

Chapter 4 - Part 1

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NCCU, Spring 2021

Road map

Chapter 2: labor supply

We developed a neo-classical model of labor supply, relying on utility maximization

We discussed the incentives individuals face

Chapter 3: Labor demand

We developed a neo-classical model of labor demand, relying on profit maximization

We discussed the incentives that firms face for hiring workers

Chapter 3: Equilibrium

We will now put the two pieces together to make predictions about the wage and employment outcomes

We start with a single market, but move on quickly....

Outline

1. Equilibrium in the labor market
2. Policy application: payroll taxes, subsidies, and mandated benefits

1. Equilibrium in the labor market

Equilibrium

LS is upward sloping

Individuals

We think it is backward bending eventually, but not relevant for most outcomes

LD is downward sloping

The firms

Equilibrium: w^* , E^*

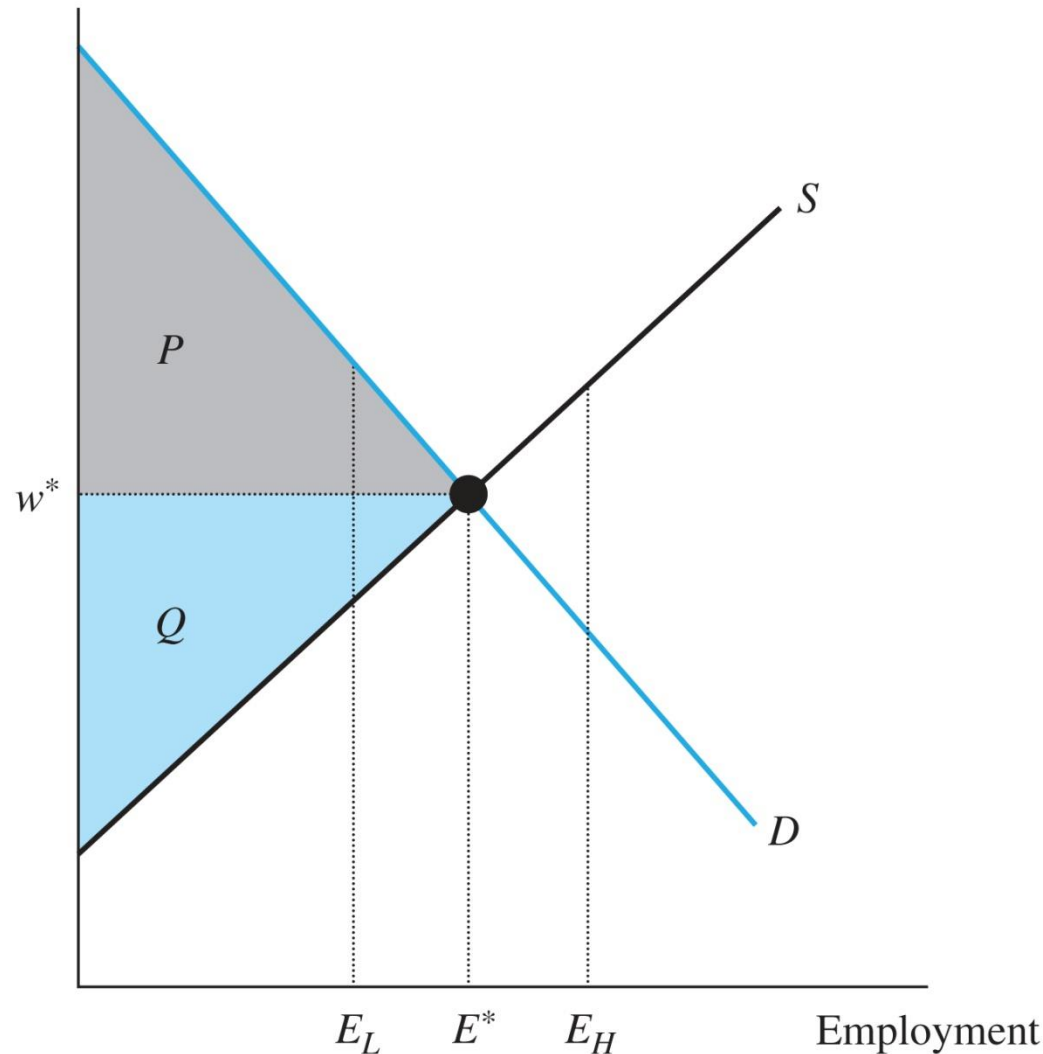
If w too high or too low, pressure to move

One wage results

No unemployment

We thought about adjustment costs with LD—it may take time

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Dollars

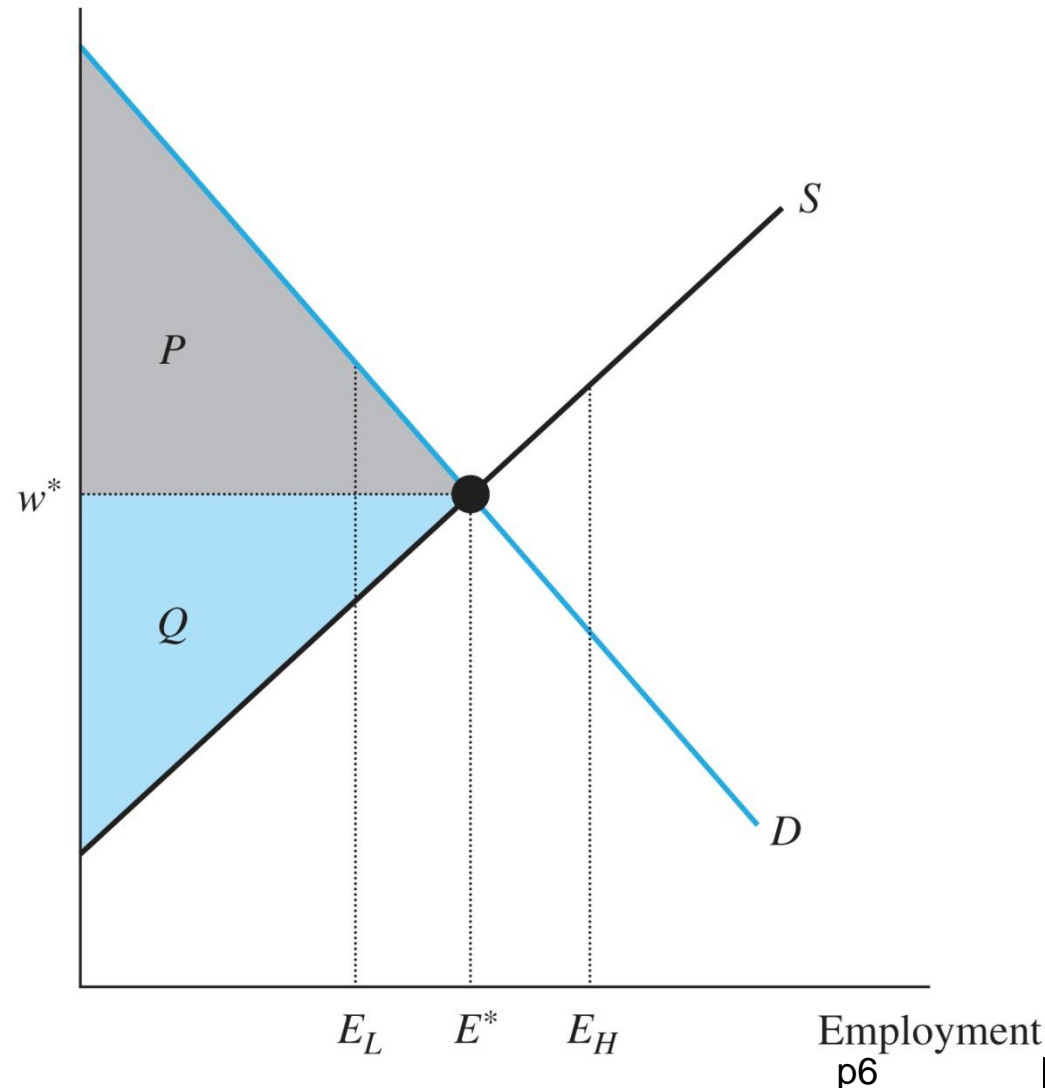


Efficiency

P is “producer surplus”—firms were willing to pay a higher wage, but didn’t have to
Q is “worker surplus”—individuals were willing to work for a lower wage, but didn’t have to
P+Q is total surplus
Surplus because of gains from trade

Deviations from E^* result in less surplus— E^* is the efficient outcome

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There are multiple markets...

Many of the interesting labor economic questions arise from there being multiple markets

How does low-skilled immigration affect the low-skilled labor market? The high-skilled labor market?

Markets can be segmented for many reasons

- Skill-level

- Geography

- Industry

- Gender

Our first example: suppose there were two labor markets segmented by geography, North and South

Competitive equil. with N and S

Suppose there are two regional labor markets, N and S

Workers are perfect substitutes—an N worker and S worker are identical

Mobility is costless

Simplification: suppose LS is vertical

For prime age workers, we think LS is inelastic

It simplifies the welfare analysis

Suppose we start with the wage in N being higher than in the S

Can this persist? No....

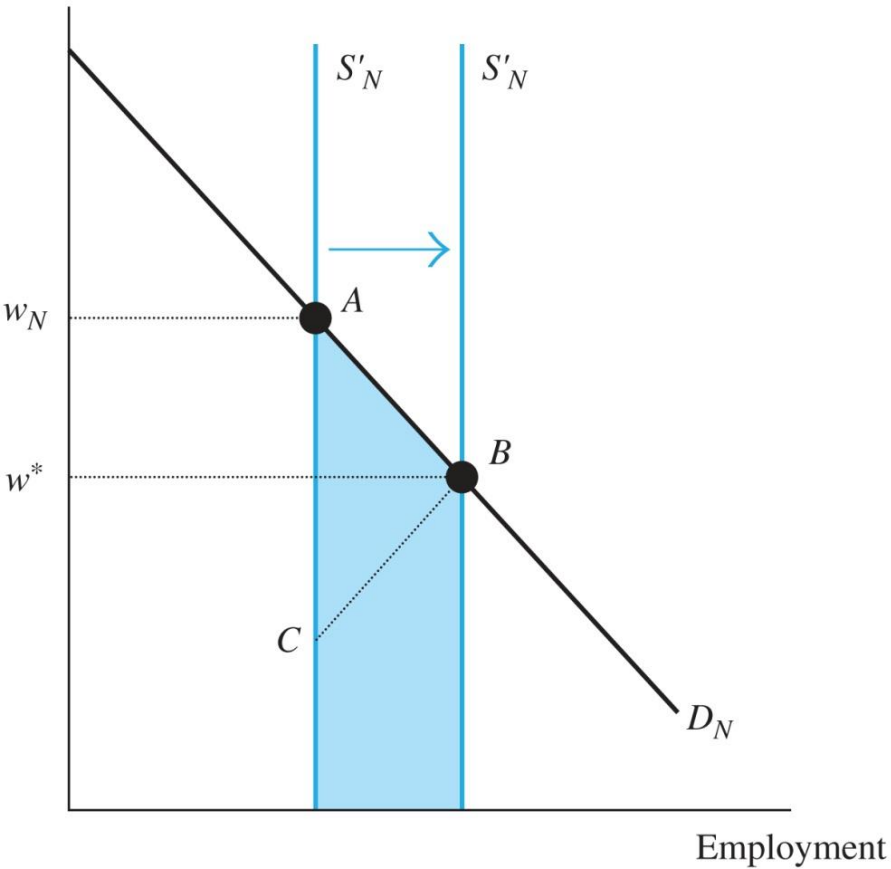
With costless mobility, some workers in S would want to move to the N

Migration would stop when wages are equalized

The picture

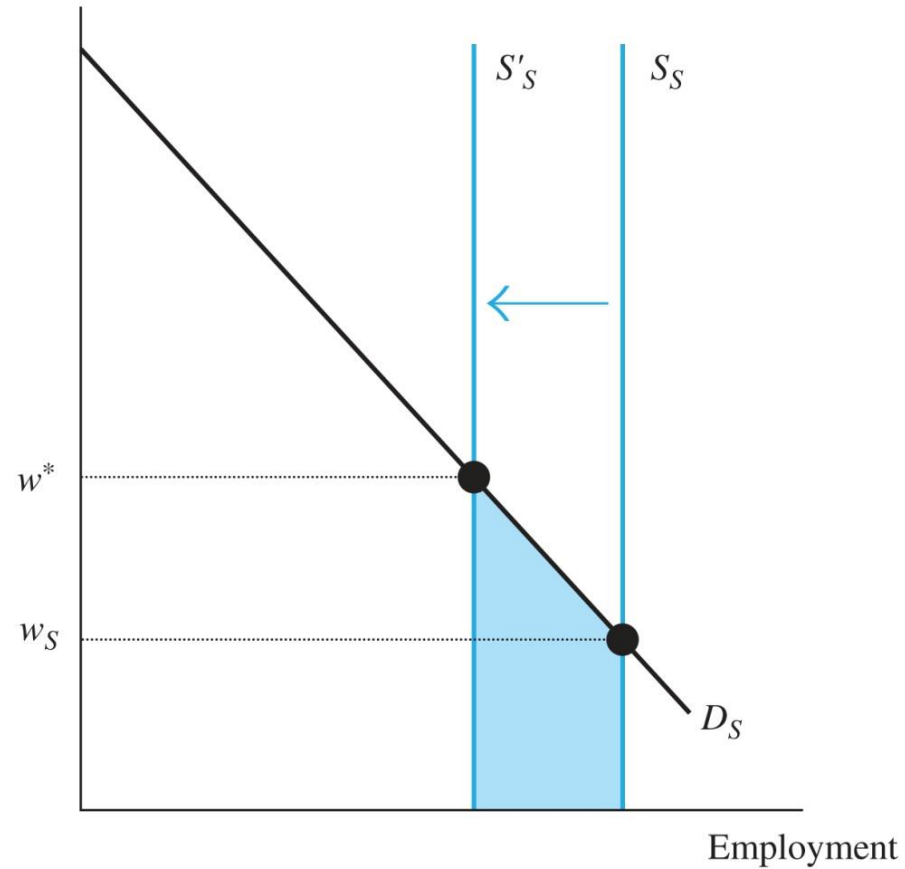
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Dollars



(a) The Northern Labor Market

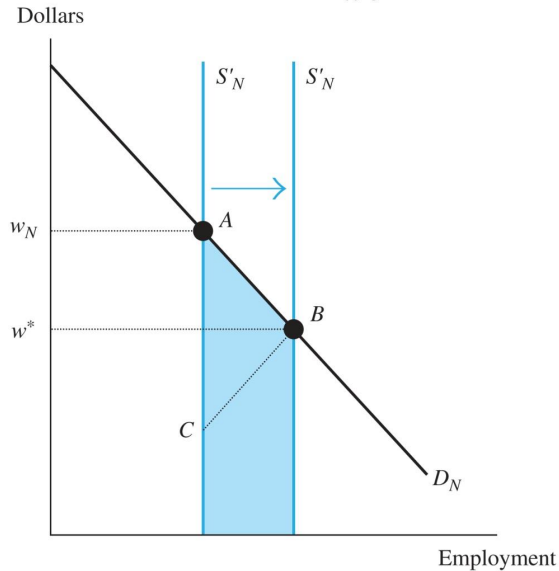
Dollars



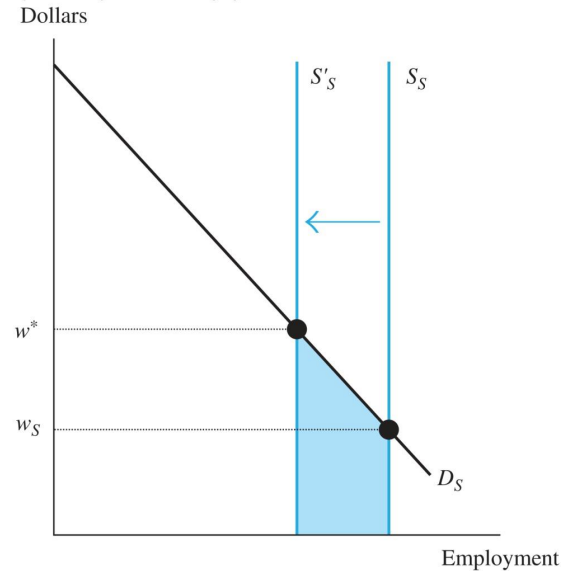
(b) The Southern Labor Market

The analysis

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(a) The Northern Labor Market



(b) The Southern Labor Market

As workers flow from S to N, LS in S moves left and LS in N move right

This will continue until the wages are equalized

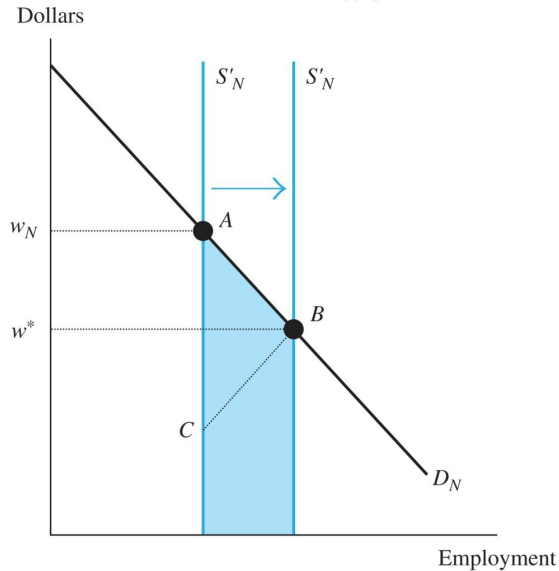
We could have allowed firms to move to seek out lower wages....

We would model this by shifting demand curves

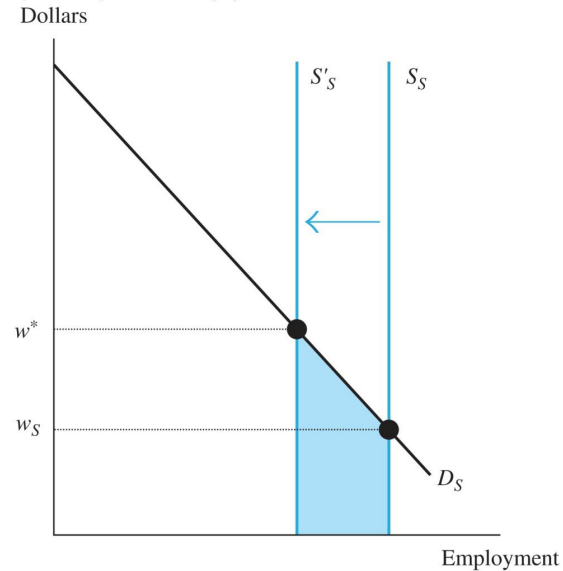
Implication: competitive regional labor markets should result in one wage

The analysis

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(a) The Northern Labor Market



(b) The Southern Labor Market

Another implication: the free flow of workers increases surplus

Lost surplus in South is less than gained surplus in North

Why? Workers are going from the low-productivity/low-wage area to the high-productivity/high wage area

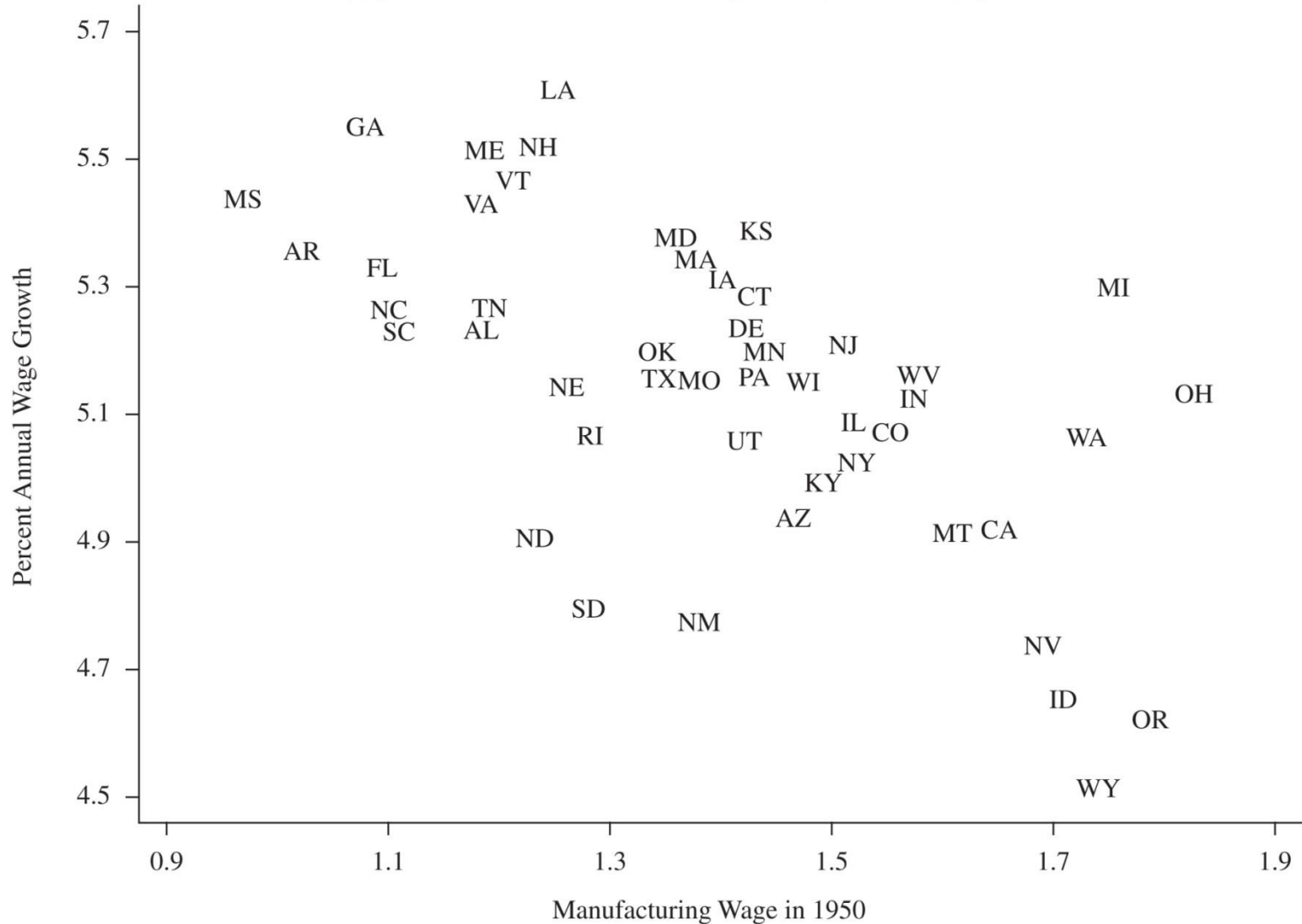
This is very similar to the usual “gains from trade” argument

Now, workers are being traded rather than goods

(Usual) Result: profit/utility maximization behavior leads to greater efficiency

Is there regional convergence?

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Is there regional convergence?

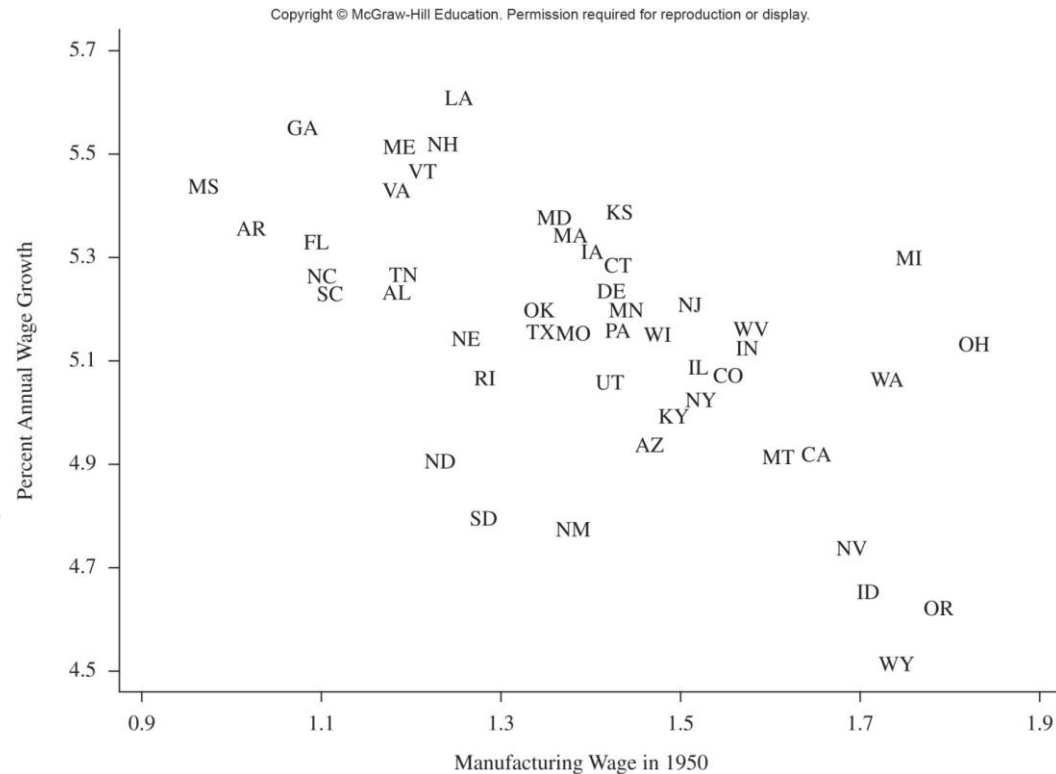
Yes

Low-wage areas
experienced higher
growth

Or, the growth/level
relationship is
negative

Half of the wage gap
disappears in 30
years

Similar results found
for Japan



Bottom line

1. We expect competitive labor markets to converge to equilibrium w and E

It may take time if there are adjustment costs for firms

2. We expect convergence across local labor markets as long as there is mobility

This too may take time, as workers move (maybe cheaper for younger workers to move?)

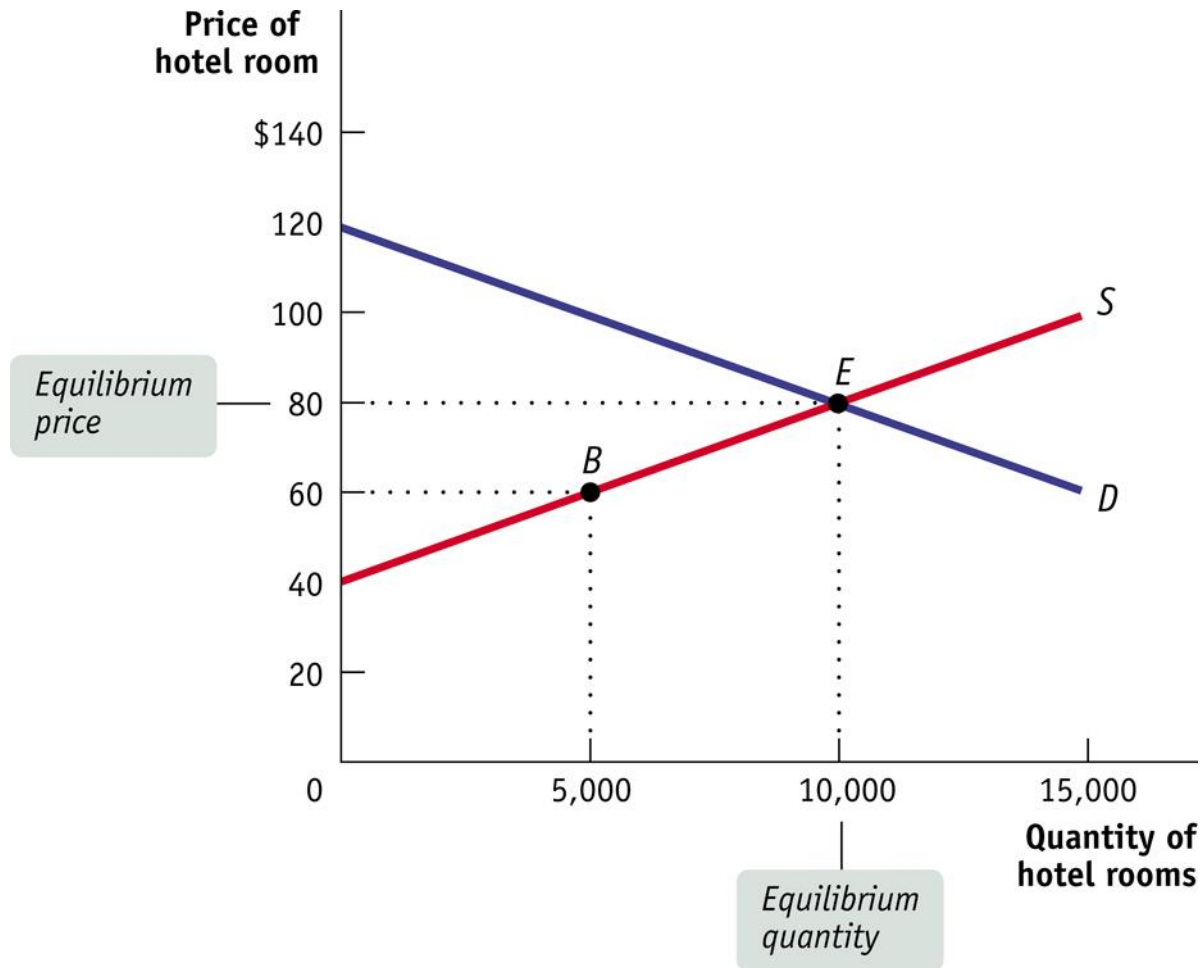
What happens if mobility was costly? A wage gap would persist equal to that mobility cost

3. These adjustments are efficient

2. Tax review

Example: hotel rooms

Imagine the market for hotel rooms in a city
(abstracting from quality differences)



Example: hotel rooms

Tax applied: \$40/unit paid by owner

7-2: before vs. after

D doesn't shift

S shifts up by \$40

Logic: compare suppliers' behavior at A and B

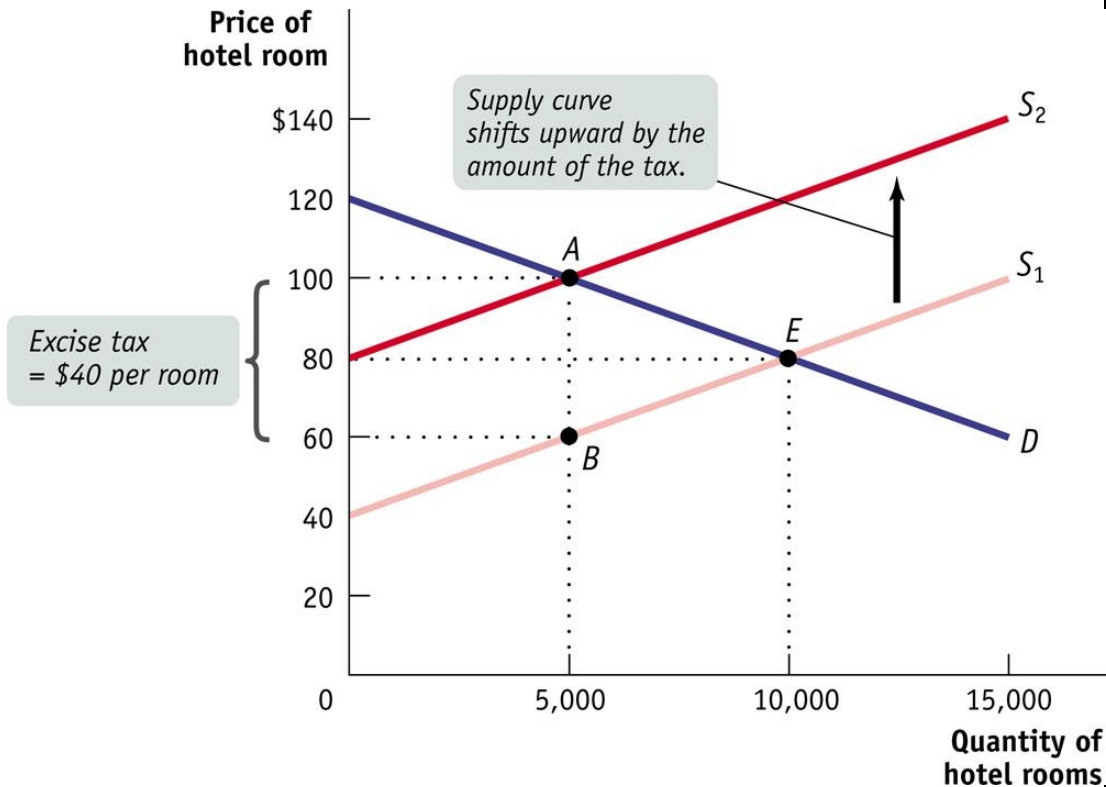
Predicted effect of \$40 tax

$Q=5000$

Price paid = $\$100 \times 5000$

Price rec'd = $\$60 \times 5000$

Gov revenue = $\$40 \times 5000$



Note: with taxes we shift up/down rather than left/right

And just to be sure...

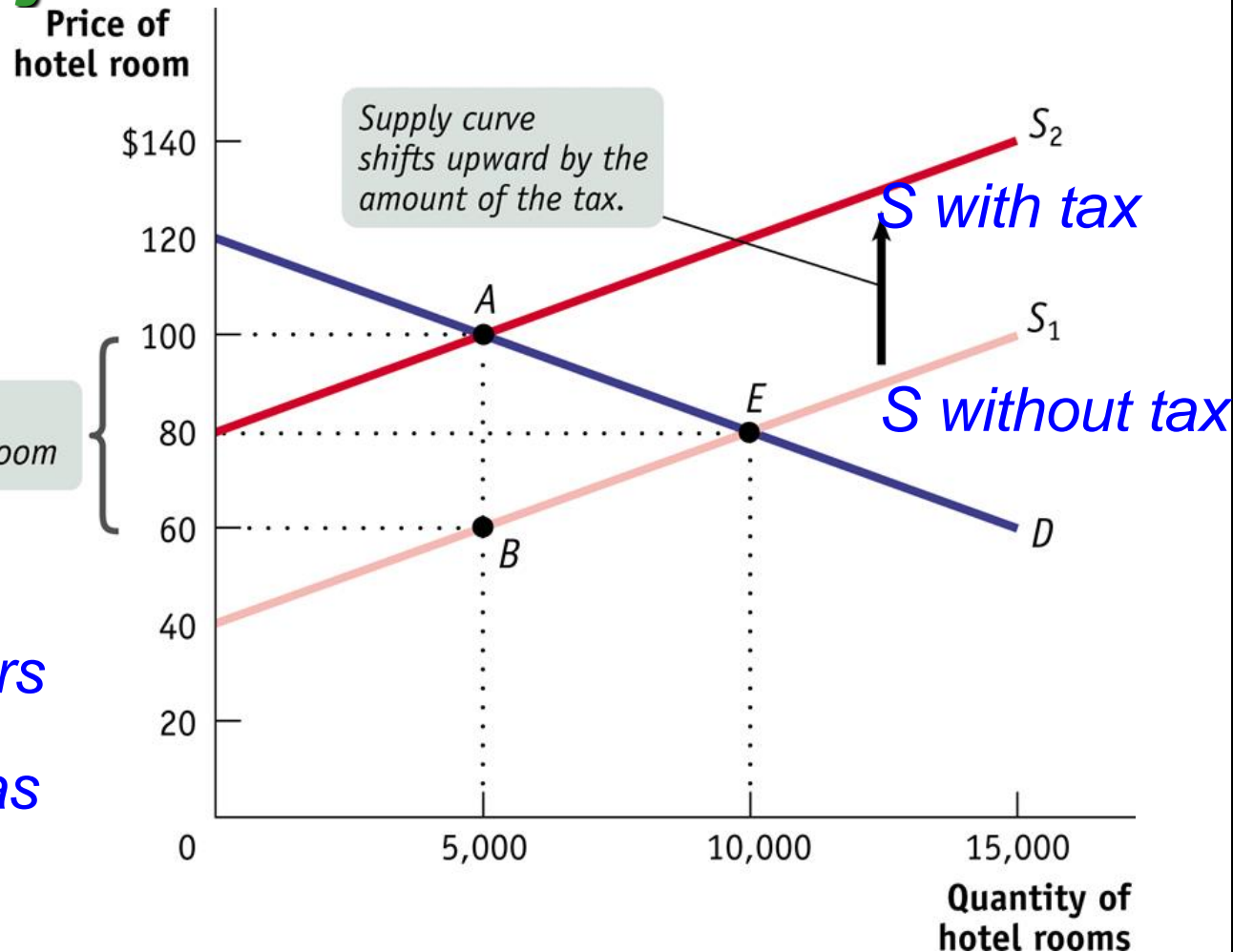
A Tax on Suppliers

Demanders pay
\$100/room

Suppliers give gov't
\$40/room

Suppliers keep
\$60/room

At \$60/room, suppliers
provide 5,000
rooms, just as was
suggested by the
original S curve



$$\text{Equil: } Q^D(\text{Price}_{\text{consumers pay}}=100) = Q^S(\text{Price}_{\text{hotels keep}}=60) = 5,000$$

Example: hotel rooms

Tax applied: \$40/unit paid by consumer

7-3: before vs. after

S doesn't shift

D shifts down by \$40

Logic: compare demanders' behavior at A and B

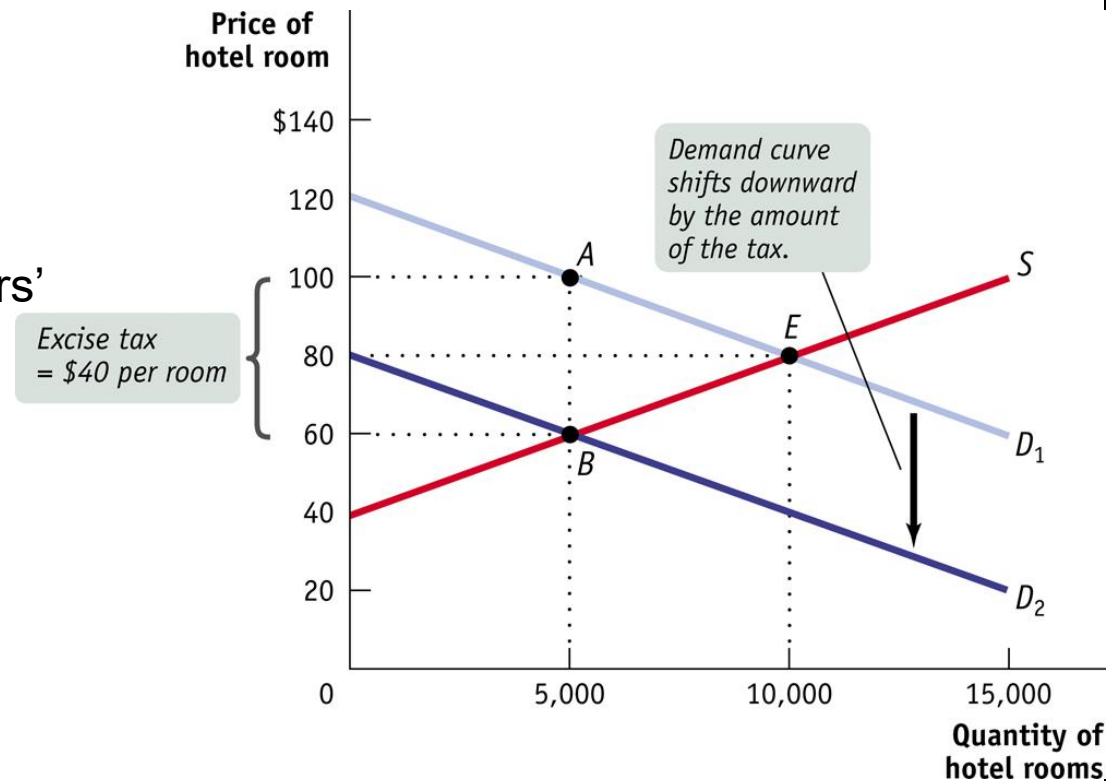
Outcome

$Q=5000$

Price paid=\$100 x 5000

Price rec'd=\$60 x 5000

Gov revenue=\$40 x 5000



And just to be sure...

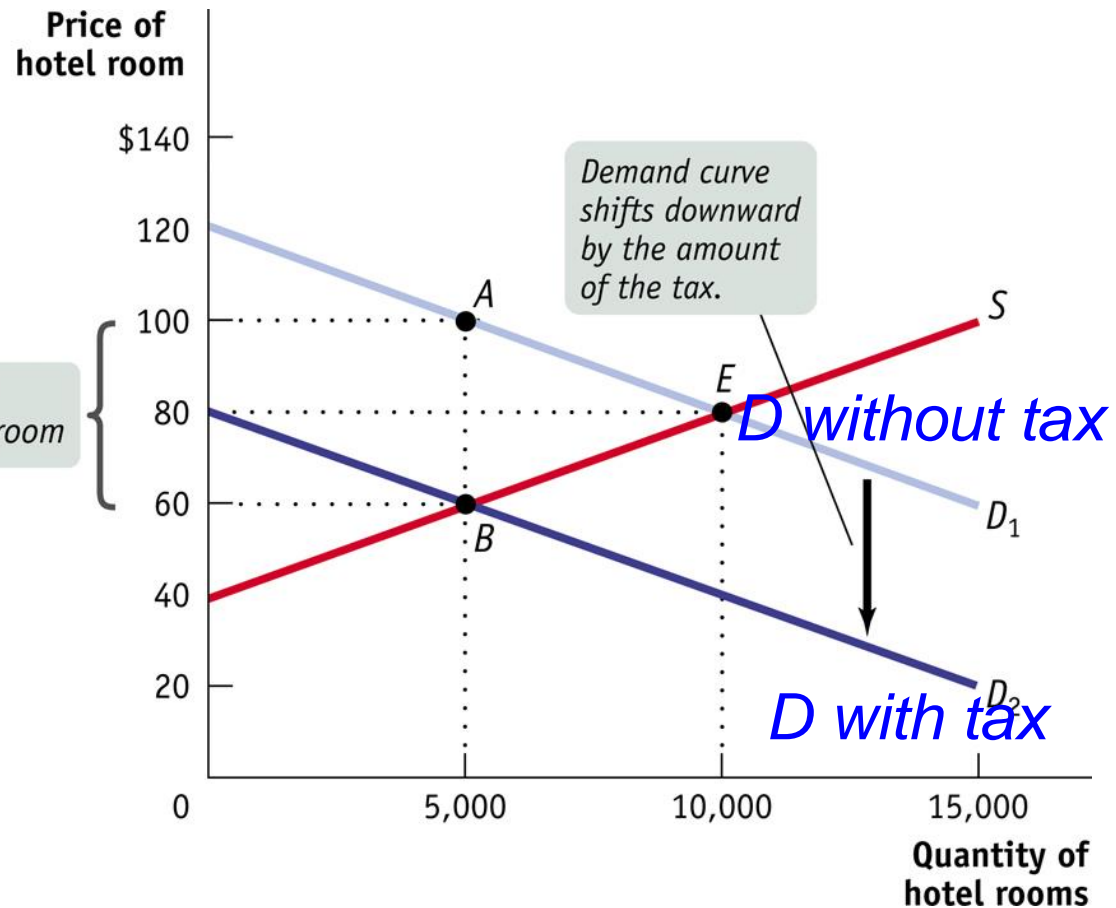
A Tax on Demanders

Demanders pay \$60/room to suppliers and give \$40/room to gov't

Suppliers get \$60/room

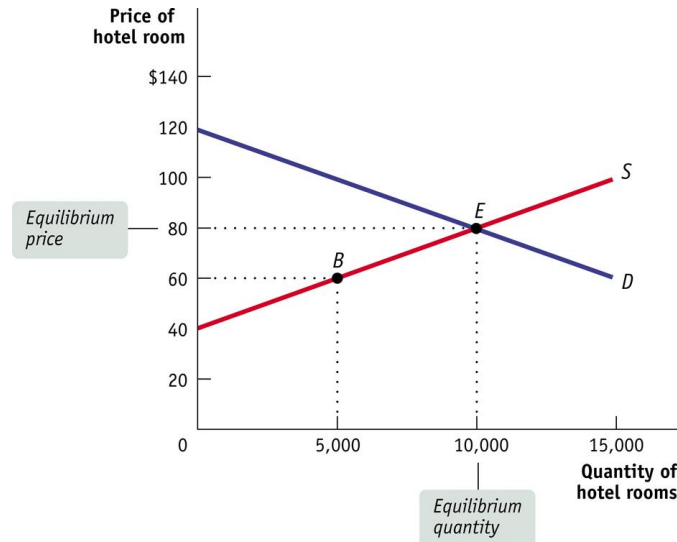
When demanders pay \$60/room to suppliers, they want 5,000 rooms, just as was suggested by the original D curve

Excise tax = \$40 per room



$$\text{Equil: } Q^D(\text{Price}_{\text{consumers pay}}=100) = Q^S(\text{Price}_{\text{hotels keep}}=60) = 5,000$$

The comparison...



Taxing suppliers \$40

$Q=5000$

Price paid = $\$100 \times 5000$

Price rec'd = $\$60 \times 5000$

Gov revenue = $\$40 \times 5000$

Taxing demand. \$40

$Q=5000$

Price paid = $\$100 \times 5000$

Price rec'd = $\$60 \times 5000$

Gov revenue = $\$40 \times 5000$

Principle: in economic terms, it doesn't matter who is the nominal payer of the tax!

Bonus slide: a suggestion

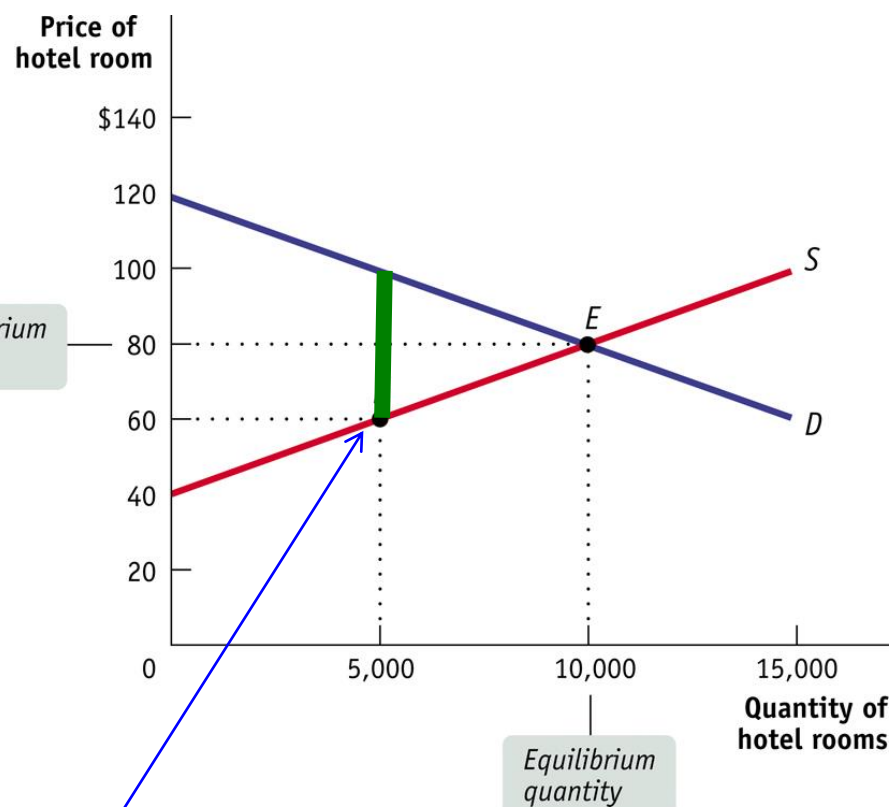
For problem sets and exams, look to see where the tax will “fit”

Don't worry about shifting S or D —it doesn't matter!

We need a \$40 tax and Q^* is going to decline—move to left until the \$40 tax “fits”

Logic: Q^D for the price paid (with tax) equals the Q^S for the price received

This will simplify many later pictures



Green bar is \$40 tax: move to left until there is “room” for this \$40 tax

Tax Incidence

What we just showed: whether suppliers or demanders are nominally taxed doesn't affect who "pays the tax" in economic terms

Measuring who "pays" the tax

Idea: how much does the price paid/price received change with the imposition of a tax?

Part of tax born by consumer = | Price paid with tax – price paid without |

Part of tax born by firm = | Price rec'd with tax – price rec'd without |

What determines the incidence (i.e., who pays) the tax?

The price elasticity of demand (PED) and the price elasticity of supply (PES)—see next slide

The lower the PED, the more the incidence falls on demanders

Why? The lower the PED, the less ability consumers have to shift their consumption with price changes—consumers stomach price changes without changing the quantity demanded

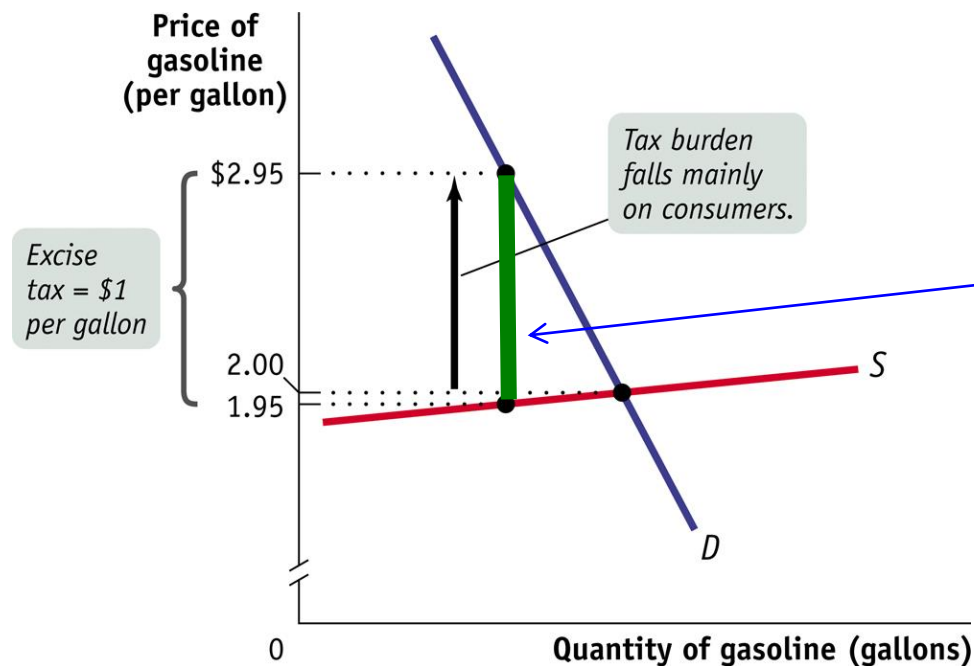
The lower the PES, the more the incidence falls on suppliers

Example: burden on demander

7-4: I added green bar for the tax

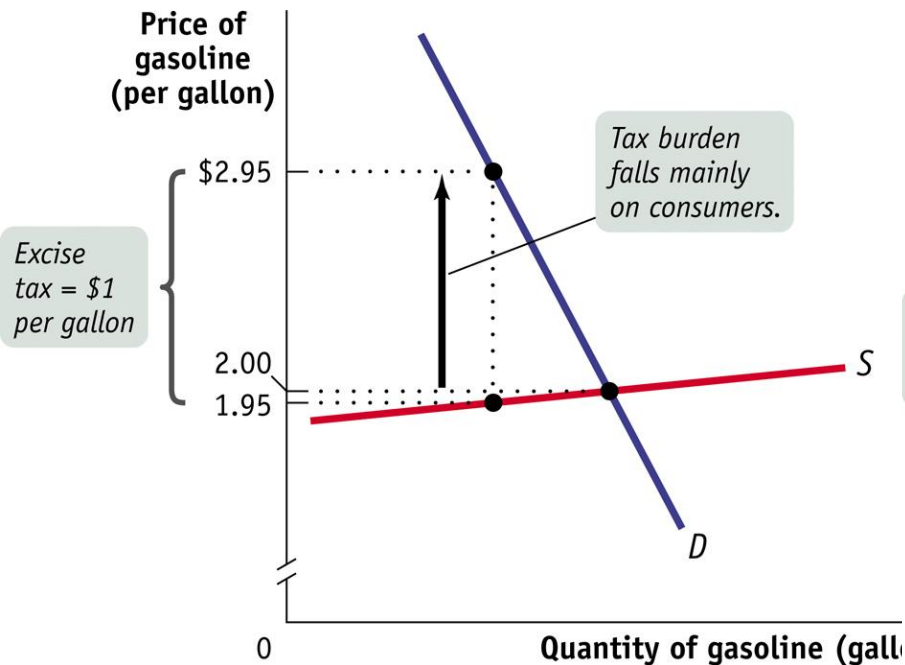
Outcome: price paid by consumer rises by \$0.95 with \$1 tax, implying burden is mostly on demander

PED is relatively inelastic and PES is relatively elastic



*Green bar is \$1 tax:
move to left until
there is "room" for
this \$1 tax*

Example: comparing burdens



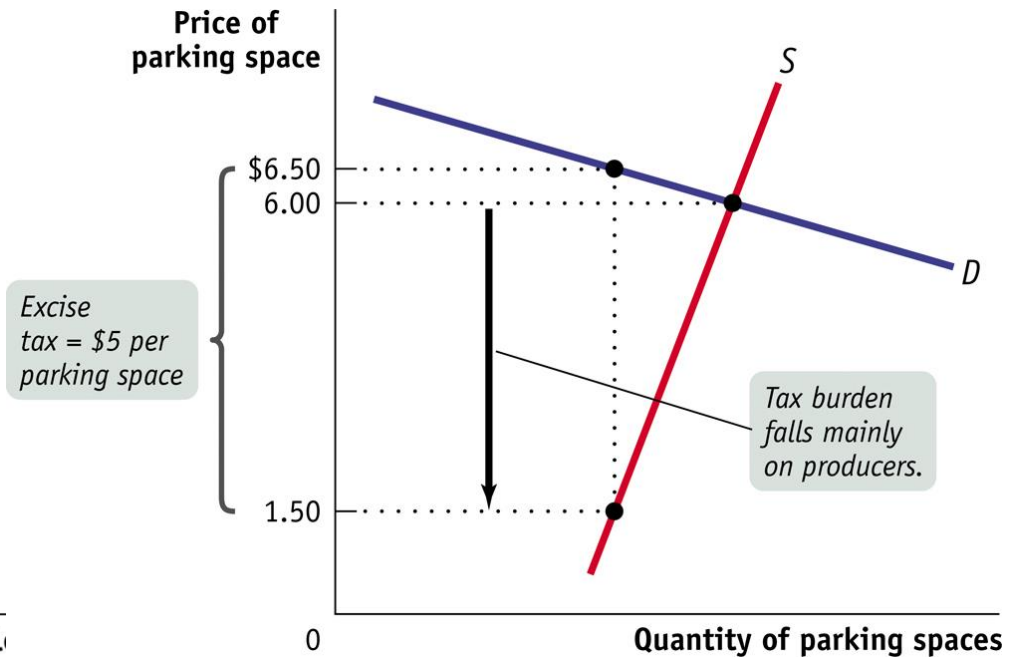
7-4: burden on demanders

\$1 tax raises price paid by \$.95

D is much more inelastic than S

Qty D changes less with price change than does Qty S

Effect: tax born by demanders



7-5: burden on suppliers

\$5 tax raises price paid by \$.50

S is much more inelastic than D

Qty S changes less with price change than does Qty D

Effect: tax born by suppliers

Summary: who really pays the tax

We can analyze the effect by analyzing new price paid and new received

Shifting curves or “making room for the tax”

In economic terms, it doesn't matter if we nominally tax the demander or the supplier

Tax incidence: measuring who really pays a tax

How much does the tax increase price paid/reduce price received?

Increases price paid a lot/reduces price received a little—“tax falls on consumers”

Increases price paid a little/reduces price received a lot—“tax falls on producers”

Depends on PED and PES

Lower the PED, the more consumers pay

Lower the PES, the more suppliers pay

3. Policy application: payroll taxes and mandated benefits

Payroll taxes in 2014 in the U.S.

For employed workers, Firms AND individuals each

6.2% of first \$117,000 to fund Social Security system

OASI: retirement payments

SSDI: disability payments for disabled workers

SSI: disability payments more generally

1.45% of all earnings to Medicare (health insurance for 65+)

Or, 7.65% each (up to \$117,000) and 15.3% combined

For self-employed workers

15.3% up to \$117,000, and 2.9% for earnings higher

Other payroll taxes paid by firm only

Unemployment insurance

Workers compensation (on-the-job injury)

January 26, 2010

OP-ED CONTRIBUTORS

A Payroll Tax Break for Jobs

By CHARLES E. SCHUMER and ORRIN G. HATCH

Washington

WITH the national unemployment rate at 10 percent, and more than 15 million Americans looking for work, ideas to spur job creation are at the forefront of everyone's minds. While we may represent different political philosophies, we recognize that high unemployment — particularly long-term unemployment — is not a liberal problem or a conservative problem; it's a national problem that takes a huge toll on families.

The idea for some sort of jobs tax credit is percolating again, but the jobs credit that existed in the late 1970s was of limited success, and it was excruciatingly complicated. Recalling this experience, members of Congress from both parties have been lukewarm to such a credit, and the idea was dropped from the stimulus package last year.

We have an idea that is simple, straightforward and easy to explain and administer. In fact, it is so simple that the legislative text of the proposal is only a few pages long — a rarity when it comes to tax policy.

Here's the idea: Starting immediately after enactment, any private-sector employer that hires a worker who had been unemployed for at least 60 days will not have to pay its 6.2 percent Social Security payroll tax on that employee for the duration of 2010. The Social Security trust fund will then be made whole with spending cuts elsewhere in the budget between now and 2015. That's it. Simple to understand, and easy to explain.

The politics of this proposal

The rhetoric

What about the individual payroll taxes? Why give the firms a break and not individuals?

Wait, is this a give-away to businesses?

Basic application of equilibrium: It didn't matter.

A tax moves us to the same equilibrium, regardless of what side of the market it is levied on

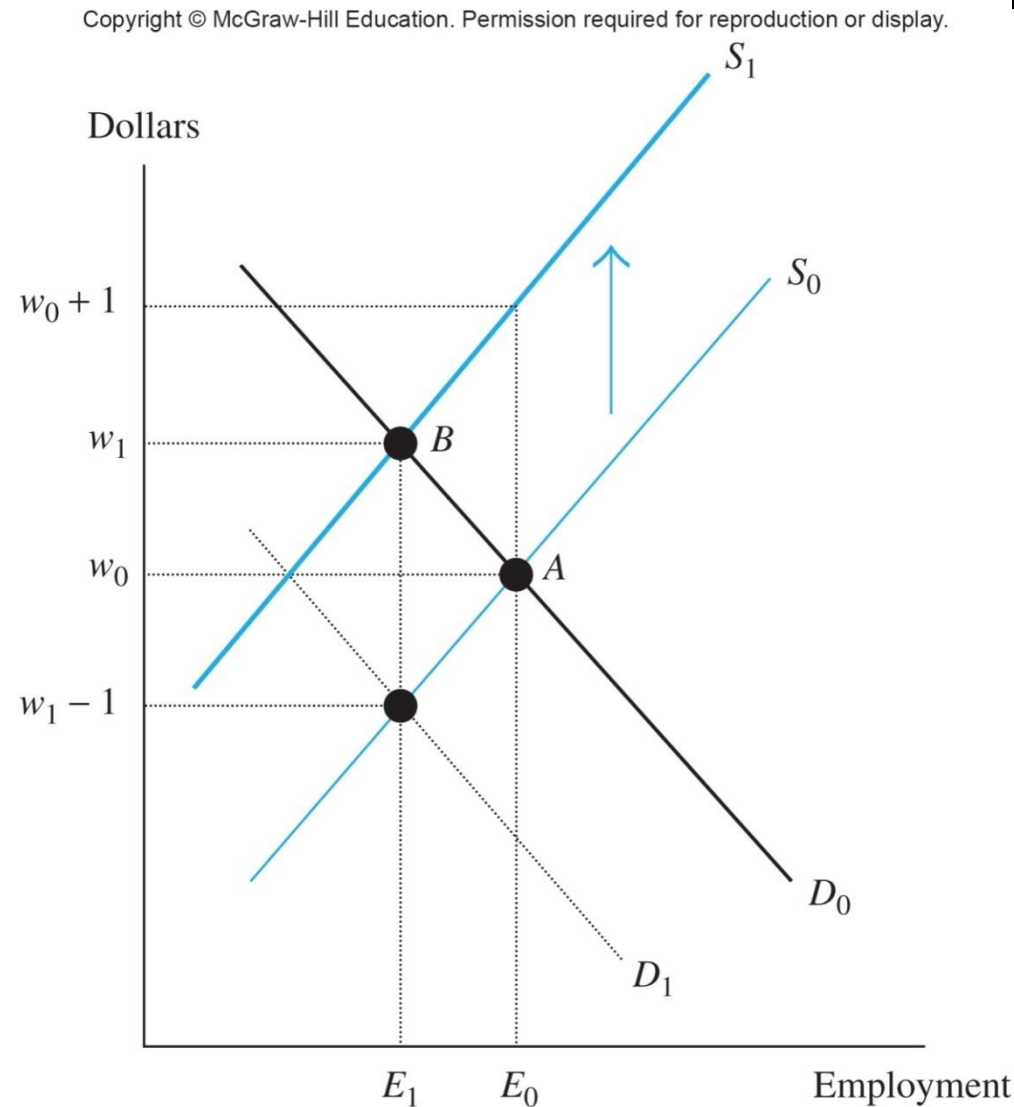
Corollary: it doesn't matter which side of the tax is suspended—the effect will be the same

The book's picture

The book compares shifting up S (a tax workers pay) and shifting down D (a tax firms pay)

The outcome is the same: employment of E_1

Bottom line: who “pays the tax” is not determined by how it is collected



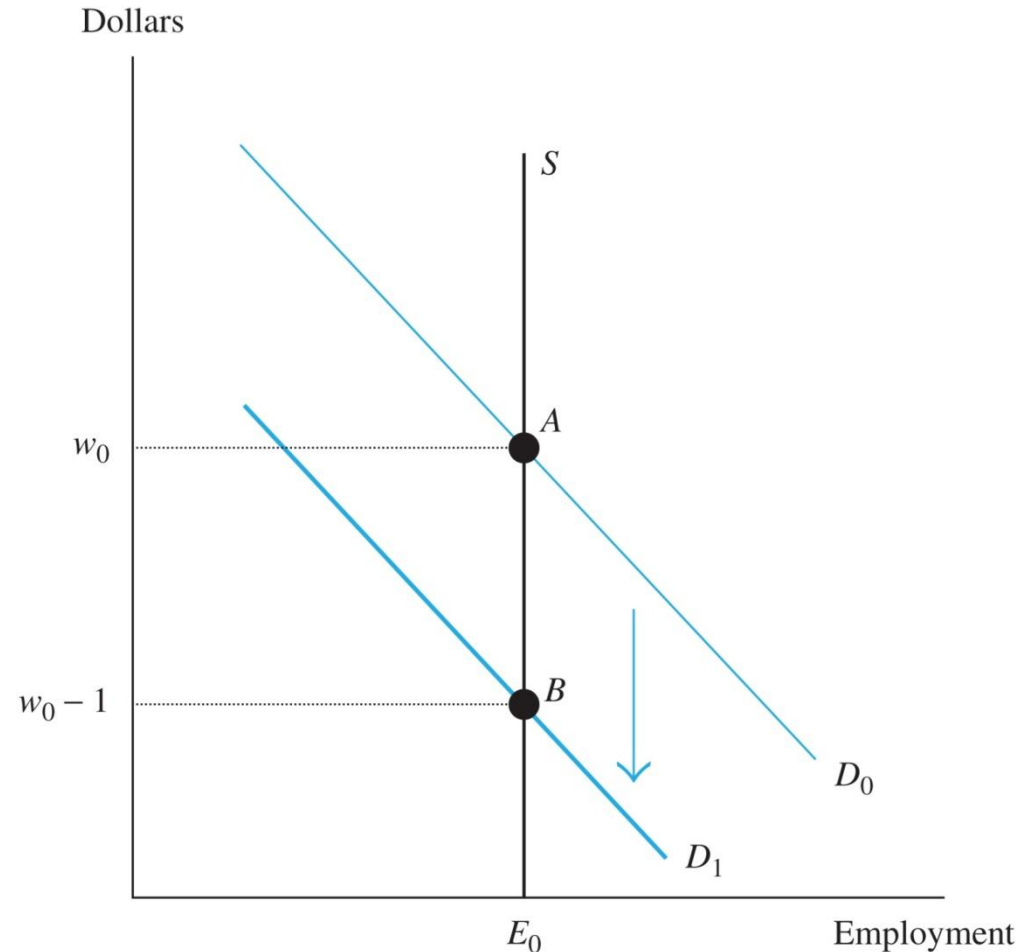
The book's picture

The case where it is shifted to workers completely: Perfectly Inelastic Supply

LSE tends to be very inelastic in the long run—individuals work for a living

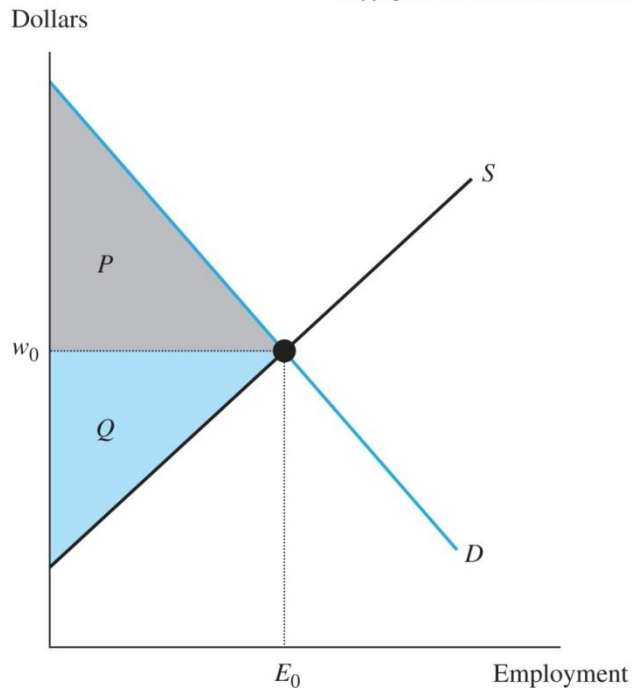
More generally, the more inelastic, the more one bears....

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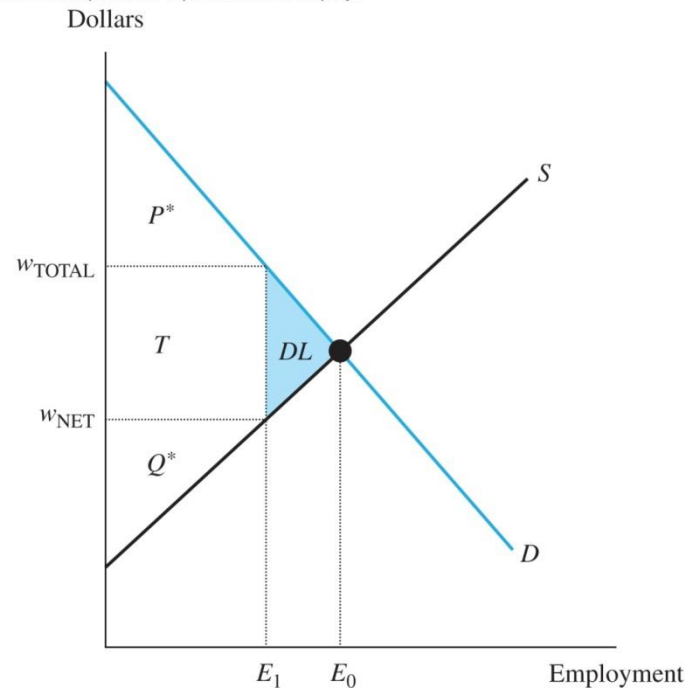


Welfare analysis of taxes

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(a) No-Tax Equilibrium



(b) Payroll Tax Equilibrium

Welfare implications: just compare surplus between the two

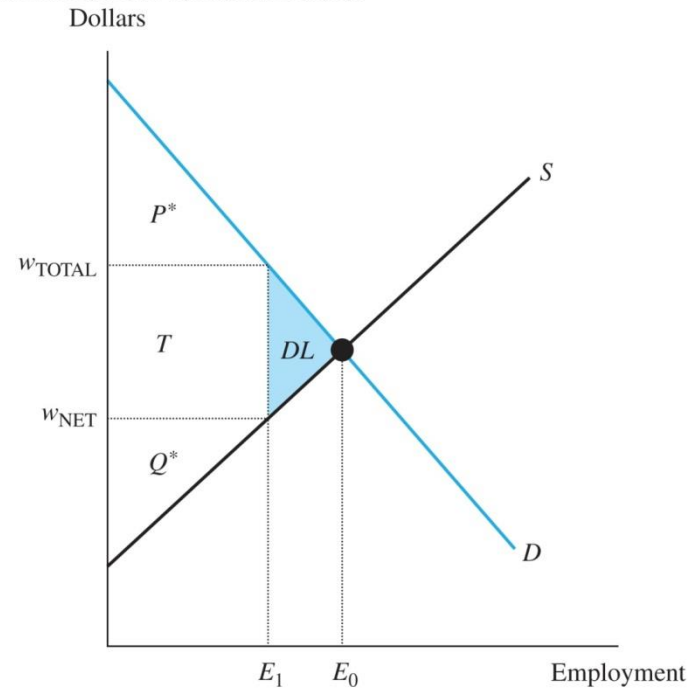
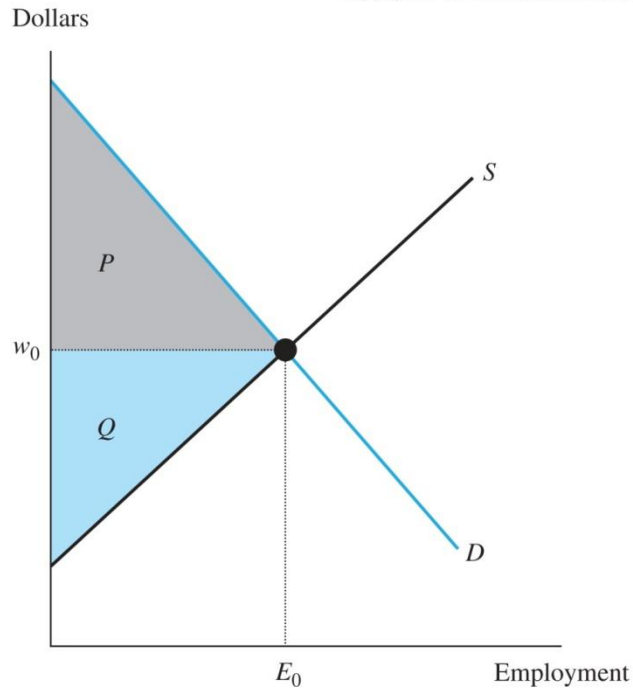
New picture: move in and make room for the tax

Lost transactions, which is lost trade, leads to lost surplus

Lost surplus is the deadweight loss

Spelling it out completely...

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TABLE 4-1
Welfare
Implications of
a Payroll Tax

	No-Tax Equilibrium	Payroll Tax Equilibrium
Producer surplus	P	P^*
Worker surplus	Q	Q^*
Tax revenues	—	T
Total gain from trade	$P + Q$	$P^* + Q^* + T$
Deadweight loss	—	DL

Mandated benefits

Sometimes the government taxes employers to provide workers benefits

- Taxes pay for unemployment insurance

Sometimes the government mandates employers to provide workers benefits

- Workers' compensation insurance (for job injuries)

- Health insurance

If other benefits are provided, should they be provided through mandates or taxes?

- Paid maternity/paternity leave?

- Paid vacation?

- Paid sick leave?

Mandates and our model

Suppose we mandate the offering of a benefit that costs the employers C

This will shift LD down by C . Why? The cost of employment has just gone up by C .

This will shift LS up. Why? The workers are now benefiting more from the employment relationship—they get the wage and the benefit

The question: How much do employees value the mandated benefit?

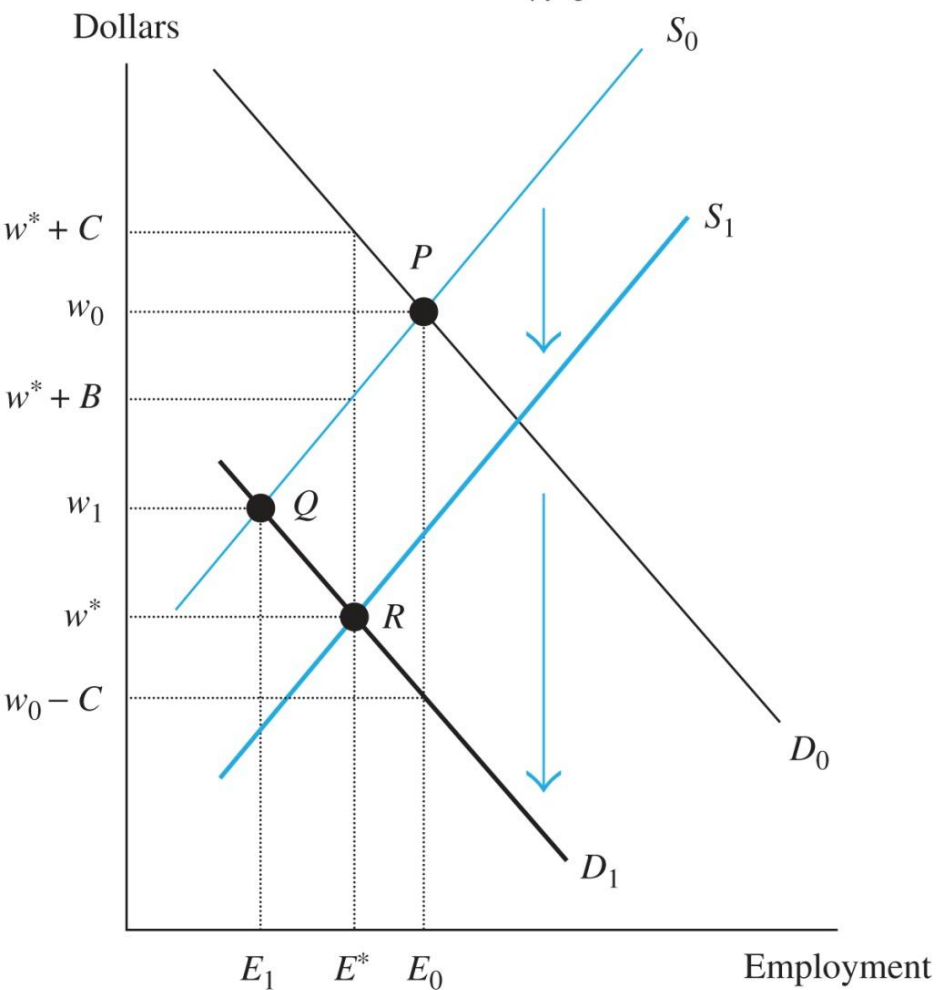
More than C ? If employer's can get better rates on health insurance, then health insurance may be valued by employees greater than C

C ? If the benefit is just valued as much as it costs

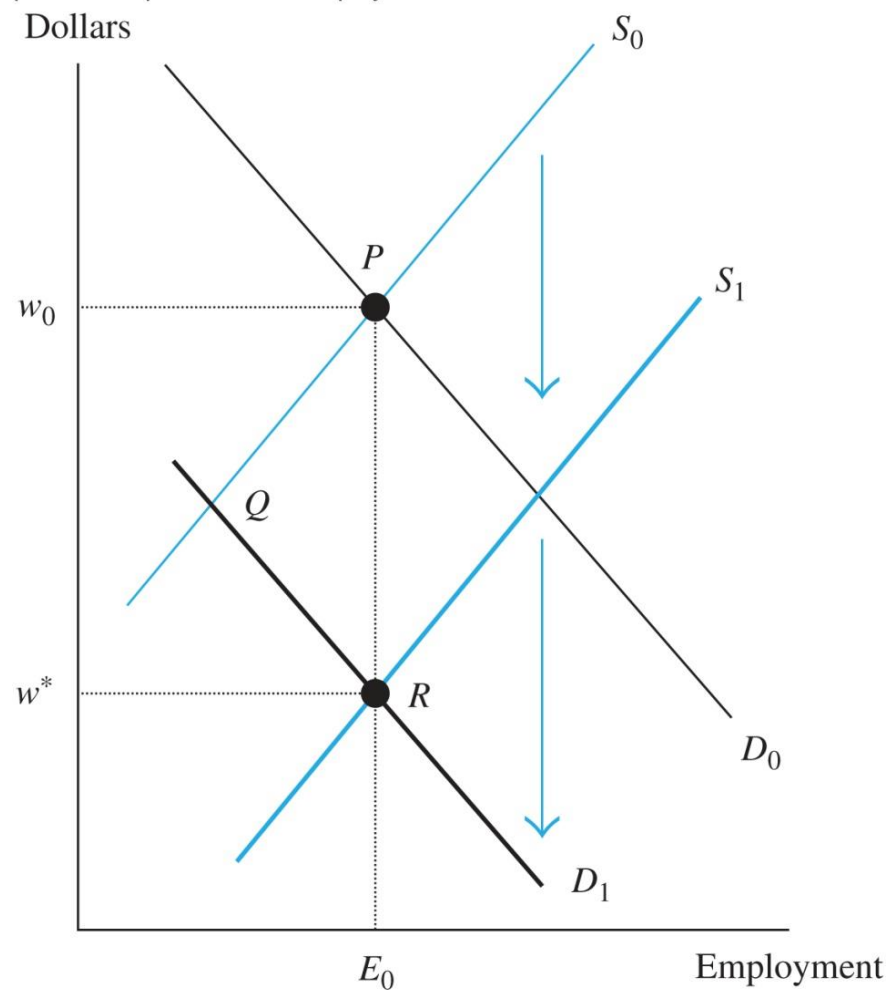
Less than C ? What if the product is substandard or many employees don't value it (and it cannot be sold)?

The picture

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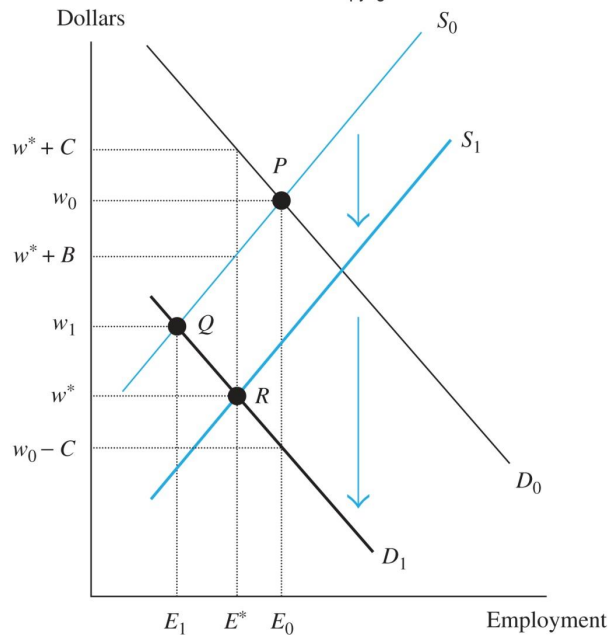
(a) Cost of Mandate Exceeds Worker's Valuation



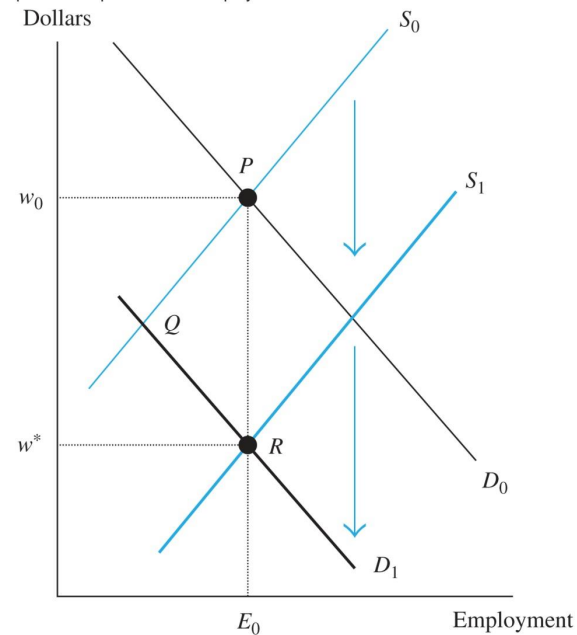
(b) Cost of Mandate Equals Worker's Valuation

The picture

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(a) Cost of Mandate Exceeds Worker's Valuation



(b) Cost of Mandate Equals Worker's Valuation

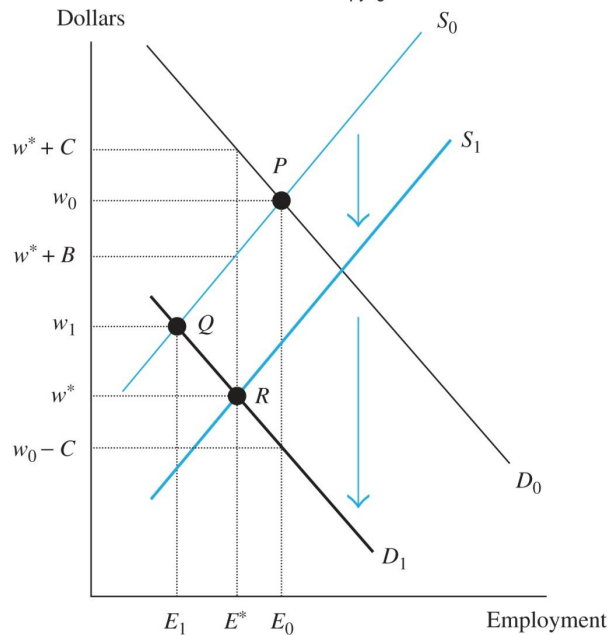
If valuation equals C : Employment level doesn't change, wages decline by C

Why? Workers are always hired until $w = \text{VMP}$ —the workers are paid exactly what they produce for the firm

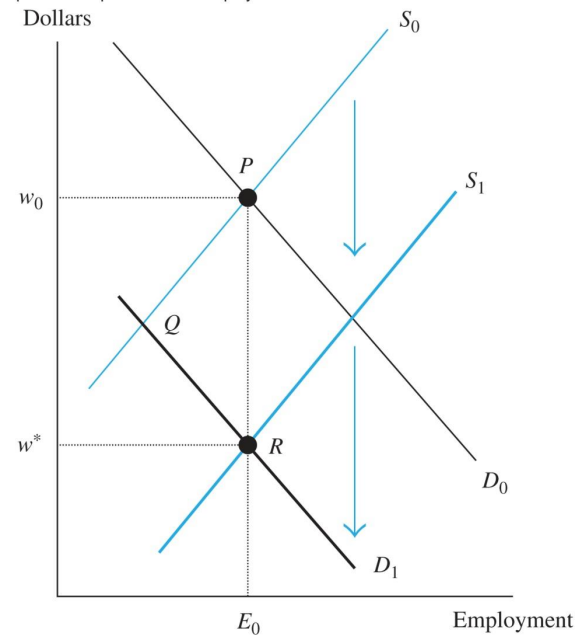
So what does a mandate do? It doesn't change total compensation or employment, but it changes the mix of compensation—including the benefit in total compensation

The picture

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(a) Cost of Mandate Exceeds Worker's Valuation



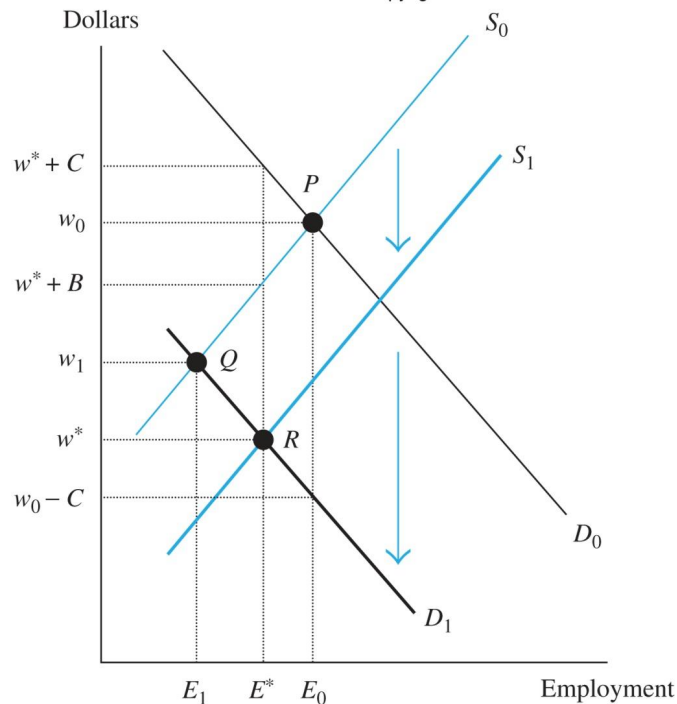
(b) Cost of Mandate Equals Worker's Valuation

If the value is $B (<C)$: Employment declines, wages drop (the exact amount depends on the curves)

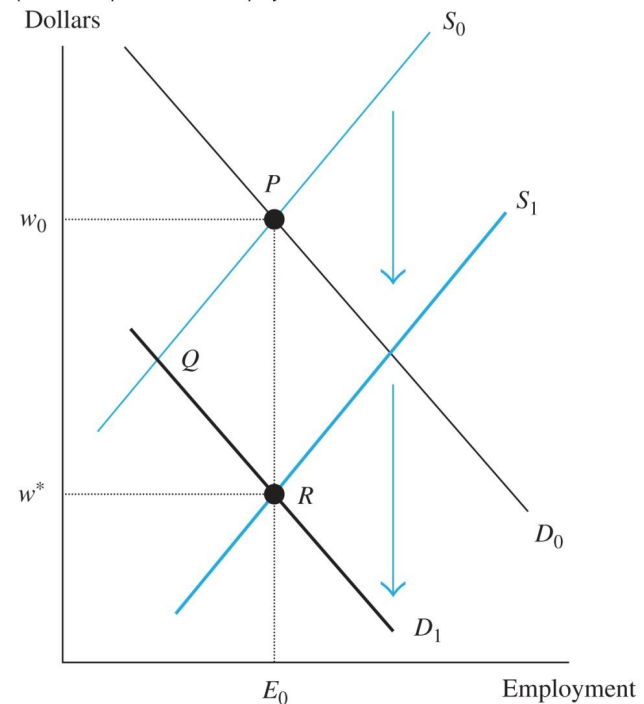
If the value is $>C$: Employment increases, wages drop (the exact amount depends on the curves)

Comparing to taxes

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(a) Cost of Mandate Exceeds Worker's Valuation



(b) Cost of Mandate Equals Worker's Valuation

If instead the benefit were offered through taxes, by imposing a tax of C

Employment drops to E_1 , which is a level that is always lower than mandated benefits levels employment level

Therefore, mandated benefits are always superior to taxes!

Mandated benefits vs. taxes

What does the previous analysis suggest?

Taxes always reduce employment, and the cost of the benefit is split (taxes are split unless LS or LD are vertical)

Mandated benefits reduce employment less, and may even increase employment

So deadweight loss is always less with mandated benefits ?!?!?

Not so fast

Why did mandated benefits increase S? Because workers valued the benefits

Why are taxes not increasing S? Because there is an implicit assumption that the benefit is not tied to employment—so there is no need to shift S

But, benefits provided through taxes COULD be tied to employment—and that would shift out S similarly

And, some benefits MUST (?) be tied to employment: What does “paid vacation leave” and “paid maternity leave” mean for those not working?

Conclusions

1. Taxes, subsidies, and mandates affect the labor market outcomes of workers and employers

2. Taxes: it doesn't matter who is nominally taxed or subsidized

The market forces of equilibrium account for the taxes and subsidies either way

3. Mandated Benefits: they don't simply increase total compensation

Why? Market forces, such as VMP, put limits on how much can be paid

LS and LD can shift to take into account the benefits

4. Taxes vs. mandated benefits

They can have different effects on the outcome

The real source of the differences: Do you attach the benefits to the employment relationship or do you not?