Econ 330: Urban Economics

Lecture 07

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Lecture 07: Urban Labor Markets

Schedule

Today:

(i). Urban labor markets

- **Urban labor demand**
- **Urban labor supply**
- **Urban labor EQ**

(ii). Monopsony

Upcoming:

- **Reading** (Chapter 5)
- **Problem set 01 due on Friday at Midnight**

Housekeeping

Urban labor markets

Urban labor Markets

Why care about labor markets in urban economics?

David Card:

> A city *is* a labor market

Cities provide incentives for firms and workers to locate close to each other

Density of a city is generated entirely by incentives in the labor market

Q: Modeling **individual** location decisions, what should we consider?

Urban labor Markets

What are the most important features in location decisions?

- Wages
- Rents
- Amenities (catch all)
- Birthplace
- Distance to birthplace

Wages are significant factor of individual/household location choices

Imagine if Amazon/Google/Microsoft opens a campus in Portland

- What would happen to rents? Gentrification? Commute times?

Introducing large amounts of high paying jobs + capital changes a city

Urban labor Markets

A labor market consists of:

(i). Firms that buy labor. Generate labor demand

(ii). HH's who sell labor. Generate labor supply

Labor and urban economist model labor markets (supply) differently

Labor: Discuss labor supply as being generated from labor-leisure tradeoff

- Model: Rational agents making optimal choices over leisure/education

Urban: Discuss labor supply as being generated from *location choices*

- Assume people work fixed hours but choose where to work

Urban labor Markets: Labor demand

Urban labor Markets: Labor demand

What do both fields have (somewhat) in common?

Labor demand

Definition: Labor Demand

- Set of quantities of labor demanded corresponding to a *set* of wages

Q: What's the difference between changes in:

- *labor demand*
- *quantity of labor demanded*

Δ Labor demand: Shift in the demand curve

Δ Quantity of labor demanded: Movement along a demand curve

Urban labor Markets: Labor demand

We will start with the **competitive** model:

Assumptions:

(i). Firms seek to maximize profits

(ii). Markets are perfectly competitive (in both inputs and output)

$\Rightarrow$ No individual firm can influence the price of labor (or other inputs)

$\Rightarrow$ No individual firm can influence the output price

Are these assumptions reasonable? Discuss

Urban labor Markets: Labor demand

Derive a condition for EQ labor the firm will hire in the competitive model?

$$\pi = P * Q - TC$$

Urban labor Markets: Labor demand

Derive a condition for EQ labor the firm will hire in the competitive model?

$$\pi = P * Q - TC$$
$$\pi = \underbrace{P * F(L, K)}_{\text{TR}} - \underbrace{w * L - r * K}_{\text{TC}}$$

where:

- P: Output price
- $F(L, K) = Q$: Quantity produced (function of labor and capital)
  - $Q = F(L, K)$
- w: Wage rate; L: total labor employed $\Rightarrow w * L =$ cost of labor
- r: rental rate; K: capital $\Rightarrow r * K =$ cost of capital

Urban labor Markets: Labor demand

Claim: Firm hires labor iff the *marginal profit* w.r.t to labor is positive.

Definition: Marginal Profit w.r.t to labor ($\frac{\Delta \pi}{\Delta L}$)

- The change in profit from hiring an additional unit of labor

"Proof": (Too many cooks)

- If $\frac{\Delta \pi}{\Delta L} < 0$, added profit from an additional unit of labor is negative (ie. a loss), so the firm *should not* hire the next unit
- If $\frac{\Delta \pi}{\Delta L} > 0$, added profit from an additional unit of labor is positive (ie. a gain), so the firm *should* hire the next unit
- If $\frac{\Delta \pi}{\Delta L} = 0$ Optimal allocation for the firm. Can't do better

Urban labor Markets: Labor demand

Definitions:

- **Marginal Product of Labor**: Change in output from an additional unit of labor employed
  - $MP_L = \frac{\Delta F(L,K)}{\Delta L}$
- **Marginal Revenue Product of Labor**: Value of the change in output from an additional unit of labor employed
  - $MRP_L = P * \frac{\Delta F(L,K)}{\Delta L}$

Urban labor Markets: Labor demand

So what is $\frac{\Delta \pi}{\Delta L}$?

$$\frac{\Delta \pi}{\Delta L} = P * \frac{\Delta F(L,K)}{\Delta L} - w * \frac{\Delta L}{\Delta L}$$

Urban labor Markets: Labor demand

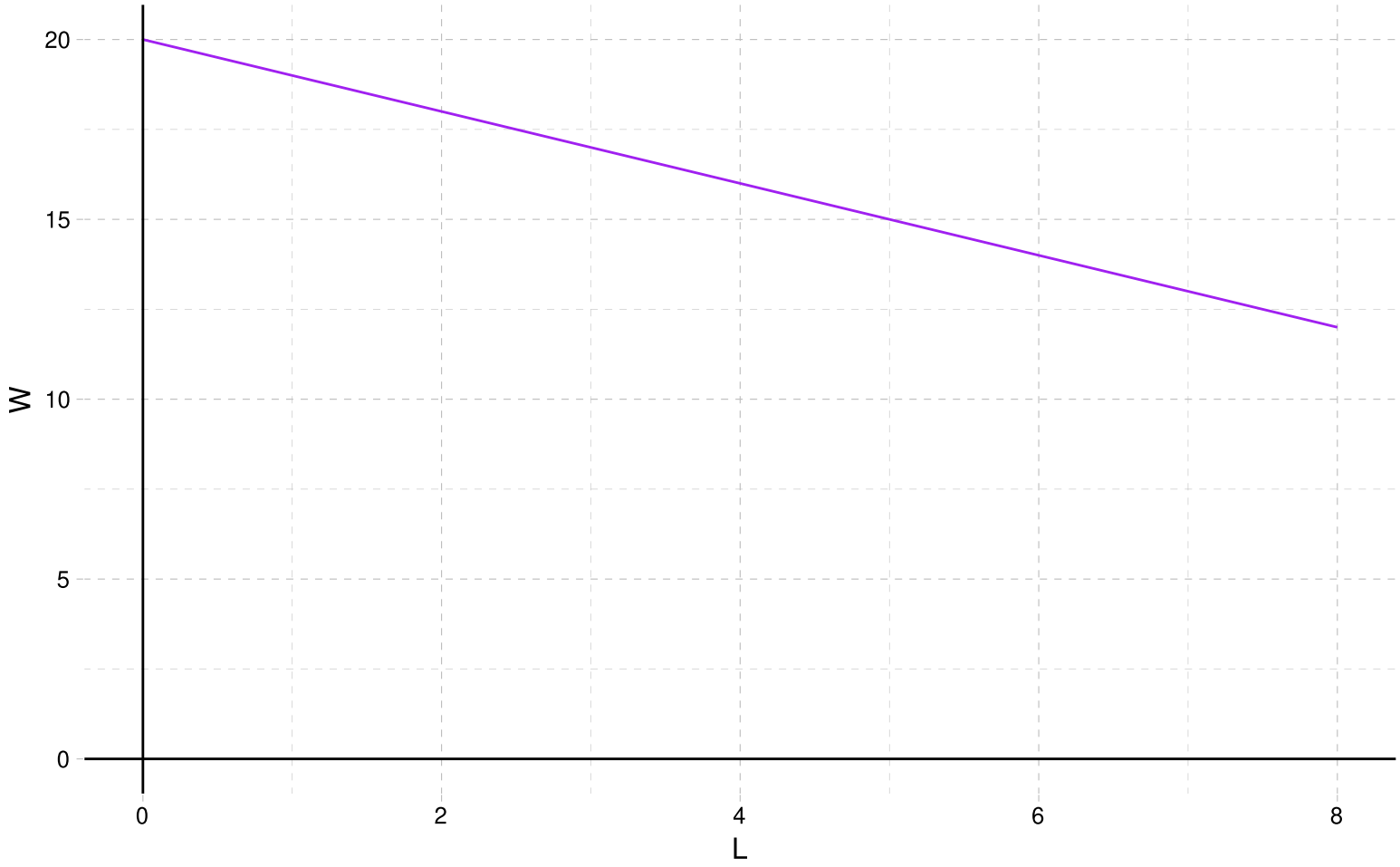
So what is $\frac{\Delta \pi}{\Delta L}$?

$$\begin{aligned}\frac{\Delta \pi}{\Delta L} &= P * \frac{\Delta F(L,K)}{\Delta L} - w * \frac{\Delta L}{\Delta L} \\ &= P * MP_L - w \\ &= MRP_L - w\end{aligned}$$

Now, set $\frac{\Delta \pi}{\Delta L} = 0$ to get the labor demand curve:

$$MRP_L - w = 0 \implies MRP_L = w$$

Urban labor Markets: Labor demand



Urban labor Markets: Labor demand

Why might **labor demand** curves vary across cities?

(i). Differences in productivity across cities (agglomeration)

(ii). Variation in (business) taxes across cities

(iii). Industrial public service infastructure (electricity, water, gas pipelines)

(iv). Land use policies

- stricter zoning $\Longrightarrow$ higher land price $\Longrightarrow$ less money for other inputs

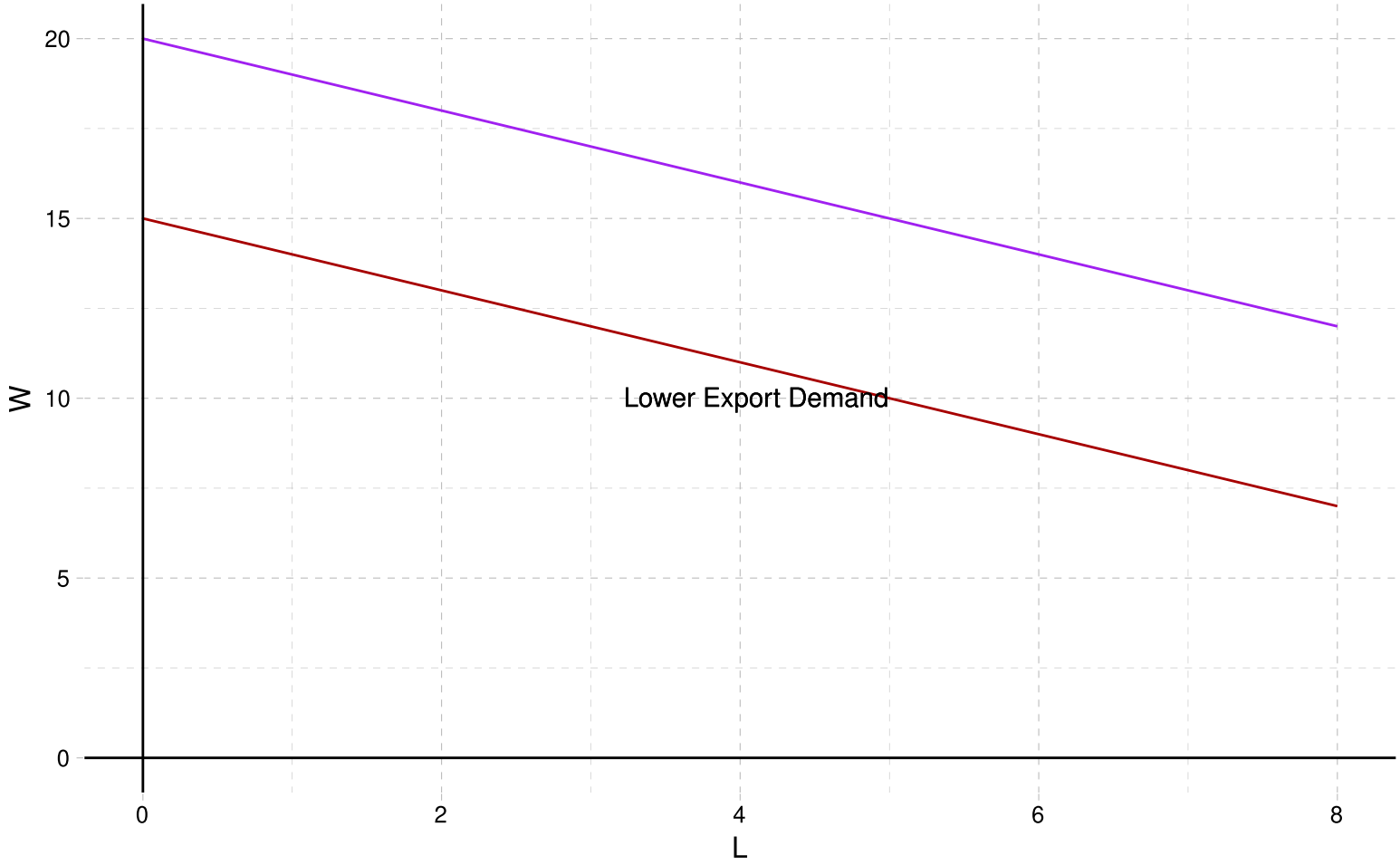
(v). Demand for a city's exported goods

Urban labor Markets: Labor demand

Q: What would two cities where everything is equal except one has a higher productivity of labor look like?

Urban labor Markets: Labor demand

Q: What about a city with lower export demand?



Urban labor markets: Supply

Labor Supply

Labor supply is driven from location decisions of individuals. What generates location choices?

1) **Wages**

2) Rents

3) Amenities

4) Other, individual specific stuff (like birth location)

Labor Supply

A *set* of quantities of labor supplied corresponding to a *set* of wages.

Q1: What causes *movement along* the labor supply curve?

- A change in wages. That's it!

Q2: What causes a *shift* of the labor supply curve?

1) Changes in amenities (building of a nicer school, eroding of air quality)

2) Changes in residential government expenditures (increase in taxes drives people away, increases in govt spending brings people in)

Labor Supply

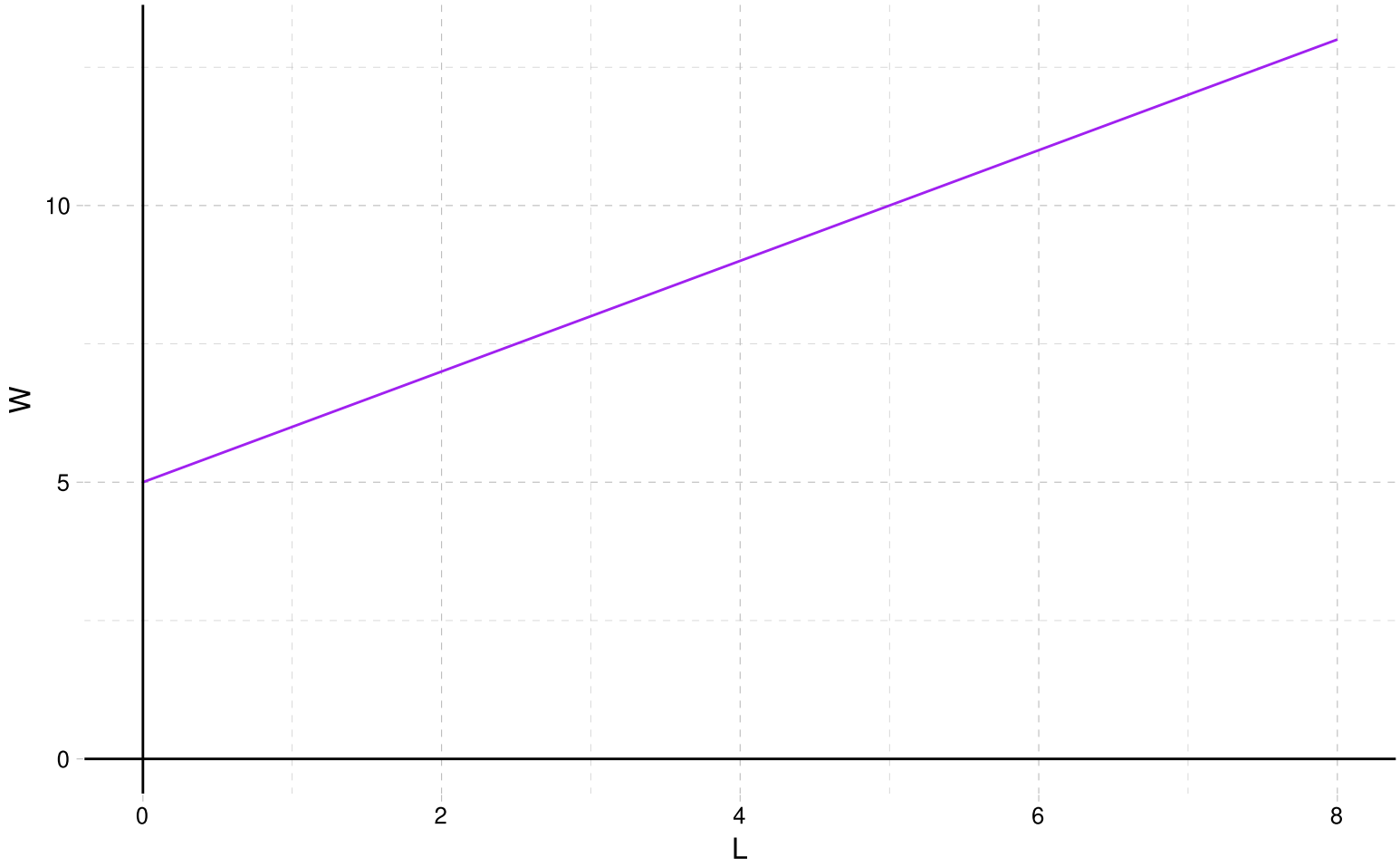
Knowing how responsive workers are to changes in wages is key for vast swaths of policies

- Estimates for labor supply elasticities are pretty big
- If $\varepsilon_{\text{workforce,wage}} = 2$, what does this mean?

In general estimated labor supply elasticities are higher for workers with a college degree than without a college degree. What does this mean?

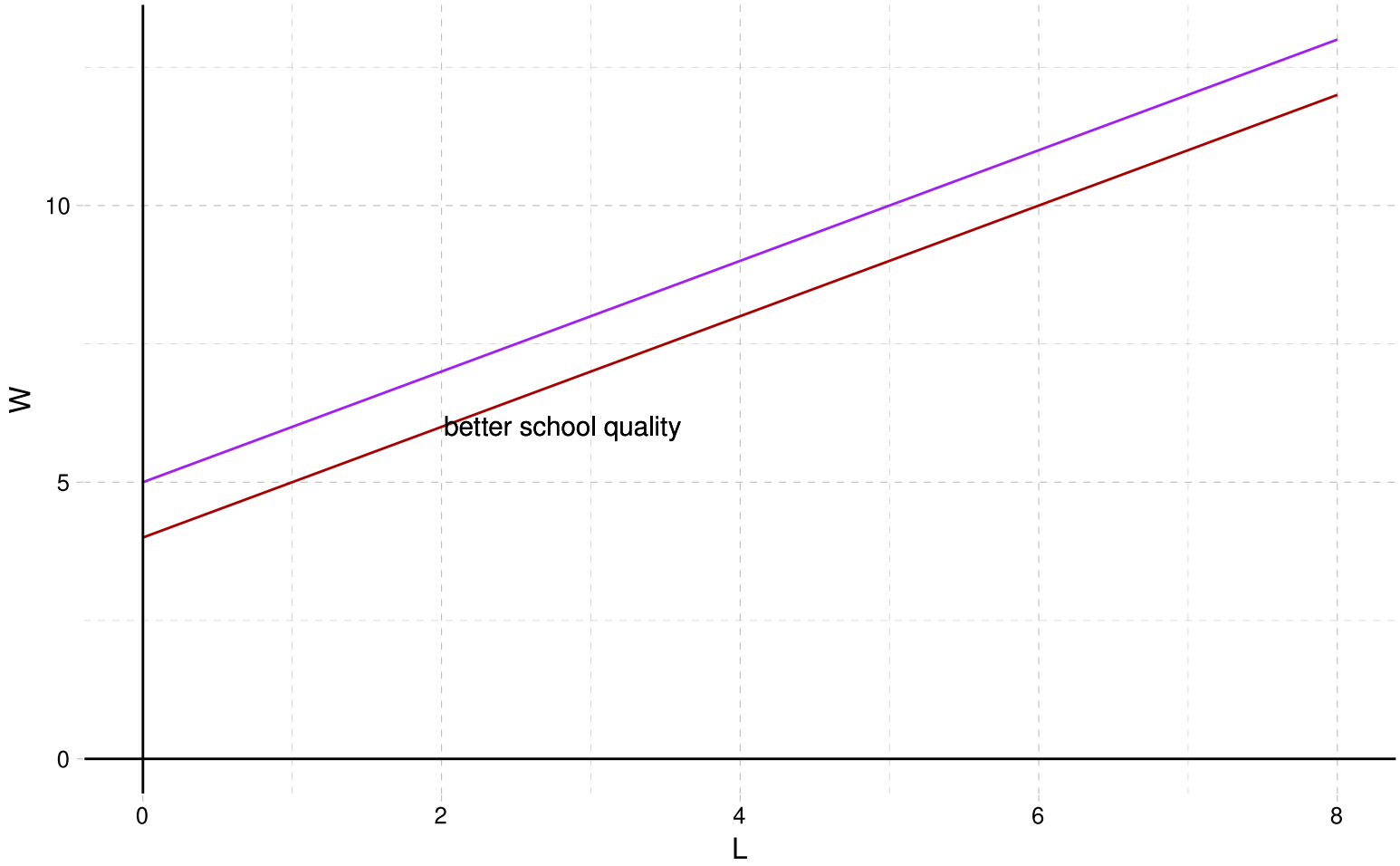
- College educated individuals are more responsive to changes in wages w.r.t to their location decisions

Labor Supply Example



Labor Supply

Question: What happens when a city improves its school quality?



Checklist

0) : ✅

1) : ✅

2) : ✅

3) ✅

4) **Equilibrium**

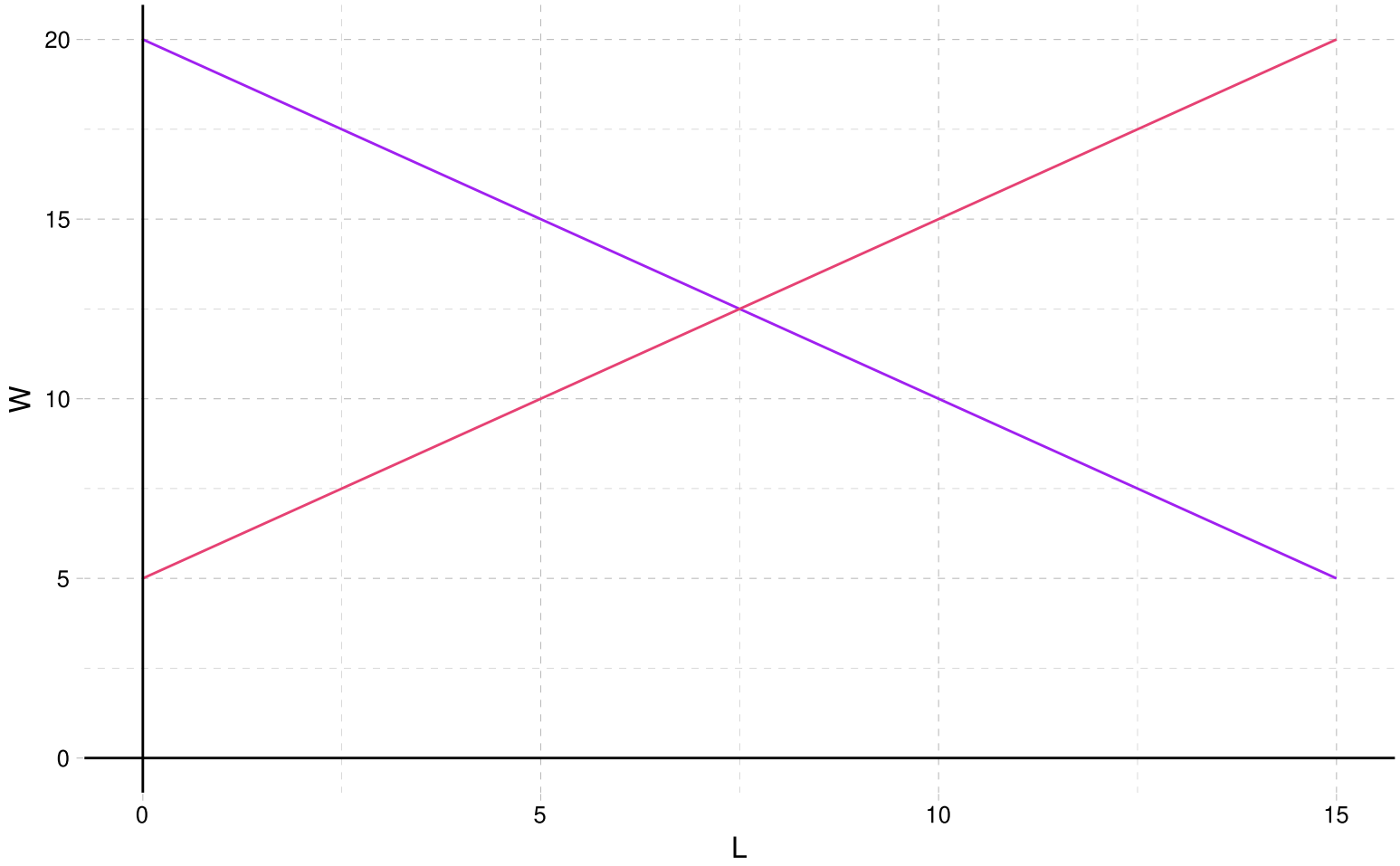
Equilibrium

Defn

- A **labor market equilibrium** is a pair of points (L^*, W^*) such that:
  - labor supply = labor demand
- In other words: a labor market eq is where there is no excess supply or demand

We usually think of cities as being "seperate" labor markets, so the eqs can be different across cities

Equilibrium: Example



Min Wage Refresher

Recall from EC201: minimum wages are a form of **price controls**.
Specifically, a minimum wage is a:

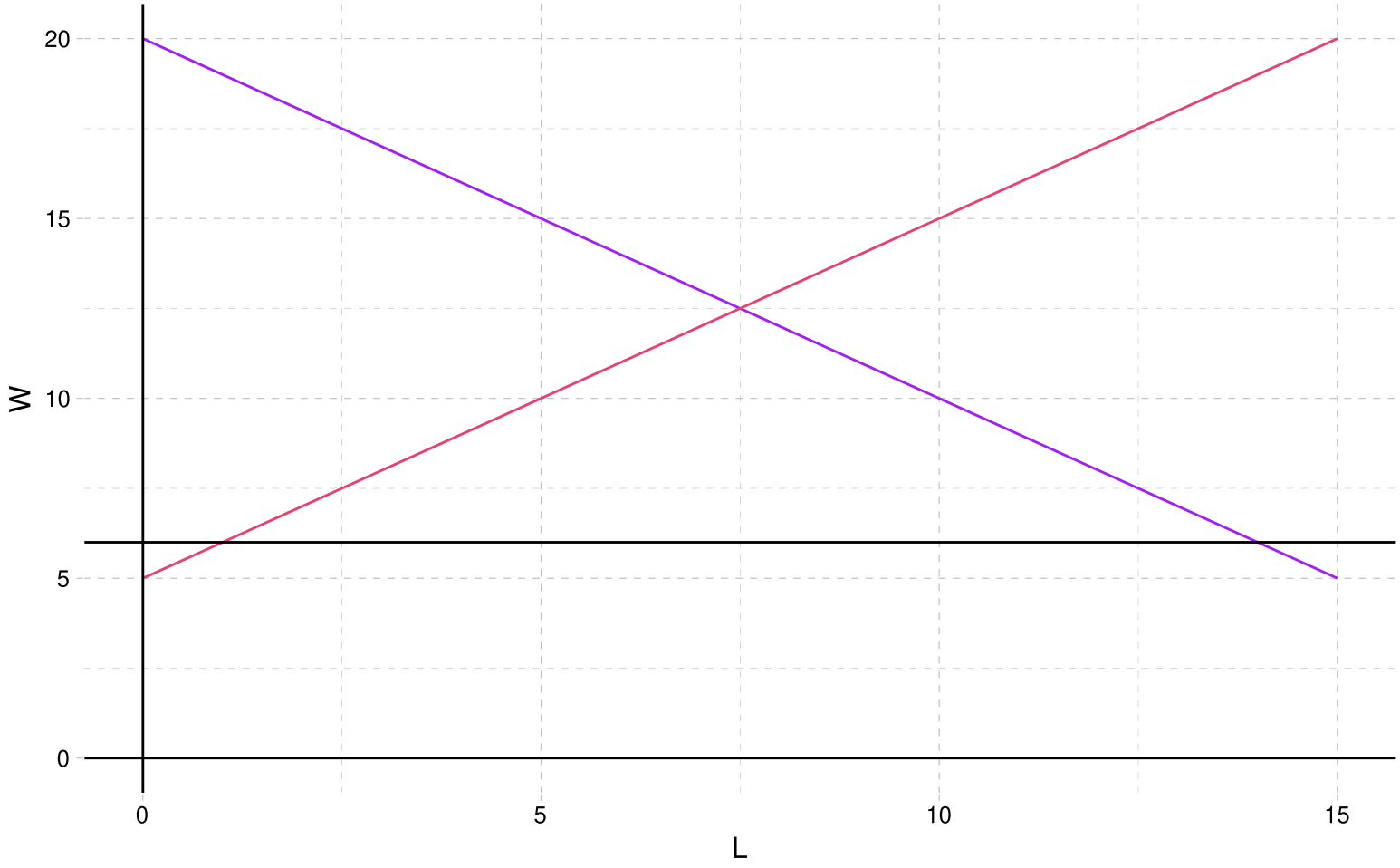
- Price floor: dictates the *minimum* allowed price for transactions in a marketplace

We say that a price floor is **effective** if it has an impact on the market equilibrium

- Price floors that are below the market price are ineffective

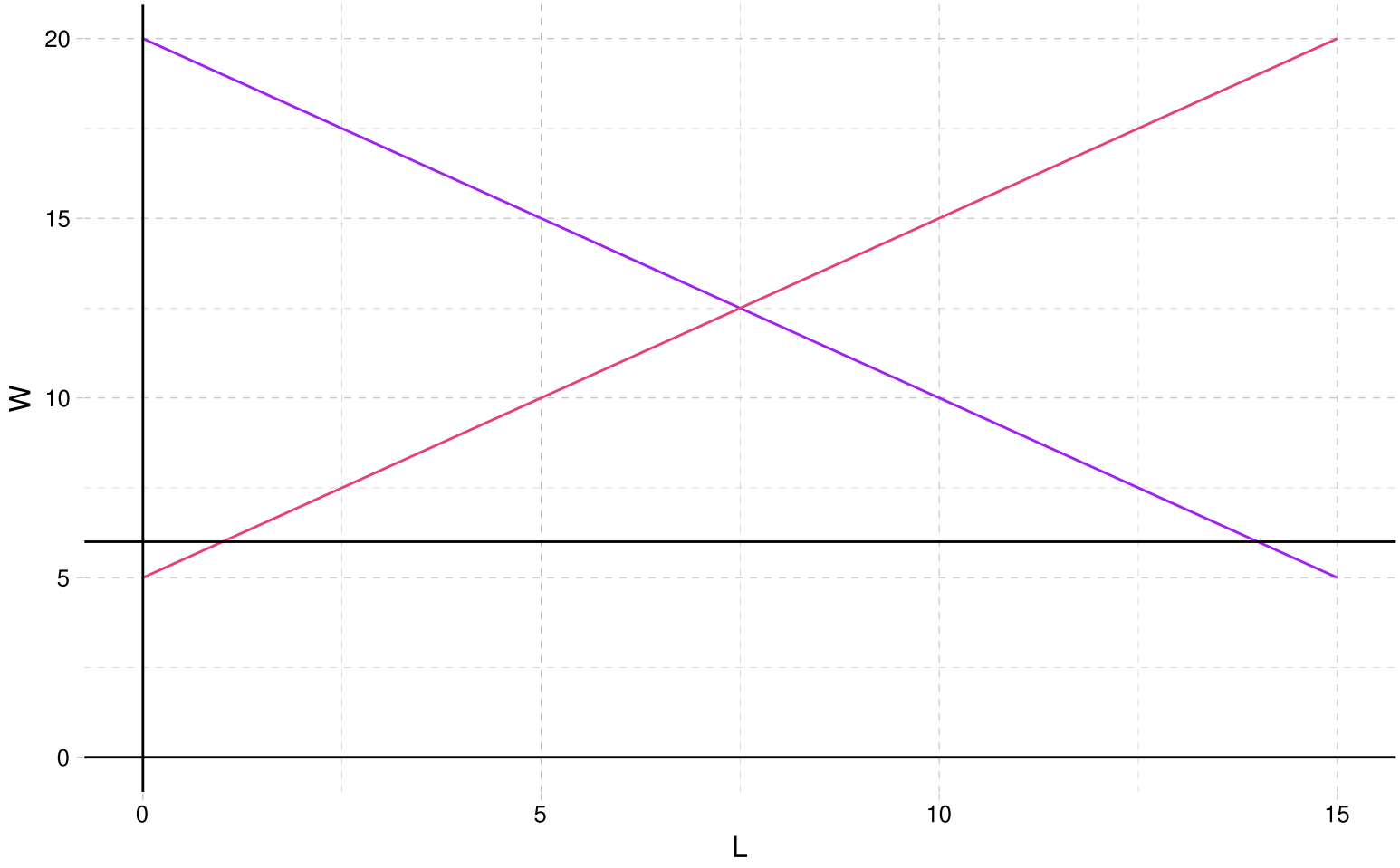
Min Wage Refresher

Is the following effective/ineffective?:



Min Wage Refresher

The following is **ineffective**



Min Wage Refresher

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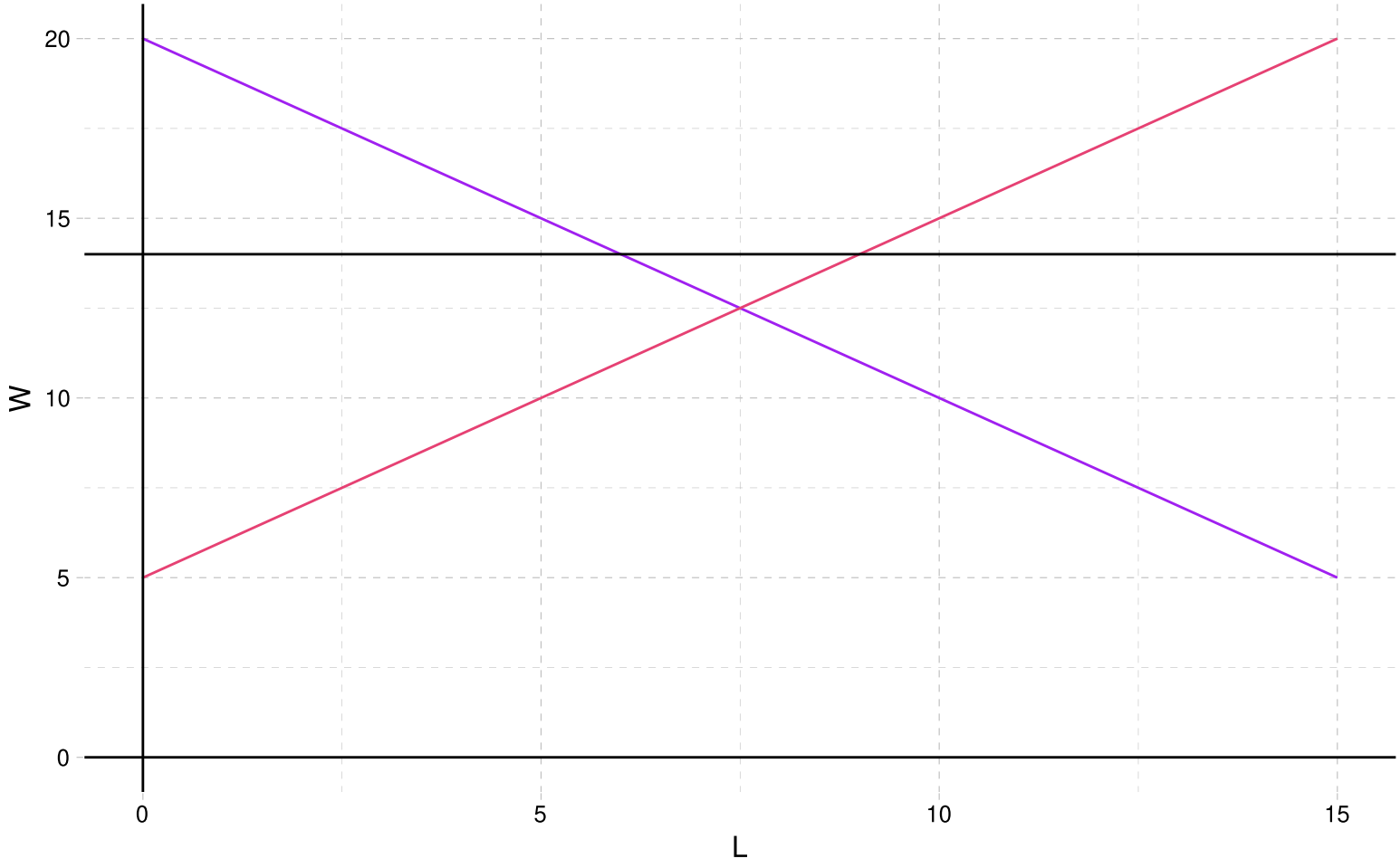
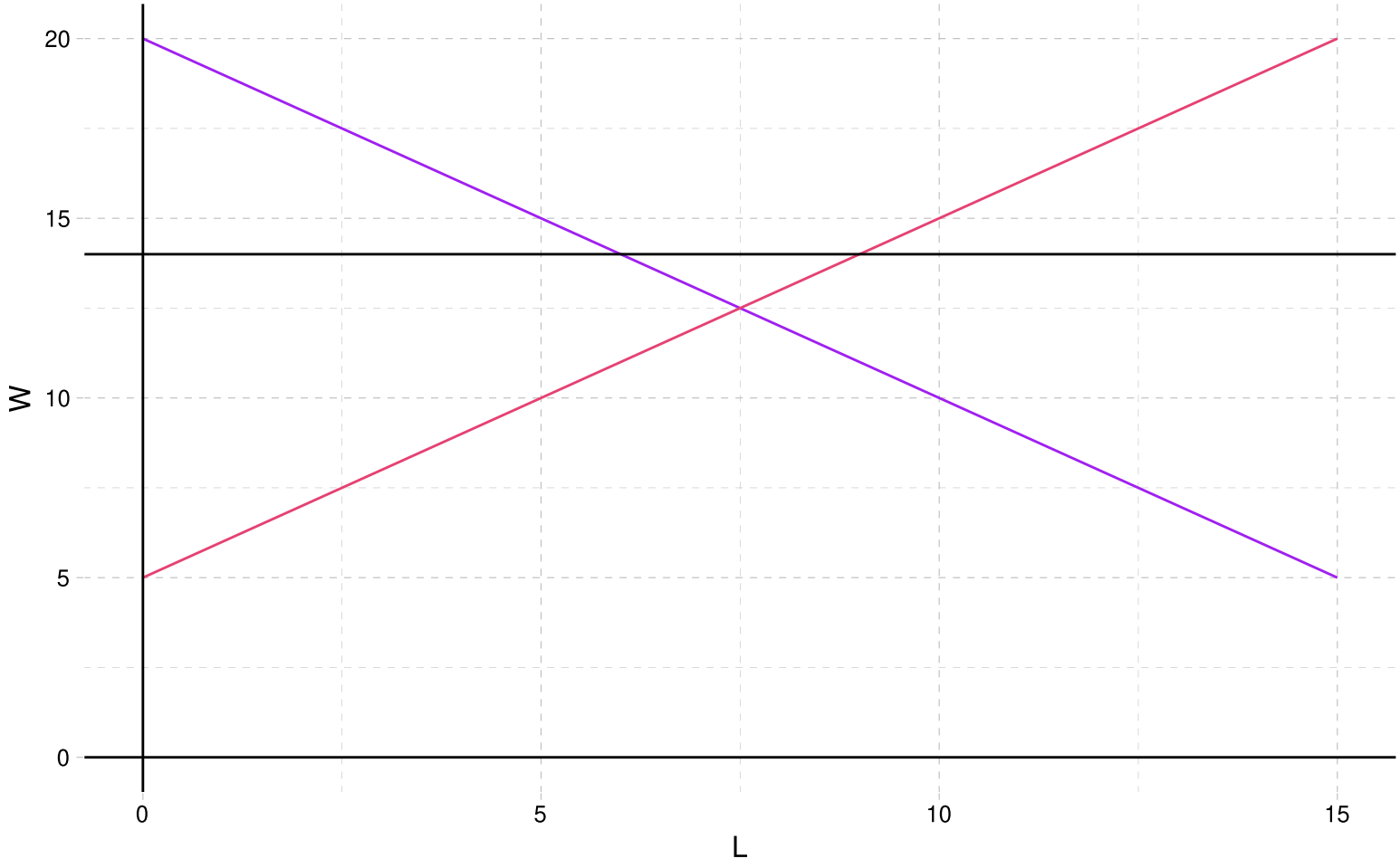
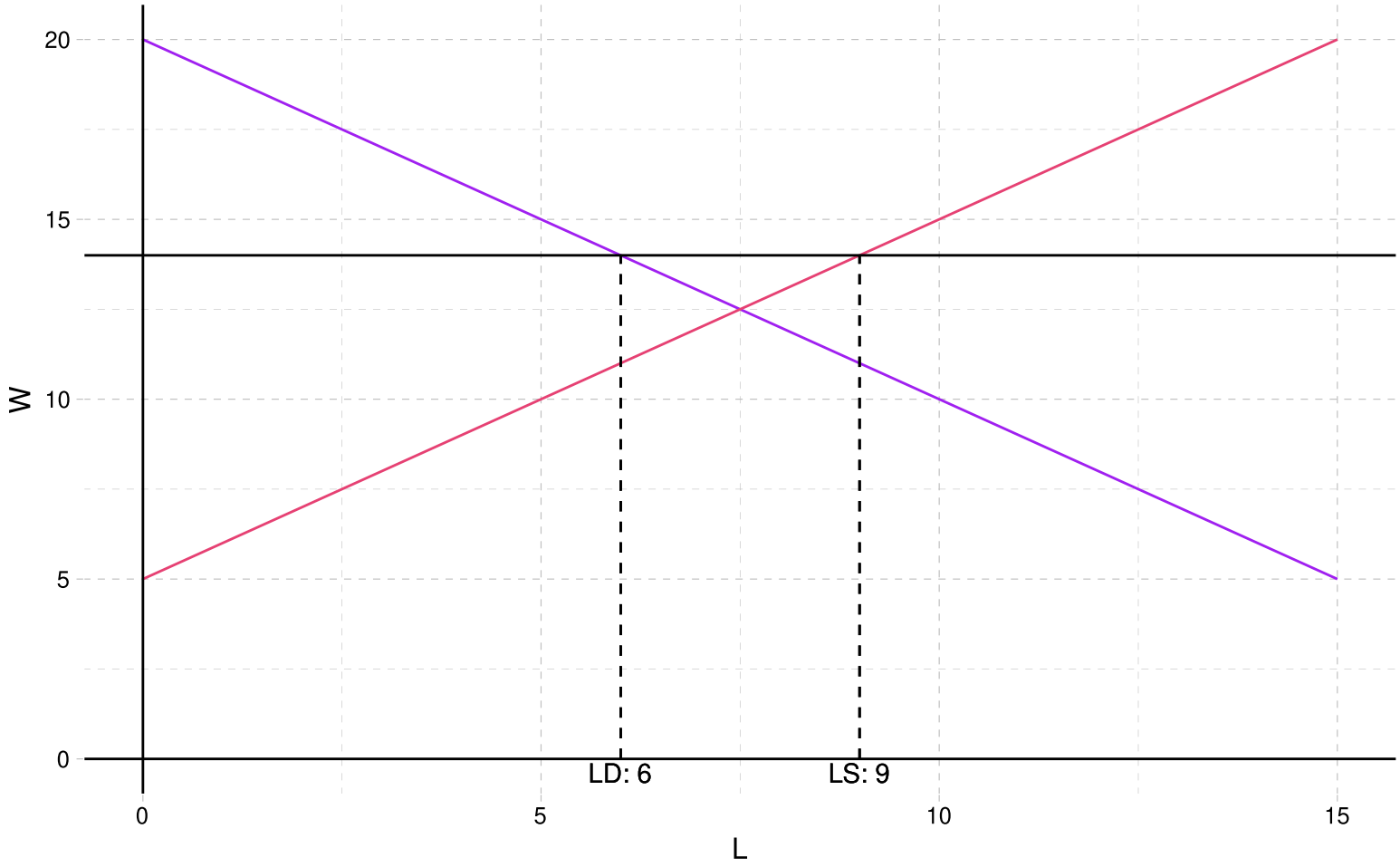


Min Wage Refresher

The following is **effective**

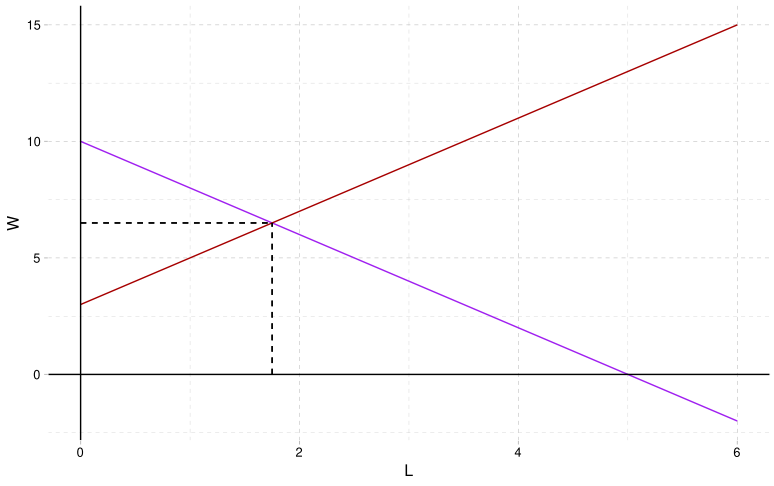


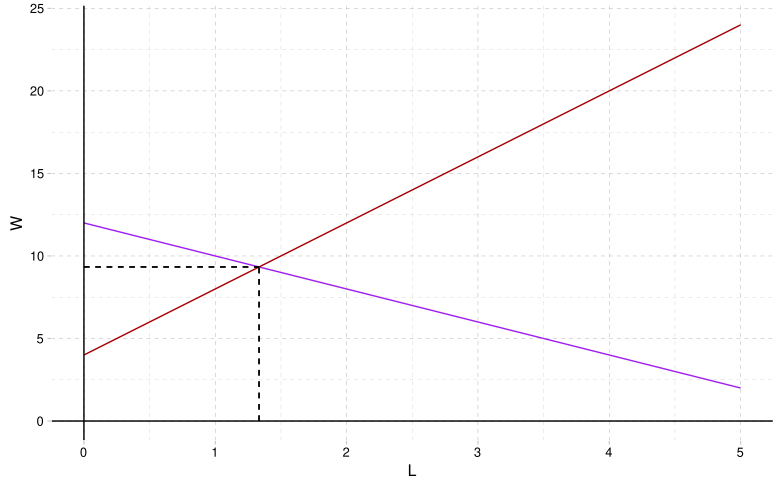
Min Wage Refresher



Example: Two Cities

If we treat cities as two *seperate* labor markets, have:





Significance?

2 Questions

- Why do we care so much about modeling cities as different labor markets? **Discuss**
- Do you think all labor markets across cities and industries are competitive? **Discuss**

Competitive Model

We built up labor **supply** and **demand**. Where do these come from?

- Demand: Firms
- Supply: Workers

What did we assume about the market structure?

- **Perfect Competition**
  - Firms pay workers their MV of labor (max WTP)

Probably not super reasonable

Monopsony

Let's consider a different labor market structure:

Monopsony

- We say a firm is a **monopsonist** if they are **the only employer** of labor in the area (city)
- We say a firm has **monopsony power** if they have the ability to influence the market wage
    - Not to be confused with **monopoly** (in which there is only one **seller** of a good)
    - **Monopsony** has to do with one **buyer** of a good

Examples of Monopsonys

Can you think of any?

- Universities (go GTFF!)
- Coal Towns
- Amazon / Walmart Towns?

Monopsony

So what do you think the main consequence(s) of **monopsony** are?

Monopsonists have the ability to pay a wage below the marginal value

The consequences?

- Higher profit for the firms
- Deadweight loss (inefficient outcome)

We will formalize this in a few slides, but first lets go over some evidence of local monopsonys

Monopsony: Formalizing the Result

In the competive model, the firm pays the worker $w = MRP_l$.

- Is this what the monopsonist would do?
- Where is this?

Recall: The competitive model

Remember: in the competitve model, the firm seeks to maximize profits (but does not influence prices).

- The competitive firm hires labor until the marginal profit w.r.t to labor is zero

$$\pi = TR - TC$$
$$\pi = TR - wL - rK$$

Profit maxing cond: $\frac{\Delta \pi}{\Delta L} = 0 \implies MRP_L - w = 0 \implies w = MRP_L$

Monopsony: Formalizing the Result

With a monopsonist, the amount of labor they hire influences the wage. That is, now

$$\pi = TR - w(L)L - rK$$

where $w(L)$ is an increasing function of the amount of labor hired

- The firm should hire labor until marginal cost is equalized to marginal benefit (**same as before**)
    - or: *marginal profit wrt labor* is equal to zero

$$\frac{\Delta \pi}{\Delta L} = 0$$

Monopsony: Formalizing the Result

So the monoposonist hires until:

$$MRP_L = MC_L$$

Compared to the competitve outcome:

$$MRP_L = W$$

Important: Note that in the competitive model, marginal cost of labor was constant (and equal to wage).

- Now: marginal cost is increasing because monopsonist is *only* buyer of labor

An Example:

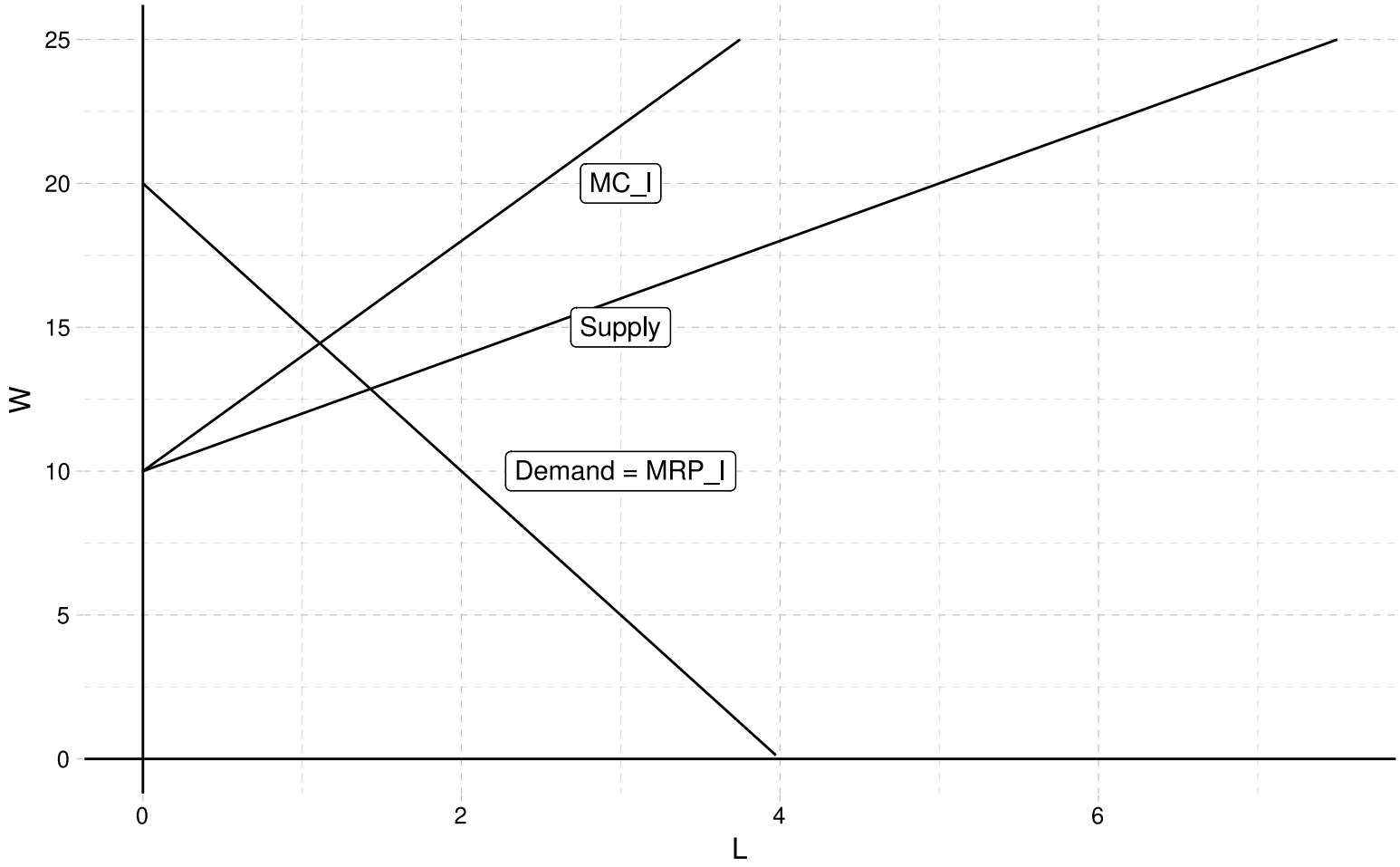
Monopsonist Wage Schedule

Wage	Labor	TC	MC
1	1	1	1
2	2	4	3
3	3	9	5
4	4	16	7
5	5	25	9

Let's fill in the table. What do you notice?

At every level of labor, the marginal cost of labor exceeds the wage

Graph of Monopsony



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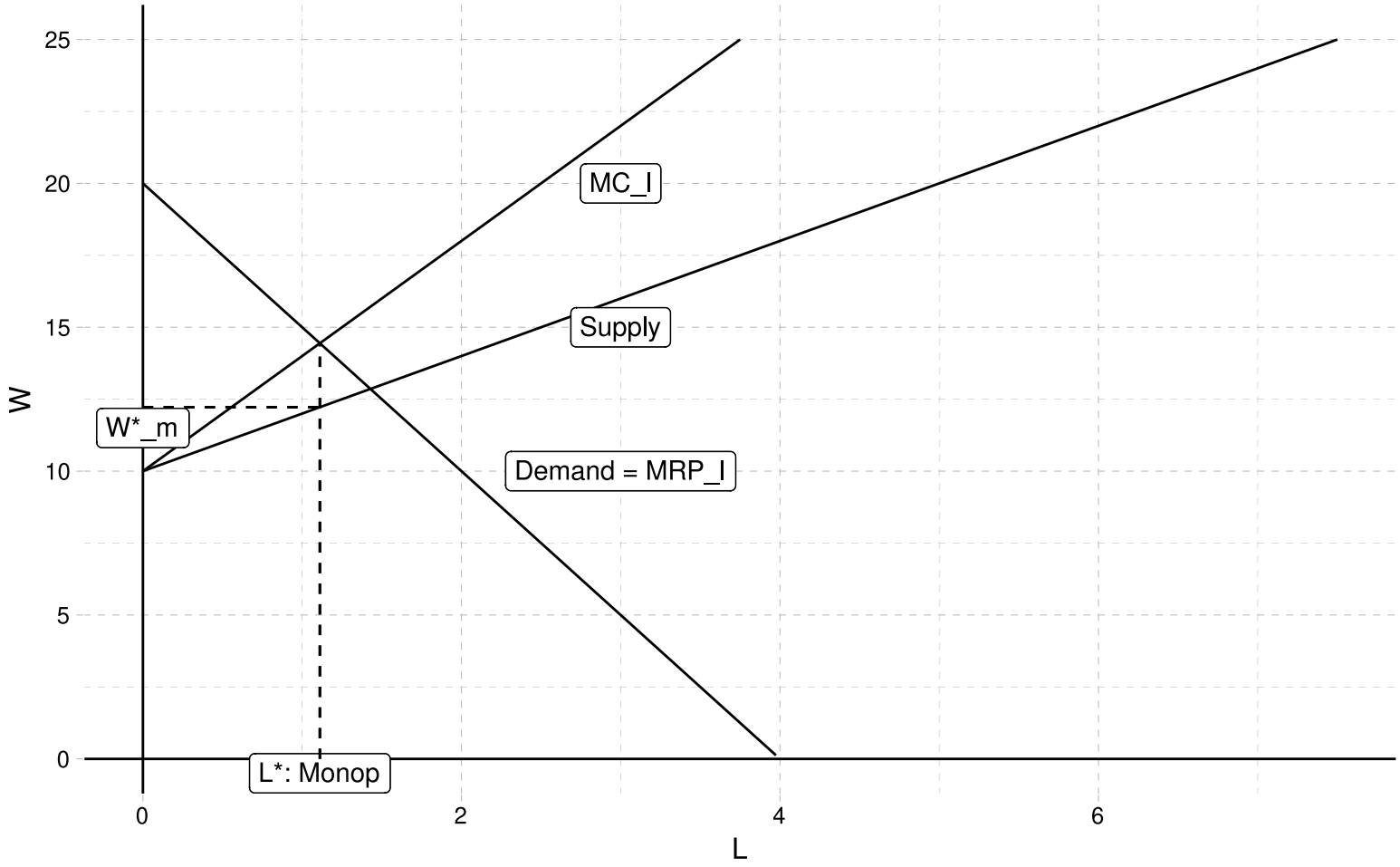

Checklist

0) : ✅

1) : ✅

2) : ✅

3) : ✅

4) : ✅