

Lecture 13(iii)

Announcements

Next week there is a debate in sections about Immigration.

To prepare, go to the special web on immigration at week 14 on Canvas.

Lecture

0. Updating deterrence game
- 1 Demand for factors of production (derived demand for labor)
2. Combine with labor supply
3. Immigration

Relabel games from last class

Before credible commitment to retaliation

		Soviet Union	
		First Strike	Don't Attack
U.S.	First Strike	USSR gets -100 U.S. gets -100	USSR gets -1000 U.S. gets 200
	Don't Attack	USSR gets 200 U.S. gets -1000	USSR gets 0 U.S. gets 0

Classic prisoner's dilemma.
Dominant strategy equilibrium is both choose first strike.

After credibly committing to massive retaliatory attack on warning. So if one party launches a first strike, nuclear winter results. The payoffs now look like: (where $-\infty$ means "minus infinity")

		Soviet Union	
		First Strike	Don't Attack
U.S.	First Strike	USSR gets $-\infty$ U.S. gets $-\infty$	USSR gets $-\infty$ U.S. gets $-\infty$
	Don't Attack	USSR gets $-\infty$ U.S. gets $-\infty$	USSR gets 0 U.S. gets 0

Now bring in North Korea. Kim Jong Un has established a reputation for ruthlessness. He had his uncle killed with an anti-aircraft gun. If he ever showed weakness, it is likely his regime would topple. If the US every tries a

surgical attack that takes out North Korea's nuclear weapons, it is likely that North Korea's conventionally weapons will survive, at least in the short run, and can be used to level Seoul, and kill millions of people. This seems to me be a credible threat that North Korea would do this. This is a terrible outcome, and it probably the main reason the US has not tried a preemptive attack up to this point.

Demand For Factors of Production (With a Focus on Labor)

So far:

- studied consumer demand (beer and pizza)
- firm supply
- Now look at demand for factors of production

Derived demand (firms don't want labor for own sake, want it to make a profit).

Technology of firm

Output prices

Input prices,

Put together and get labor demand

In the lawn business example on the right, average labor productivity is initially:

$10 \text{ lawns} / 2 \text{ workers} = 5 \text{ lawns per worker.}$

If we add one more worker, but KEEP the CAPITAL LEVELS fixed (so still only 2 lawn mowers), average labor productivity falls to:

$13 \text{ lawns} / 3 \text{ workers} = 4 \frac{1}{3} \text{ lawns per worker.}$

There is diminishing returns here. Easy to see that with only 2 lawn movers, the third worker might have to spend some time waiting around for equipment to use.

Technology given by

Production function

How output depends upon inputs.

Lawn Business:

2 workers for full day (8 hours)

1 truck

2 lawn mowers

1 edger

Suppose with this combination of inputs, output is **10 lawns mowed**

n

Add more inputs, have more output.

e

Suppose add another worker and can now mow 13 lawns.

(Handwritten signature)

Marginal Product of labor (MP) from 2 to 3 workers is

$$13 - 10 = 3 \text{ lawns.}$$

How much labor should the firm hire?

- Will depend upon the price of lawns.
 - Suppose price equal \$40 per lawn.
 - Value of the marginal product equals $P \times MP = \$40 \times 3 = \120 .
 - Should you hire the third worker?
- Will also depend upon the wage.

If wage $>$ \$120 a day,
then wage $>$ Value of MP

Bad idea

If wage $<$ \$120 day,
then wage $<$ Value of MP,

Good idea.

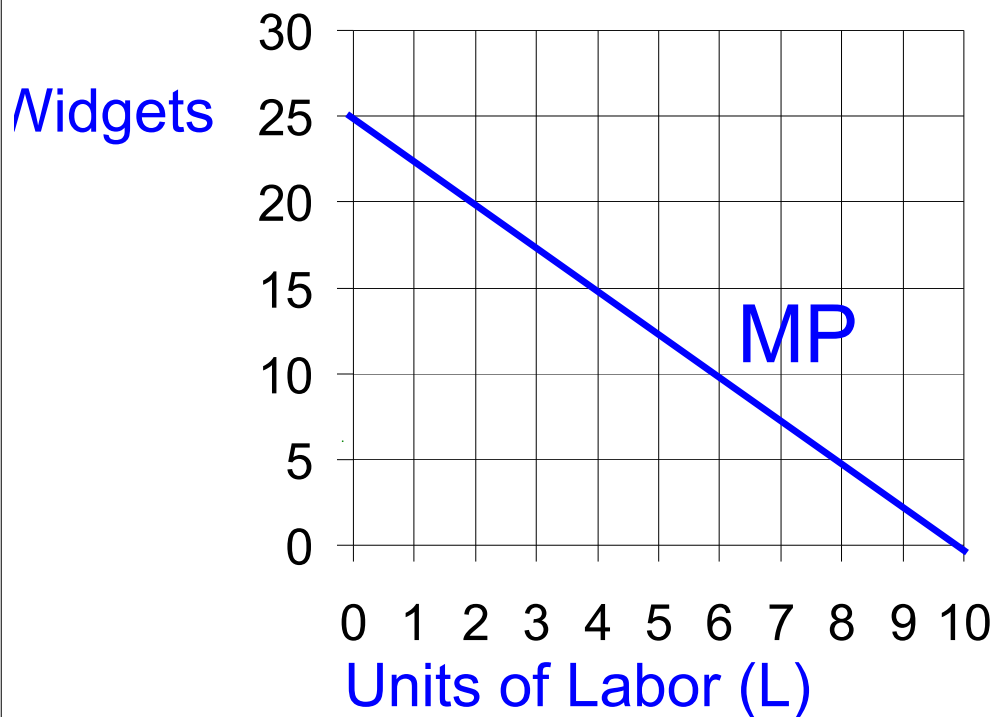
General Rule: pick labor where
wage = Value of MP

Wage is marginal cost of one more work

Value of MP is the marginal benefit.

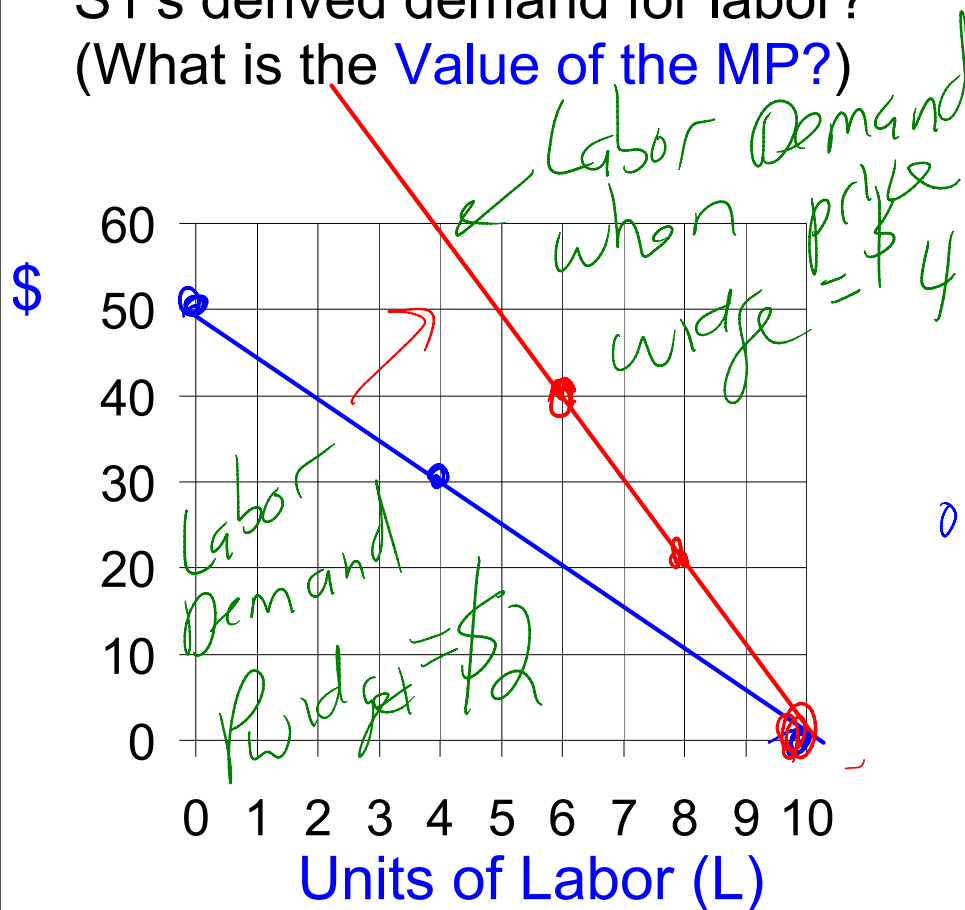
So this is yet another marginal benefit equals marginal cost condition.

Example: Back to Econland.
 Suppose the Marginal Product of Labor for S1 looks like this:

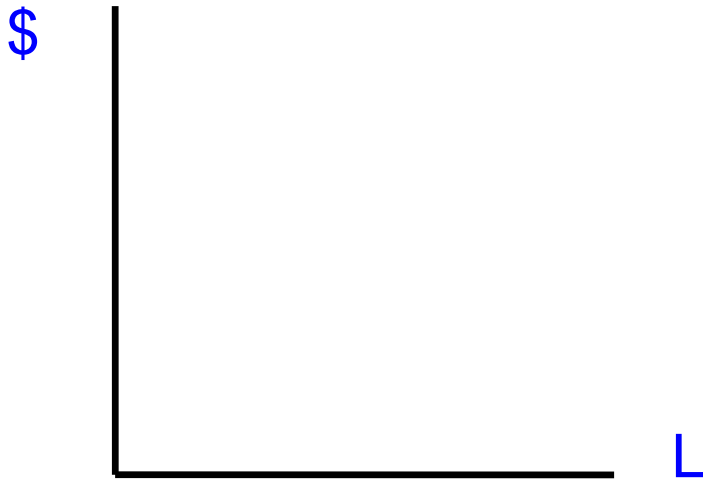


Note: We have **diminishing marginal product**, MP is downward sloping.

Suppose Widget Price is \$2. What is S1's derived demand for labor?
 (What is the **Value of the MP?**)



When widget price is \$2
 Value of MP at L = 2 is $\$2 \times 20 = \40
 Value of MP at L = 4 is $\$2 \times 15 = \30



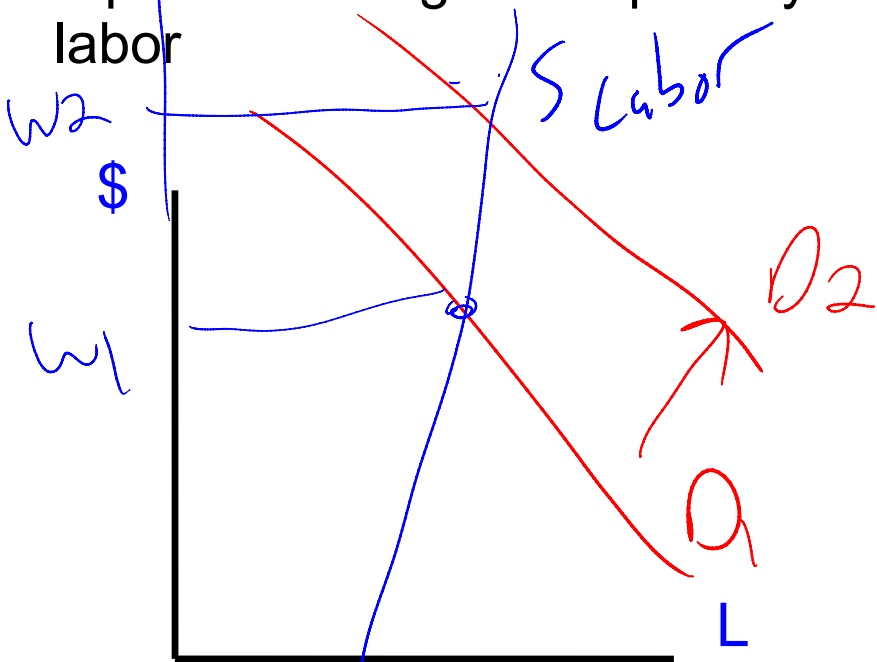
What happens when wage changes?

Movement along fixed demand curve

What happens when output price changes? shift

(Let's go back and see what happens if $P=\$4$ for S1)

Add in **labor supply** to obtain equilibrium wage and quantity of labor



Now consider the market for professional athletes. What happens to the equilibrium wage when television advertising payments to the league increase?

Increases in advertising revenues increase the value of the MP of star athletes. This shifts out the demand for labor (star athletes) raising their wages.

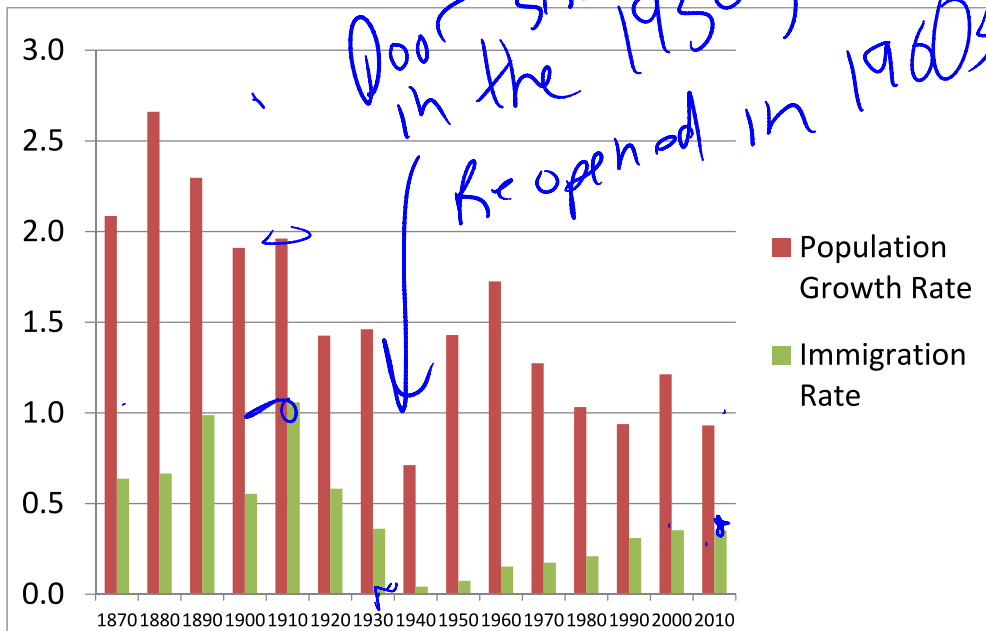
Next consider tax cut on corporations that lowers the cost of capital. This will lead to increases in the amount of capital in the economy per worker.

Research suggests that increases in capital raise the marginal product of labor, thus increasing wages. However, can have distributional effects, since capital tends to be a complement of high skill labor and a substitute for low skill labor. More on this next week.!

Immigration



Historical Background: Population and Immigration Rates



Start analysis with case where:
all workers have same skill.

Two extreme cases

Case 1 Agricultural economy
(subsistence farming)



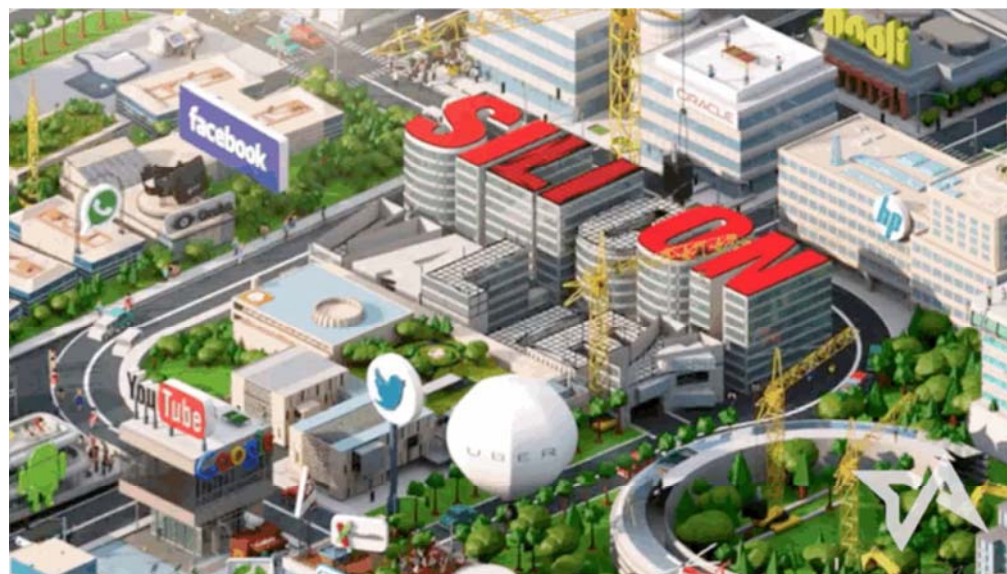
Plot average product as a function of the population:



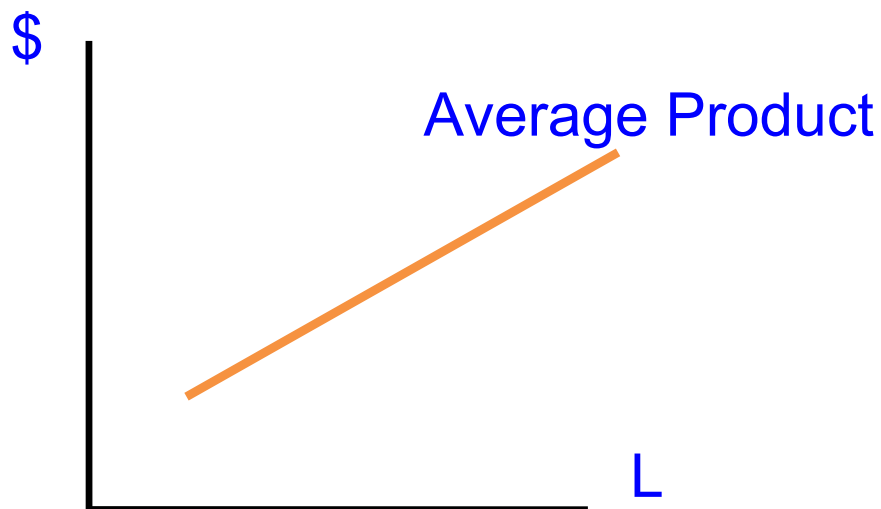
Fixed factor: Land
Run into diminishing returns

The theory underlying population control strategies (e.g. China's one child policy)

Case 2: Manufacturing or Innovation Economy
(No fixed factor like land)



Plot average product as a function of the population:

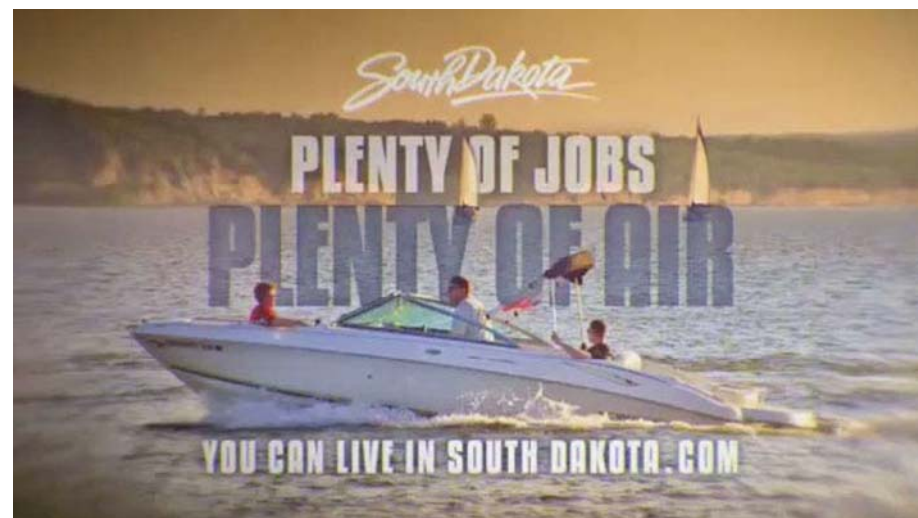


Case of increasing returns
Mechanisms:

- Scale economies
- Greater product variety
- Knowledge spillovers and information sharing (think Silicon Valley)

The theory explaining the existence of cities

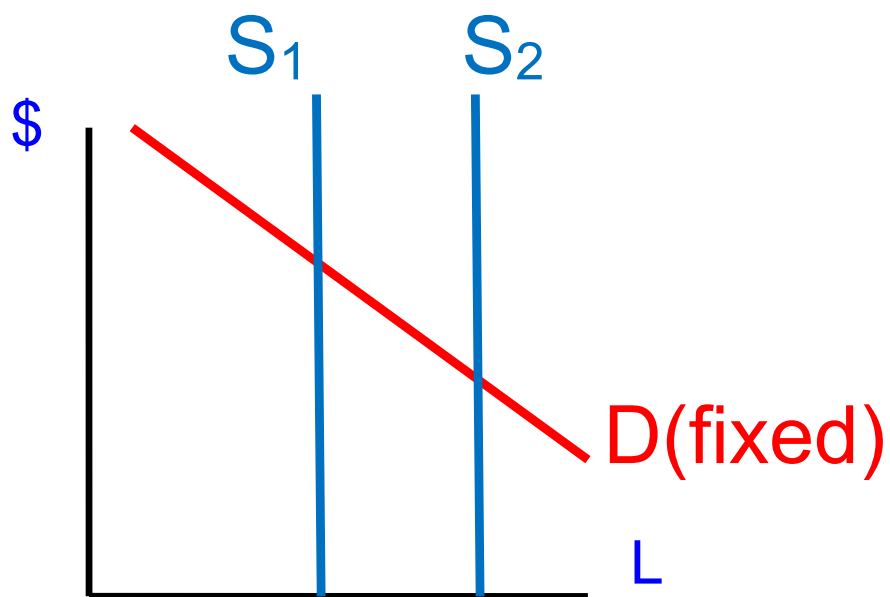
And why South Dakota is advertising to get people to move there.



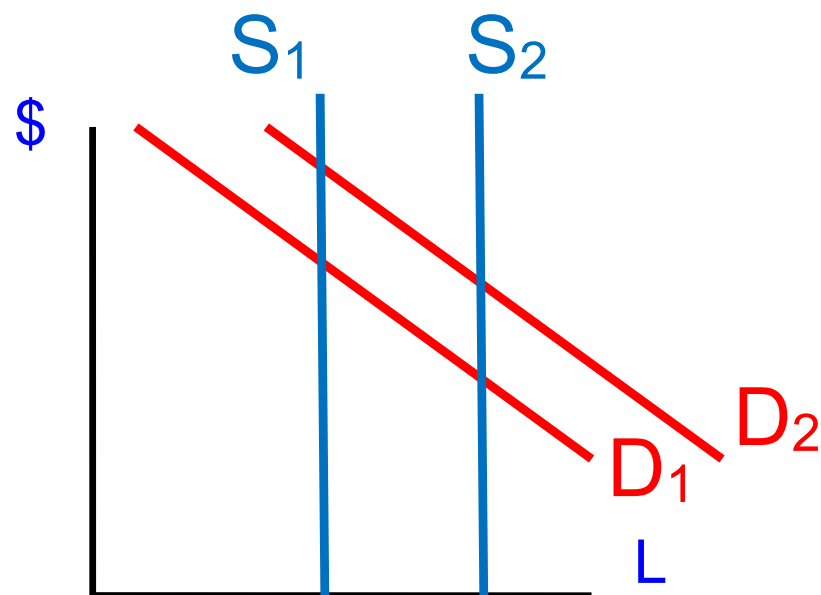
Watch clip

<https://youtu.be/HrX8OTFSFZI>

South Dakota is not thinking
population inflows will do this:



Rather, South Dakota thinking it
looks like this or better:



Migrants increase the demand for
labor (because they purchase things
and can contribute to increasing
returns)