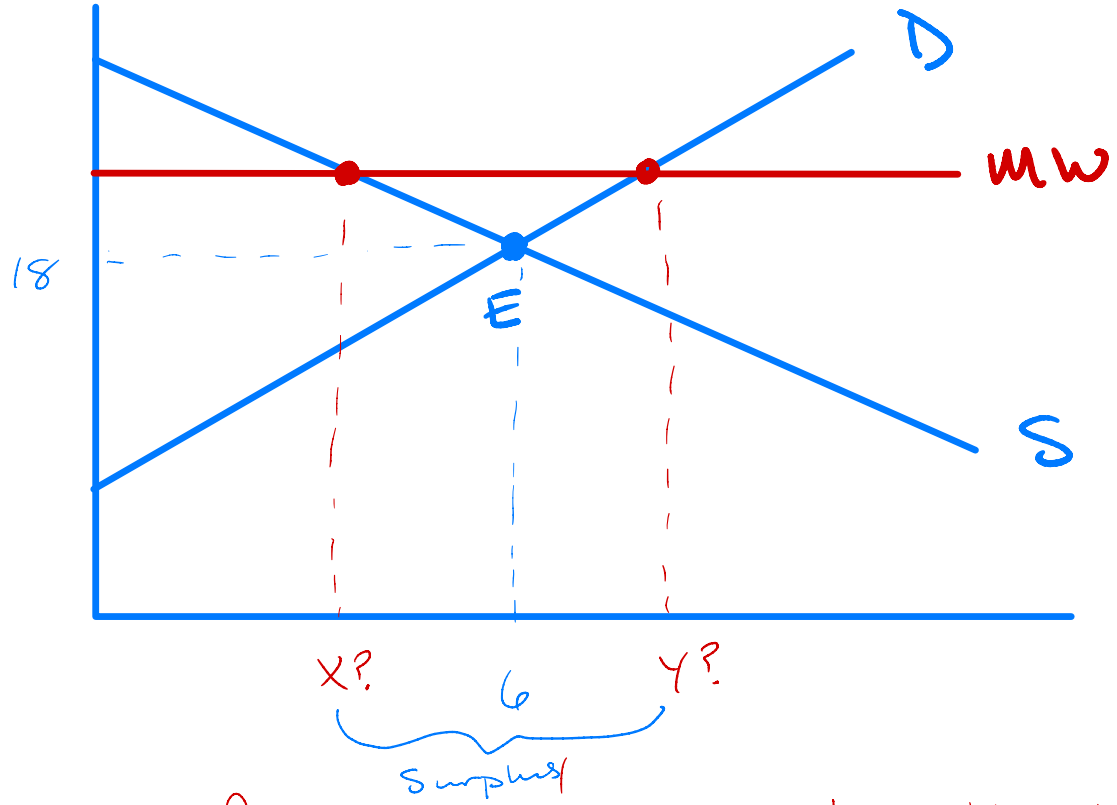
$w^* = 12 + Q^* = 18$

OAK: $30 - 4Q = 6 + 2Q$

$6Q = 24 \Rightarrow Q^* = 4$

$w^* = 6 + 2(4) = 14$

(c) (2 points) Suppose that SF implements a minimum wage of 20 an hour. Draw the labor market graph for SF again with the min wage added. Label **and compute** the associated labor surplus.



How to solve for X: replace Q_D w/ X

Demand: $20 = 30 - 2X$

$2X = 10$

$X = 5$

Supply: $20 = 12 + Y$ (Replace Qs w/ Y)

$Y = 8$

The labor surplus will be the difference between X & Y.

$X - Y = 8 - 5 = 3$

(d) (1 point) Suppose some fraction of the unemployed workers in SF moved to Oakland to look for work. What does this do to the supply curve for Baristas in Oakland? Can a *place-based* labor policy in SF impact workers in other places (like Oakland?)

This would lead to a shift to the right in the labor supply curve for OAK which will lower Eq Wage in OAK (W^*_{OAK})

Yes, we see here that even a place-based policy in SF impacts the labor market in OAK.

(e) (1 point) Would your answer to part D be the same if the federal government enacted a binding minimum wage? (No math is required, just state your answer with a sentence or two to back it up.)

If the MW was binding in both SF & OAK, then no baristas would move since, relative to one another, SF & OAK labor markets remain unchanged.

2. (7 points) **Urban Labor Markets Part II.** Suppose we have two cities, A & B. Suppose A's labor market is a complete monopsony, and B's market is perfectly competitive. The labor market for A is given by:

$$\text{Demand} : W_d^A = 35 - 3 * L_d^A$$
$$\text{Supply} : W_s^A = 5 + 1.5 * L_s^A$$

The labor market in B is given by:

$$\text{Demand} : W_d^B = 40 - 2 * L_d^B$$
$$\text{Supply} : W_s^B = 4 + L_s^B$$

(a) (2 points) Solve for the monopsonist equilibrium in city A and the competitive equilibrium in city A. Compare them. **Note:** Not a typo, solve both equilibria for city A. For the monopsony equilibrium you must write down the marginal cost MC_L first.

Competitive Eq:

(set supply equal to demand)

$35 - 3L = 5 + 1.5L$

$\rightarrow L^* = 6\ 2/3$ ← Supply (or Demand)

$W^* = 5 + 1.5(L^*)$

$= 15$

$(6\ 2/3,\ 15)$

Monopsony Eq

(set MC equal to demand)

(MC is x2 the slope of S)

$MC_L = 5 + 3L$

$35 - 3L = 5 + 3L$

$L^M = 5$

(plug into Supply curve)

$W^* = 5 + 1.5(5)$

$= 15$

$(5, 15)$

12.5, fixed typo

(b) (1 point) Solve for the competitive equilibrium in city B.

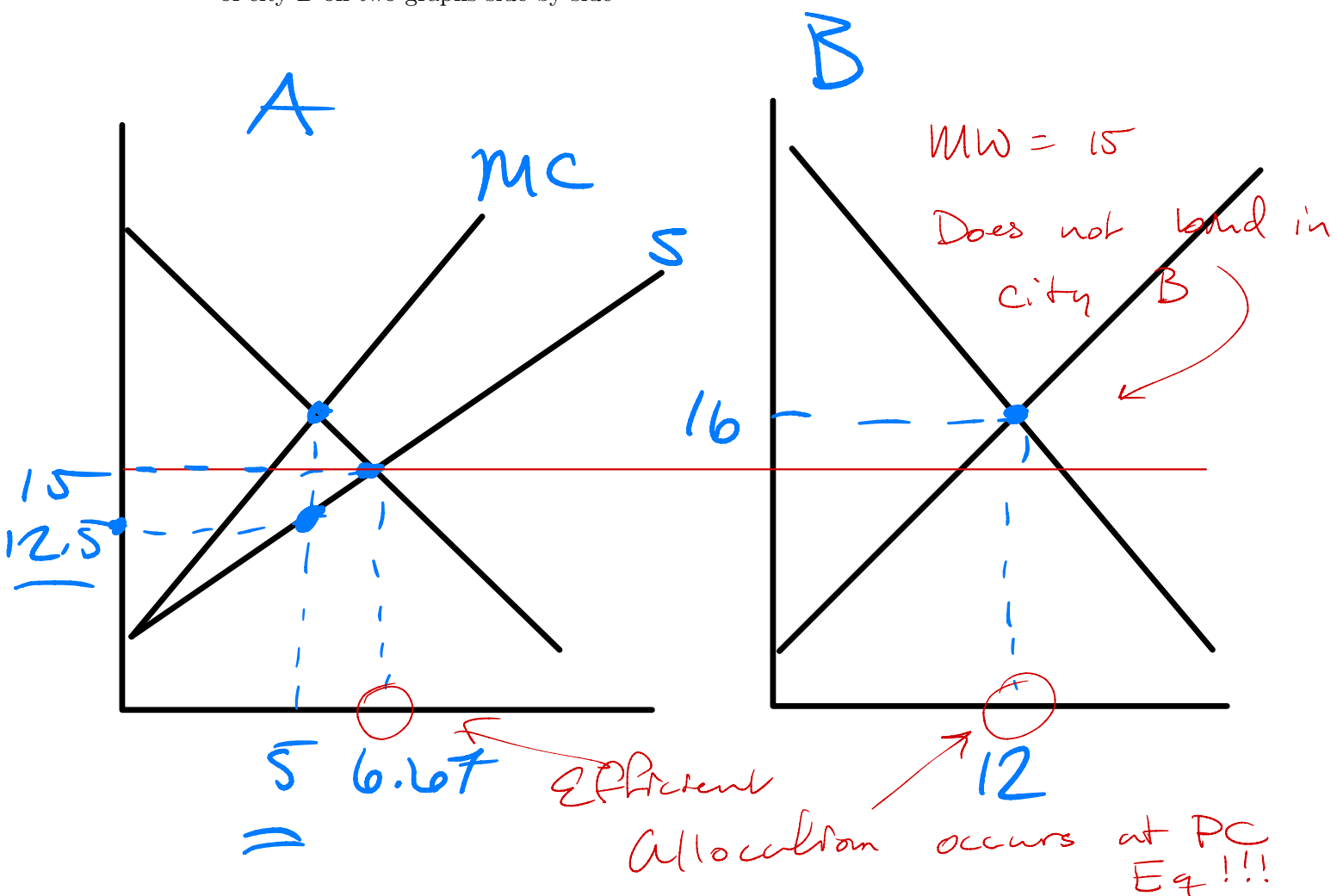
$40 - 2L = 4 + L$

$L^* = 12$

$w^* = 4 + L^* = 16$

$(12, 16)$

(c) (2 points) Graph the monopsony equilibrium of city A and perfect competition equilibrium of city B on two graphs side by side



(d) (2 points) The federal government wants to set a federal minimum wage to maximize the number of people employed across both labor markets. What minimum wage (not place-based) yields the maximum level of overall employment $(L_A^* + L_B^*)$? Provide both the specific minimum wage and the level of employment it yields.

The maximum level of employment $(L_A^* + L_B^*)$ always occurs at the perfectly Competitive Eq.

$MW = 15$ achieves this in both cities since it will not bind in City B.

3. (7 points) **Utility.** Suppose we have two cities, 1 and 2. Assume every individual has the same utility function given by:

$$u(w_j, r_j) = 4 * w_j - 0.75 * r_j$$

where $j = 1$ or $j = 2$. Furthermore, for all parts of the problem assume the total population is fixed at $1,000$ and wages in each city are given by:

$$w_1 = 15$$
$$w_2 = 12$$

(a) (1 point) What is the utility from each choice if $r_1 = 20$ and $r_2 = 15$. Is this an equilibrium? How do you know? (2 points)

$u_1(w_1, r_1) = 4 \cdot (15) - 3/4 \cdot (20) = 45$

$u_2(w_2, r_2) = 4 \cdot (12) - 3/4 \cdot (12) = 36.75$

$45 > 36.75$

Since $u_1 \neq u_2$ we do not satisfy the locational eq condition

(b) (2 points) For the rest of the problem you can now assume that rents are increasing in the population of each city. Specifically, assume $r_1(L_1) = 4 * L_1$ and $r_2(L_2) = 8 * L_2$. Compute the equilibrium population of each city equilibrium rents. (2 points)

$$U_1(w_1, r_1(L_1)) = U_2(w_2, r_2(L_2))$$

$$4 \cdot (15) - 3/4 \cdot (4L_1) = 4(12) - 3/4(8L_2)$$

$$60 - 3L_1 = 48 - 6L_2$$

$$-3L_1 = -6L_2 - 12$$

$$\boxed{L_1 = 2L_2 + 4} \quad (1)$$

$$\boxed{L_1 + L_2 = 1000} \quad (2)$$

$$(2L_2 + 4) + L_2 = 1000$$

$$\boxed{L_2^* = 332 \quad \& \quad L_1^* = 668}$$

(c) (2 points) Now suppose the government decides to levy a flat income tax of 10% on **all workers**. What are the new equilibrium population levels in each city? **Note**: your answer may include fractions/numbers with decimals (2 points)

$(1-0.1)w_i \Rightarrow$ $w_1 = (0.9)(15)$ $w_2 = (0.9)(12)$

Follow same steps as above.

Grade can't here 1st

(d) (2 points) ~~Now the~~ the government levels the 10% income tax on only people in city 1. What are the new equilibrium population levels in each city? Compare your answer to part (c). How did it change? Why? (2 points)

I messed up this question. A change does exist though it is very small. I made wages too insignificant. Whoops!

$w_1' = (1-0.1) \cdot w_1 = (0.9)(15)$ $w_2 = 12$

[Follow same steps w/ new w]

This should be different due to people moving away from city 1 to city 2. Rents will adjust.