Tax Incidence and Efficiency Costs of Taxation

131 Undergraduate Public Economics

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OUTLINE

Chapters 19-20

19.1 The Three Rules of Tax Incidence

19.2 Tax Incidence Extensions

19.3 General Equilibrium Tax Incidence

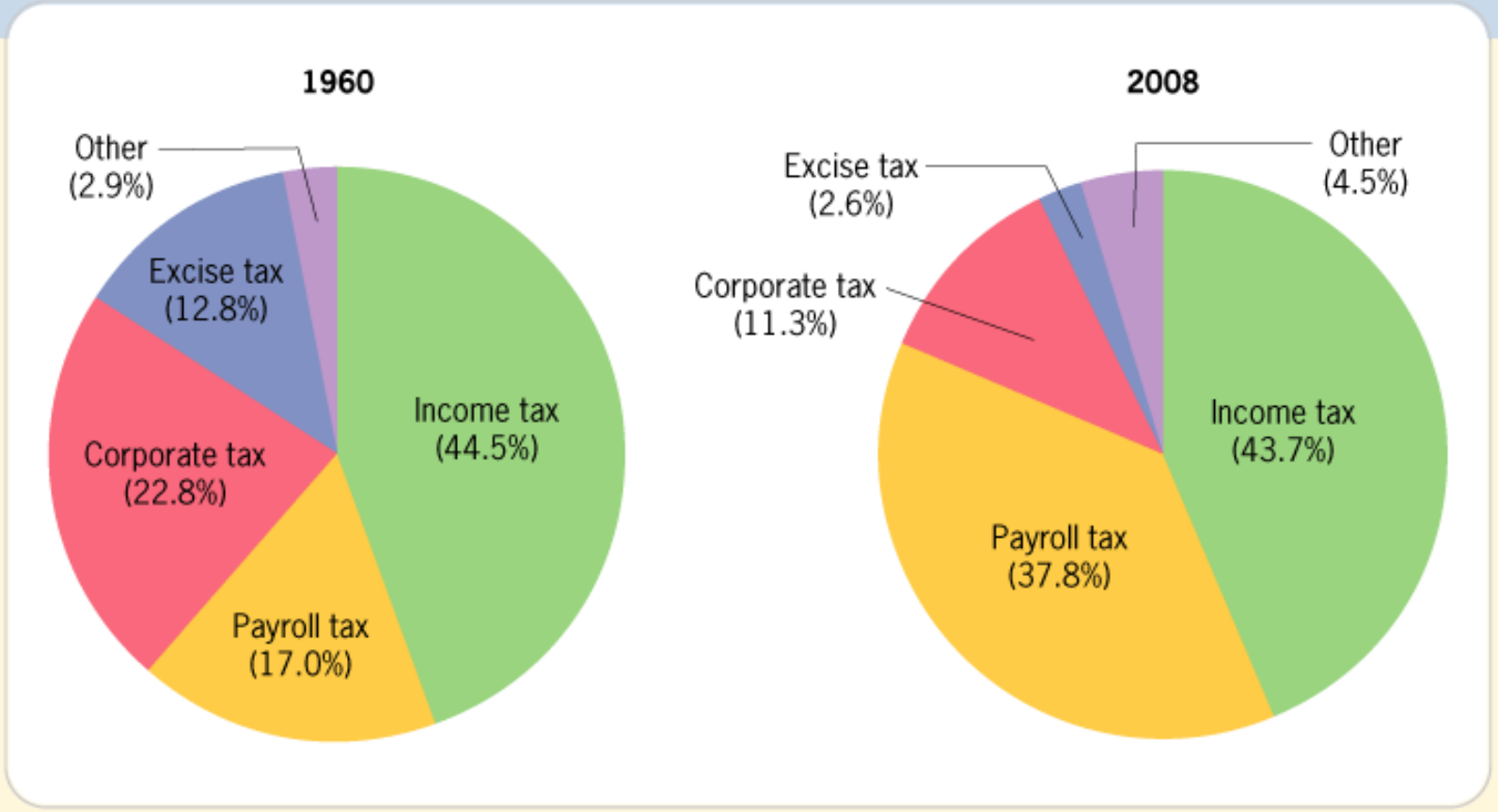
19.4 The Incidence of Taxation in the United States

20.1 Efficiency Costs of Taxation

20.2 Optimal Commodity Taxation

tax incidence Assessing which party (consumers or producers) bears the true burden of a tax.

■ FIGURE 19-1



The Sources of Federal Government Revenue (% of Total Receipts) • The federal government depends much less on corporate and excise taxes and much more on payroll taxes than it did in 1960. Its biggest source of revenue, then as now, is the individual income tax.

TAX INCIDENCE

Tax incidence is the study of the effects of tax policies on prices and the distribution of utilities/welfare.

What happens to market prices when a tax is introduced or changed?

Examples:

- what happens when impose $1 per pack tax on cigarettes? Introduce an earnings subsidy (EITC)? provide a subsidy for food (food stamps)?
- effect on price $\Rightarrow$ distributional effects on smokers, profits of producers, shareholders, farmers,...

This is positive analysis: typically the first step in policy evaluation; it is an input to later thinking about what policy maximizes social welfare.

TAX INCIDENCE

Tax incidence is not an accounting exercise but an analytical characterization of changes in economic equilibria when taxes are changed.

Key point: Taxes can be shifted: taxes affect directly the prices of goods, which affect quantities because of behavioral responses, which affect indirectly the price of other goods.

If prices are constant economic incidence would be the same as legislative incidence.

Example: Liberals favor capital income taxation because capital income is concentrated at the high end of the income distribution. Taxing capital means taxing disproportionately the rich.

Argument neglects implicitly general equilibrium price effects: if people save less because of capital taxes, capital stock may go down driving also the wages down and hurting workers. The capital tax might be shifted partly on workers.

Partial Equilibrium Tax Incidence

Partial Equilibrium Model:

Simple model goes a long way to showing main results.

Government levies an excise tax on good x

Excise means it is levied on a quantity (gallon, pack, ton, ...). Typically fixed in nominal terms (therefore subject to declines in real terms)

(ad-valorem tax is a fraction of prices (e.g. sales tax), marked automatically to inflation)

Let p denote the pretax price of x and $q = p + t$ denote the tax inclusive price of x (statutory incidence is on consumer)

TAX INCIDENCE

Demand for good x is $D(q)$ decreases with $q = p + t$

Supply for good x is $S(p)$ increases with p

Equilibrium condition: $Q = S(p) = D(p + t)$

Start from $t = 0$ and $S(p) = D(p)$. We want to characterize dp/dt: effect of a tax increase on price, which determines who bears effective burden of tax:

Change dt generates change dp so that equilibrium holds:

$$S(p + dp) = D(p + dp + dt) \Rightarrow$$

$$S(p) + S'(p)dp = D(p) + D'(p)(dp + dt) \Rightarrow$$

$$S'(p)dp = D'(p)(dp + dt) \Rightarrow$$

$$\frac{dp}{dt} = \frac{D'(p)}{S'(p) - D'(p)}$$

TAX INCIDENCE

Useful to use elasticities in economics because elasticities are independent of scaling

Elasticity: percentage change in quantity when price changes by one percent

$\varepsilon_D = \frac{q}{D}\frac{dD}{dq} = \frac{qD'(q)}{D(q)} < 0$ denotes the price elasticity of demand

(consumer faces price $q = p + t$)

$\varepsilon_S = \frac{p}{S}\frac{dS}{dp} = \frac{pS'(p)}{S(p)} > 0$ denotes the price elasticity of supply

$$\frac{dp}{dt} = \frac{D'(p)}{S'(p) - D'(p)} = \frac{\varepsilon_D}{\varepsilon_S - \varepsilon_D}$$

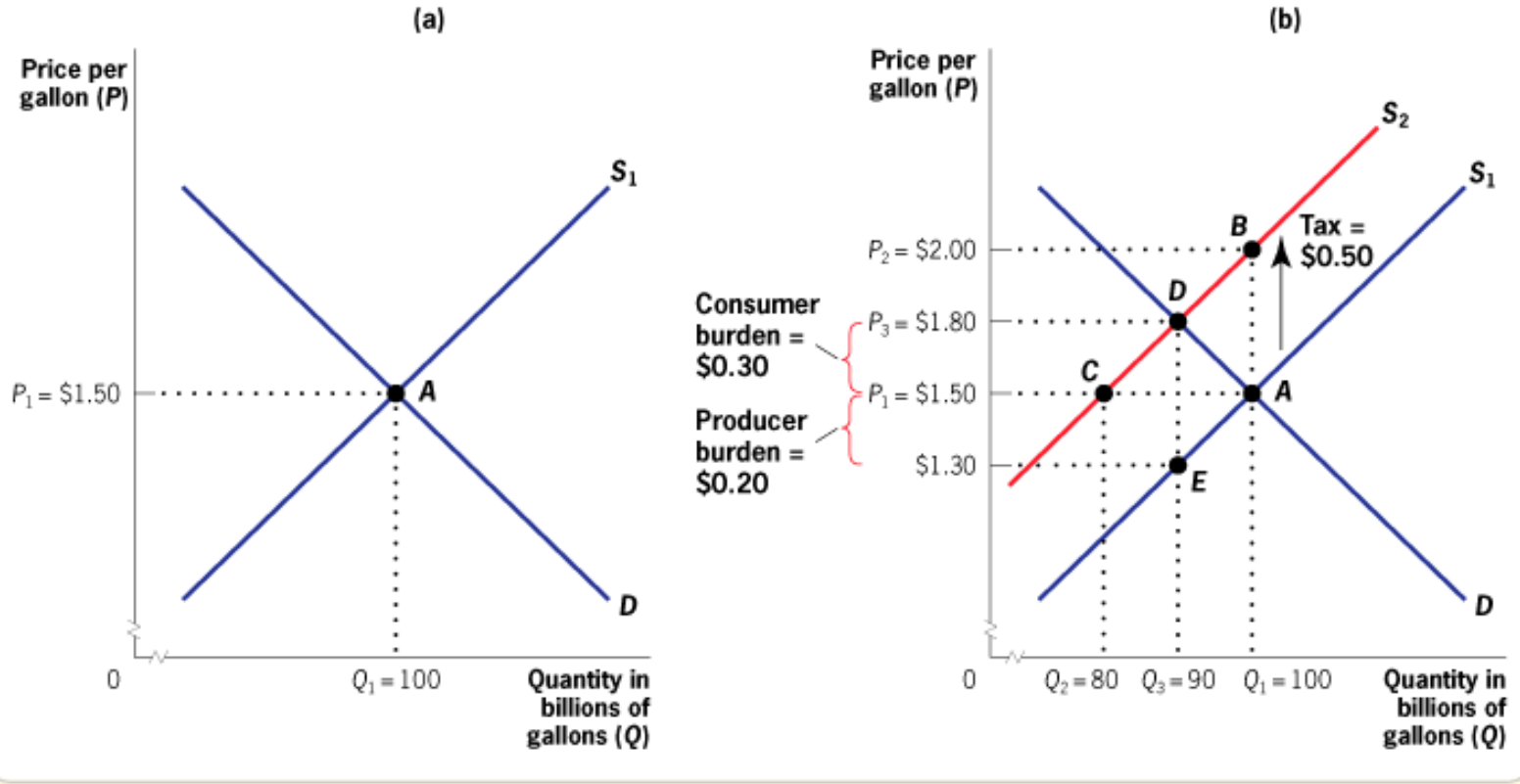
$$-1 \leq \frac{dp}{dt} \leq 0 \quad \text{and} \quad 0 \leq \frac{dq}{dt} = 1 + \frac{dp}{dt} \leq 1$$

19.1

The Three Rules of Tax Incidence

The Statutory Burden of a Tax Does Not Describe Who Really Bears the Tax

■ FIGURE 19-2



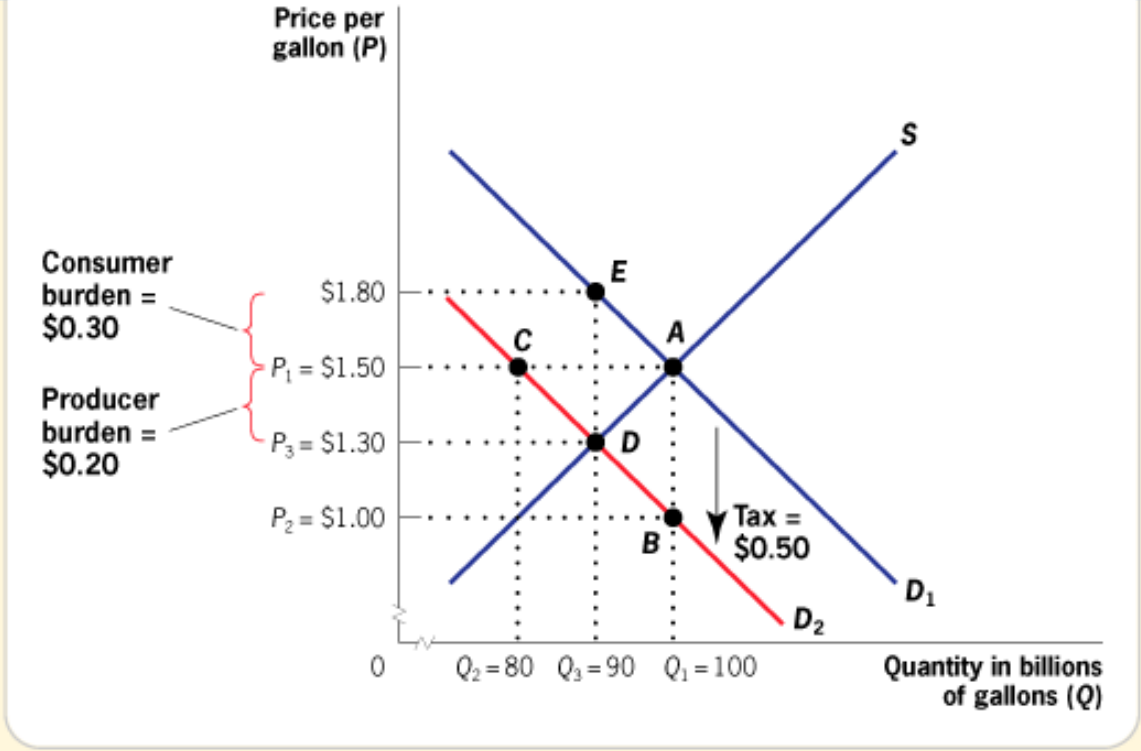
Statutory Burdens Are Not Real Burdens • Panel (a) shows the equilibrium in the gas market before taxation (point *A*). A 50¢ tax levied on gas producers (the statutory burden) in panel (b) leads to a decrease in supply from S_1 to S_2 and to a 30¢ rise in the price of gas from P_1 to P_3 (point *D*). The real burden of the tax is borne primarily by consumers, who pay 30¢ of the tax through higher prices, leaving producers to bear only 20¢ of the tax.

19.1

The Three Rules of Tax Incidence

The Side of the Market on Which the Tax Is Imposed Is Irrelevant to the Distribution of the Tax Burdens

■ FIGURE 19-3



The Side of the Market Is Irrelevant • A 50¢ tax levied on gas consumers (the statutory burden) leads to a decrease in demand from D_1 to D_2 and to a 20¢ fall in the price of gas from P_1 to P_3 (with the market moving from the pre-tax equilibrium at point *A* to the post-tax equilibrium at point *D*). The real burden of the tax is borne primarily by consumers, who pay the 50¢ tax to the government but receive an offsetting price reduction of only 20¢; producers bear that 20¢ of the tax.

TAX INCIDENCE

$$\frac{dp}{dt} = \frac{\varepsilon_D}{\varepsilon_S - \varepsilon_D}$$

When do consumers bear the entire burden of the tax? ($dp/dt = 0$ and $dq/dt = 1$)

$\varepsilon_D = 0$ [inelastic demand]

example: short-run demand for gas inelastic (need to drive to work)

$\varepsilon_S = \infty$ [perfectly elastic supply]

example: perfectly competitive industry

When do producers bear the entire burden of the tax? ($dp/dt = -1$ and $dq/dt = 0$)

$\varepsilon_S = 0$ [inelastic supply]

example: fixed quantity supplied

$\varepsilon_D = -\infty$ [perfectly elastic demand]

example: there is a close substitute, and demand shifts to this substitute if price changes.

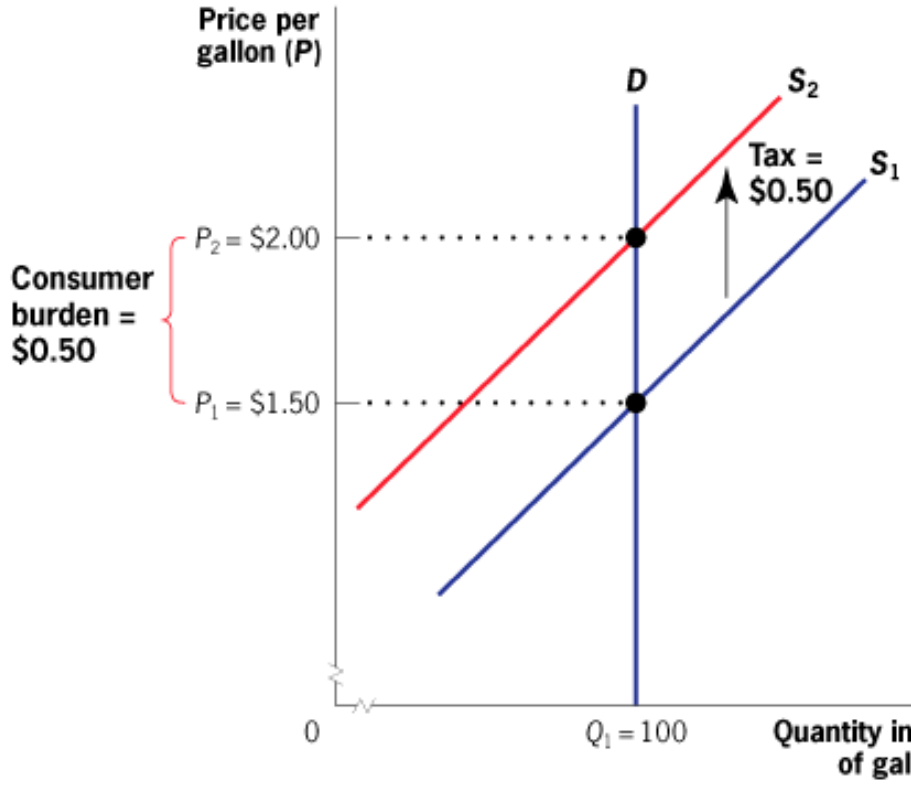
19.1

The Three Rules of Tax Incidence

Parties with Inelastic Supply or Demand Bear Taxes; Parties with Elastic Supply or Demand Avoid Them

Perfectly Inelastic Demand

■ FIGURE 19-4



Inelastic Factors Bear Taxes • A tax on producers of an inelastically demanded good is fully reflected in increased prices, so consumers bear the full tax.

19.1

The Three Rules of Tax Incidence

Parties with Inelastic Supply or Demand Bear Taxes; Parties with Elastic Supply or Demand Avoid Them

Perfectly Elastic Demand

■ FIGURE 19-5

Elastic Factors Avoid Taxes • A tax on producers of a perfectly elastically demanded good cannot be passed along to consumers through an increase in prices, so producers bear the full burden of the tax.

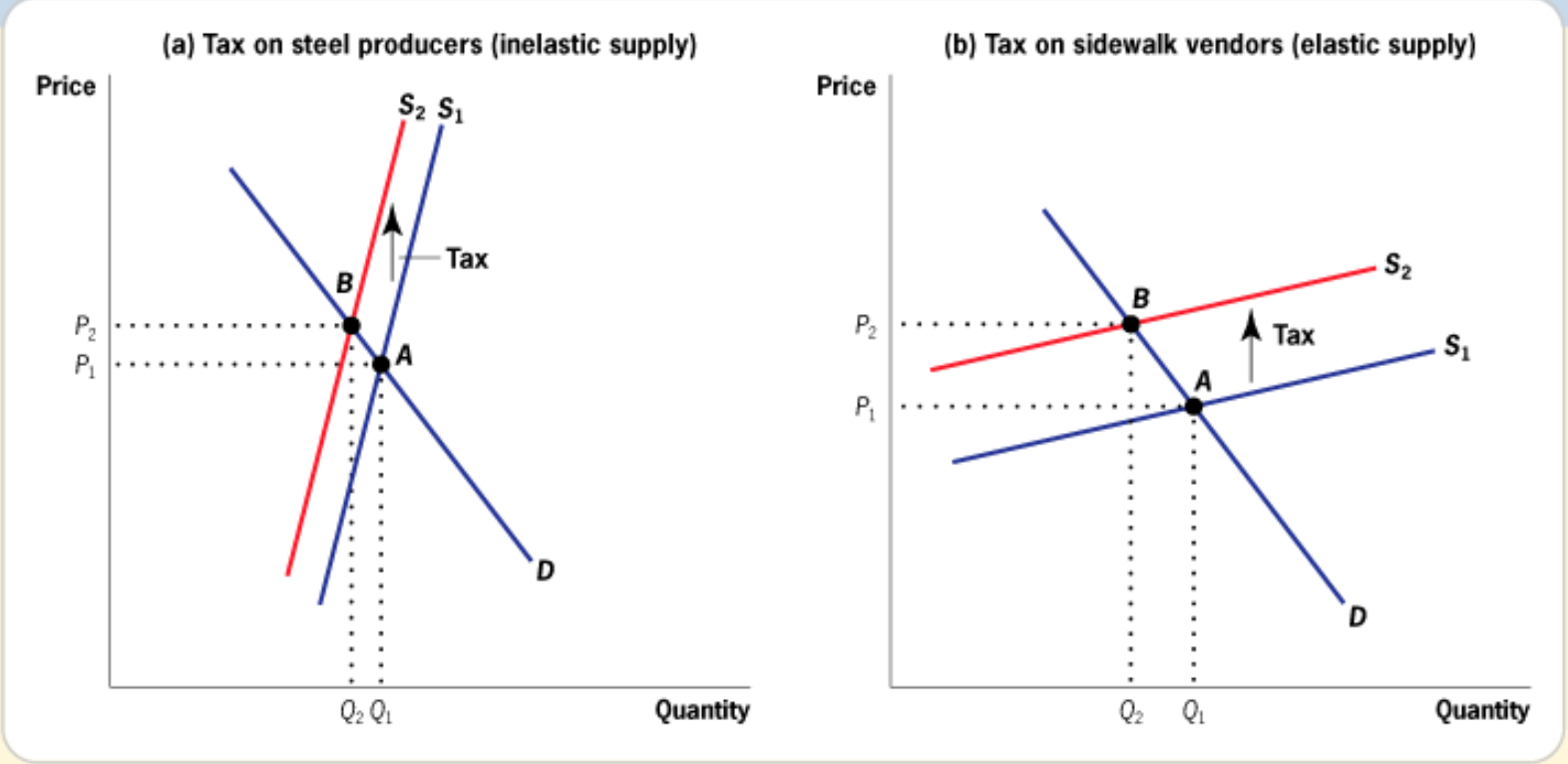
19.1

The Three Rules of Tax Incidence

Parties with Inelastic Supply or Demand Bear Taxes; Parties with Elastic Supply or Demand Avoid Them

Supply Elasticities

■ FIGURE 19-6



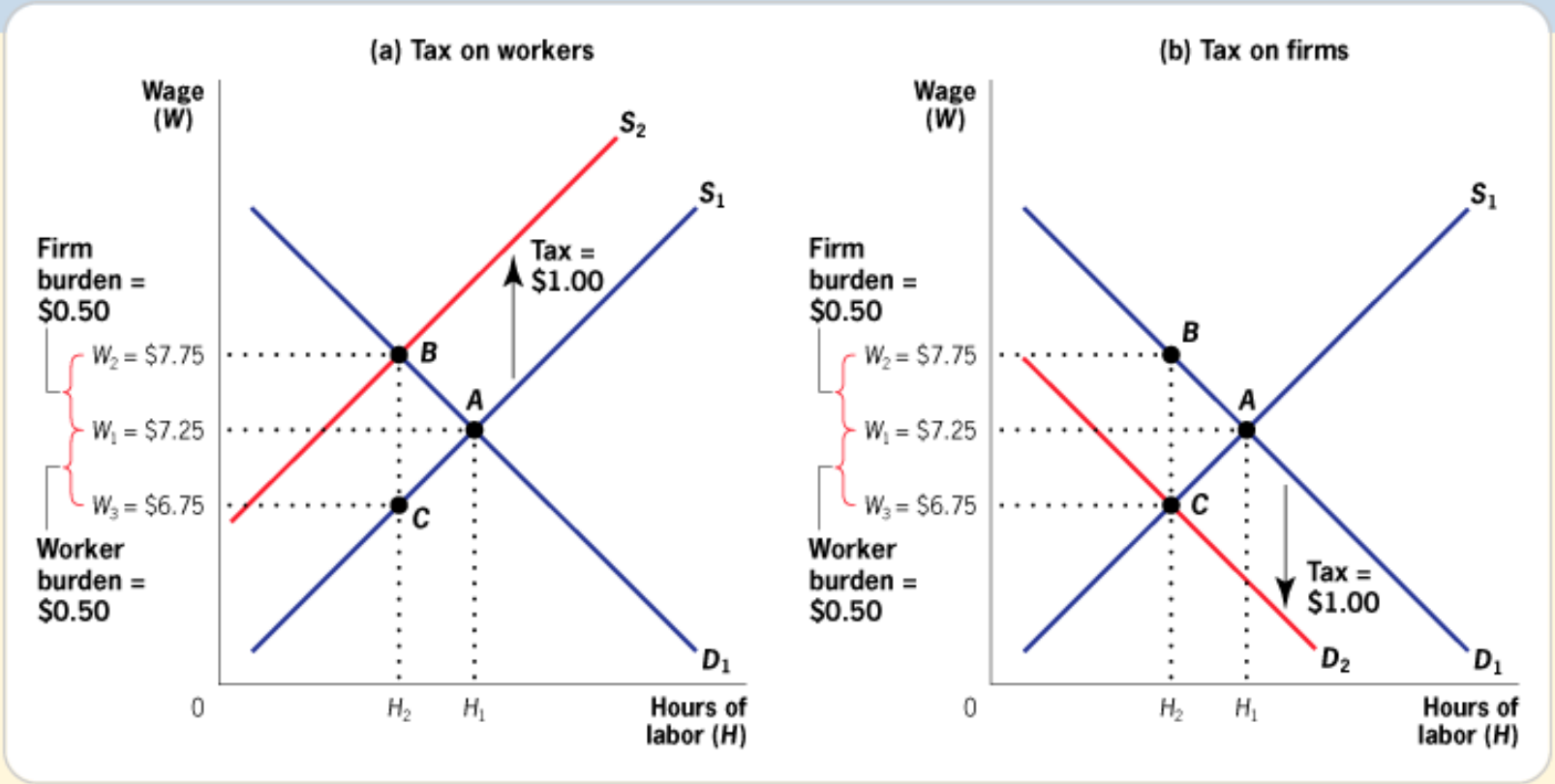
Elasticity of Supply Also Matters • A tax on producers of an inelastically supplied good, as in panel (a), leads to a very small rise in prices, so producers bear most of the burden of the tax. An equal-sized tax on producers of an elastically supplied good, as in panel (b), leads to a large rise in prices, so producers bear little of the burden of the tax (and consumers bear most of the burden).

19.2

Tax Incidence Extensions

Tax Incidence in Factor Markets

■ FIGURE 19-7



Incidence Analysis Is the Same in Factor Markets • These figures show the market for labor where firms are the consumers and workers are the producers of hours worked at a wage rate *W*. A $1.00 tax per hour worked that is levied on workers, shown in panel (a), leads the supply curve to rise from S_1 to S_2 and the wage to rise from its initial equilibrium value of $7.25 (point *A*) to a higher value of $7.75 (point *B*). A tax of $1.00 per hour worked that is levied on firms, shown in panel (b), leads the demand curve to fall from D_1 to D_2 and the wage to fall from $7.25 to $6.75 at point *C*. Thus, regardless who pays the tax, workers and firms each have a burden of 50¢ per hour.

TAX INCIDENCE: KEY RESULTS

1) statutory incidence not equal to economic incidence

2) equilibrium is independent of who nominally pays the tax

3) more inelastic factor bears more of the tax

These are robust conclusions that hold with more complicated models

TAX INCIDENCE: EXTENSIONS

1) Market rigidities (suppose there is a minimum or maximum price) then standard analysis does not carry over

Example: minimum wage. Social security taxes 7.5% on employer and 7.5% on employee. In principle the share of each should not matter as long as total is constant but minimum wage is computed on net wage (gross wage - employer tax = net wage + employee tax).

2) Effects on other markets:

Example: Suppose tax on cigarettes increases, if people substitute cigarettes for cigars then price of cigars increases and part of the burden is shifted to the cigar market and cigarette demand curves will move.

Revenue effects on other markets: tax increases, I am poorer, I have less to spend on other markets.

For small, narrow markets such as cigarettes, partial eq. analysis is a reasonable approximation (although effects on substitutes could be important).

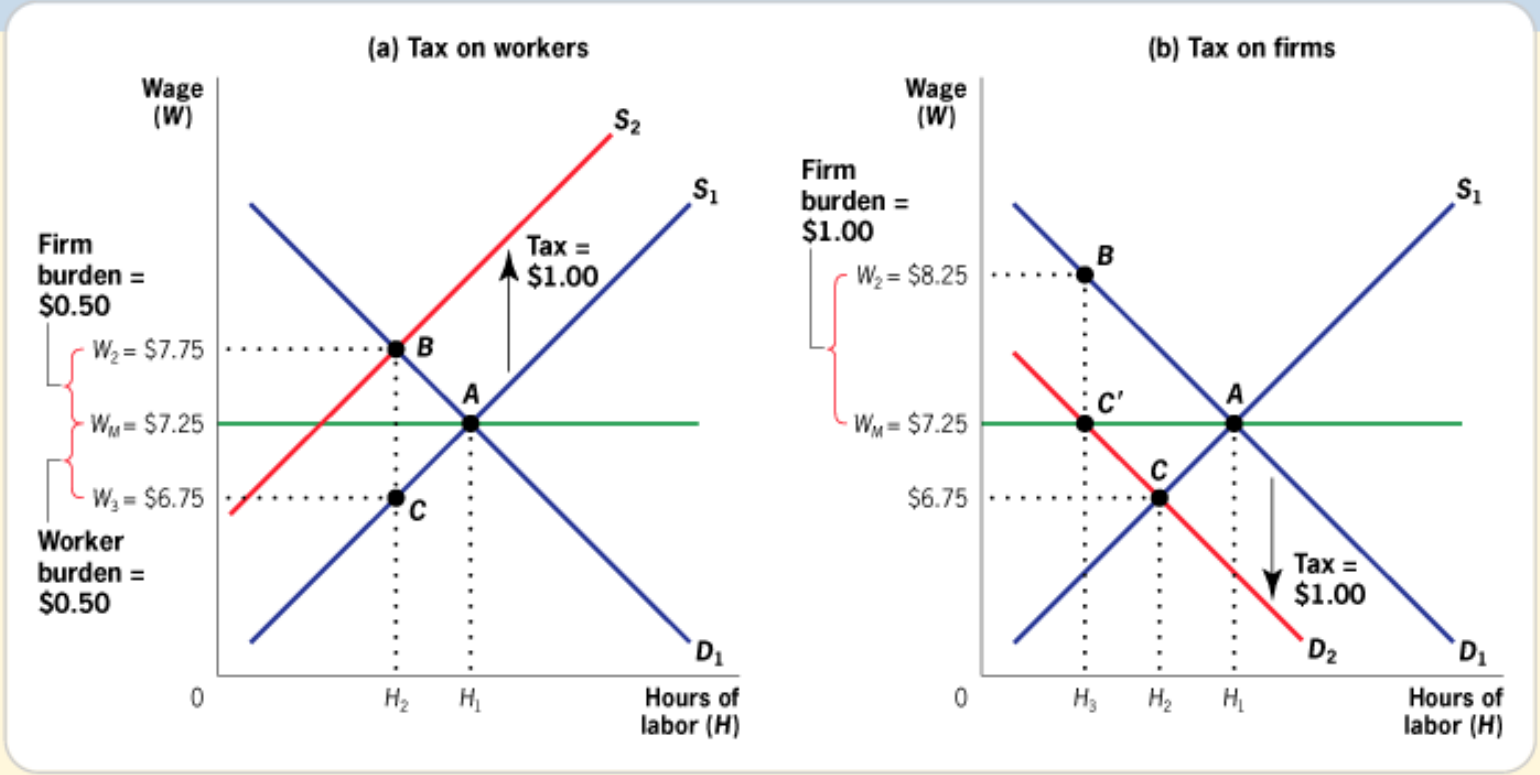
19.2

Tax Incidence Extensions

Tax Incidence in Factor Markets

Impediments to Wage Adjustment

■ FIGURE 19-8



Incidence Analysis in Factor Markets Differs with a Minimum Wage • The analysis here is the same as in Figure 19-7, with the addition of the constraint that the wage cannot fall below $7.25 per hour. If the payroll tax is levied on workers, as shown in panel (a), this constraint has no effect: the wage rises to $7.75, as in Figure 19-7, and workers and firms equally share the burden of the tax. If the payroll tax is levied on firms, as shown in (panel (b), however, the firms cannot lower the wage to the desired $6.75 per hour, so the firms bear the full amount of the tax.

Efficiency Costs of Taxation

Thus far, we have focused on the incidence of government policies: how price interventions affect equilibrium prices and factors returns: how policies affect the **distribution** of the pie

A second general set of questions is how taxes affect the **size** of the pie.

Example: income taxation

Government raises taxes to raise revenue to finance public goods or to redistribute income from rich to poor.

But raising tax revenue generally has an efficiency cost: to generate $1 of revenue, need to reduce welfare of the taxed individuals by more than $1

Efficiency costs come from distortion of behavior

Efficiency Costs of Taxation

Deadweight burden (also called excess burden) of taxation is defined as the welfare loss (measured in dollars) created by a tax over and above the tax revenue generated by the tax

In the simple supply and demand diagram, welfare is measured by the sum of the consumer surplus and producer surplus

The welfare loss of taxation is measured as change in consumer+producer surplus minus tax collected: it is the triangle on the figure

The inefficiency of any tax is determined by the extent to which consumers and producers change their behavior to avoid the tax; deadweight loss is caused by individuals and firms making inefficient consumption and production choices in order to avoid taxation.

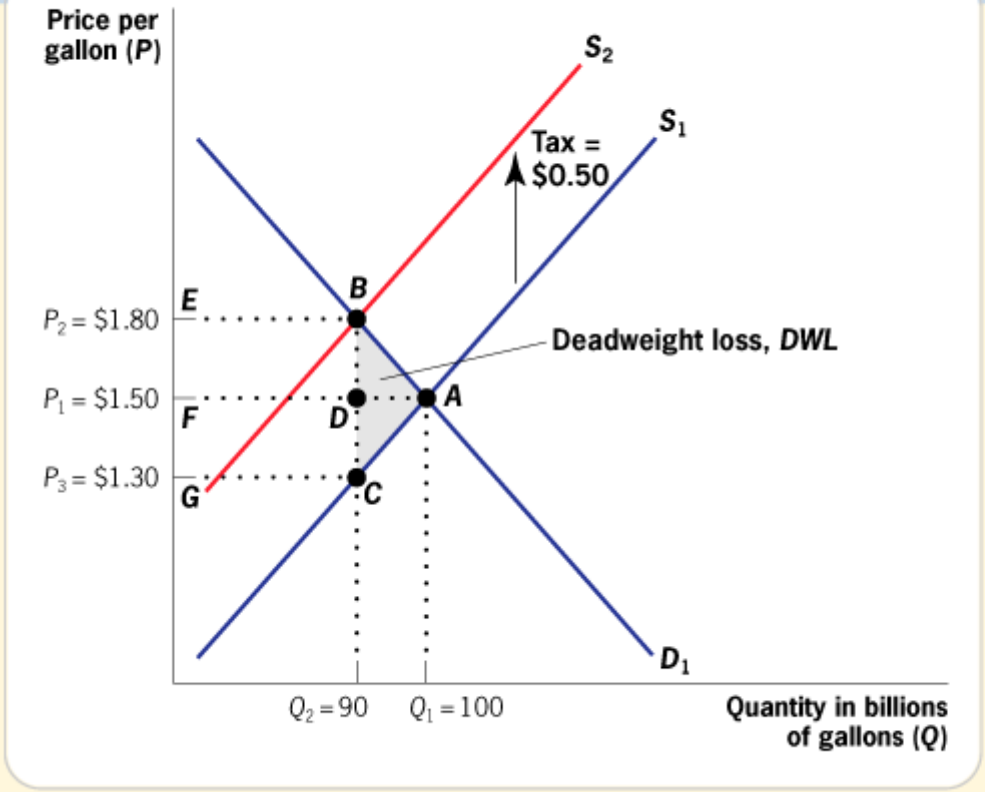
If there is no change in quantities consumed, the tax has no efficiency costs

20.1

Taxation and Economic Efficiency

Graphical Approach

■ FIGURE 20-1



Deadweight Loss of a Tax • When a tax is imposed, the supply curve shifts from S_1 to S_2 and the equilibrium quantity in the market falls from Q_1 to Q_2, creating a deadweight loss triangle *BAC*. The *DWL* arises because there are trades ($Q_1 - Q_2$) for which social marginal benefits (demand curve) exceed social marginal costs (supply curve) that are not made.

Efficiency Costs of Taxation

Deadweight burden (also called deadweight loss) of small tax dt (starting from zero tax) is measured by the **Harberger Triangle**:

$$DWB = \frac{1}{2} dQ \cdot dt = \frac{1}{2} S'(p) \cdot dp dt = \frac{1}{2} \frac{pS'(p)}{S(p)} \cdot \frac{Q}{p} \cdot dp dt$$

[recall that $Q = S(p)$ and hence $dQ = S'(p)dp$]

Recall that $dp/dt = \varepsilon_D/(\varepsilon_S - \varepsilon_D)$, hence:

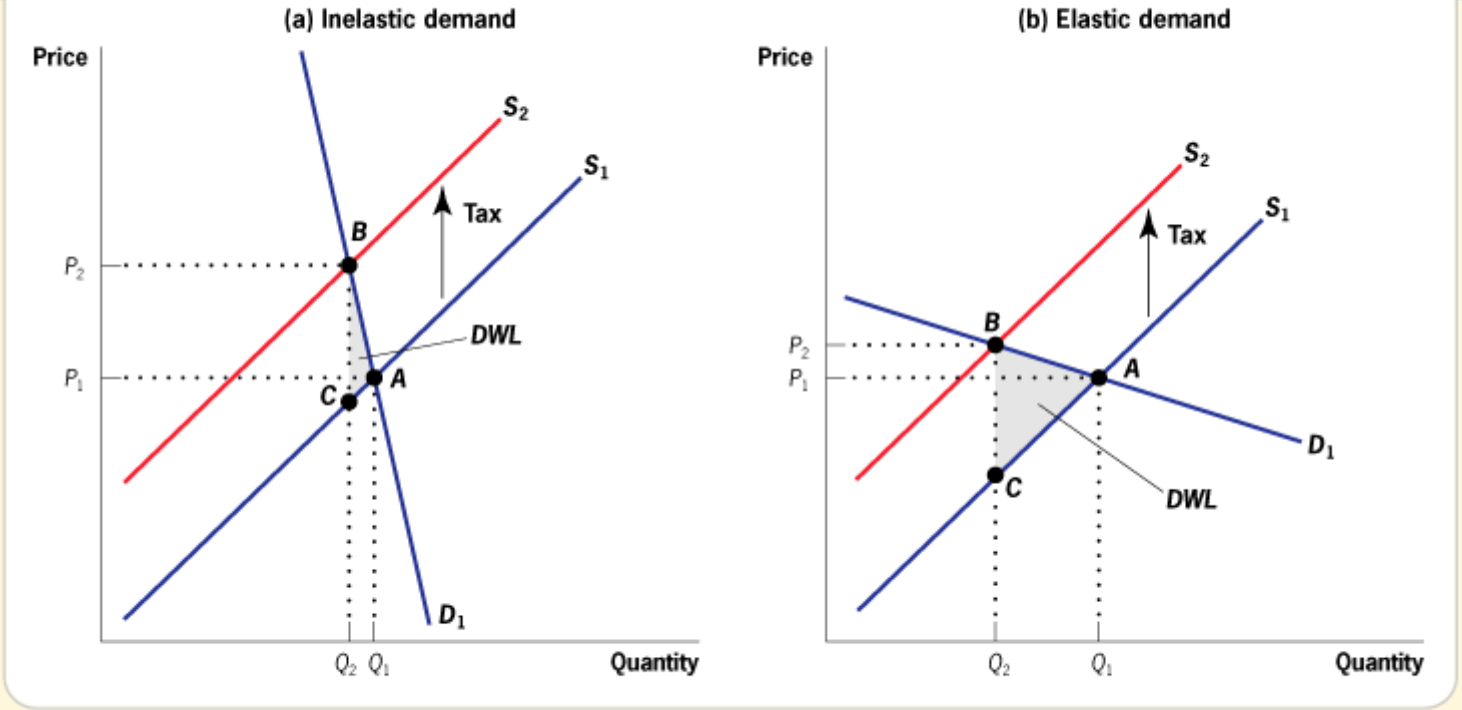
$$DWB = \frac{1}{2} \cdot \frac{\varepsilon_S \cdot \varepsilon_D}{\varepsilon_S - \varepsilon_D} \cdot \frac{Q}{p} (dt)^2$$

20.1

Taxation and Economic Efficiency

Elasticities Determine Tax Inefficiency

■ FIGURE 20-2



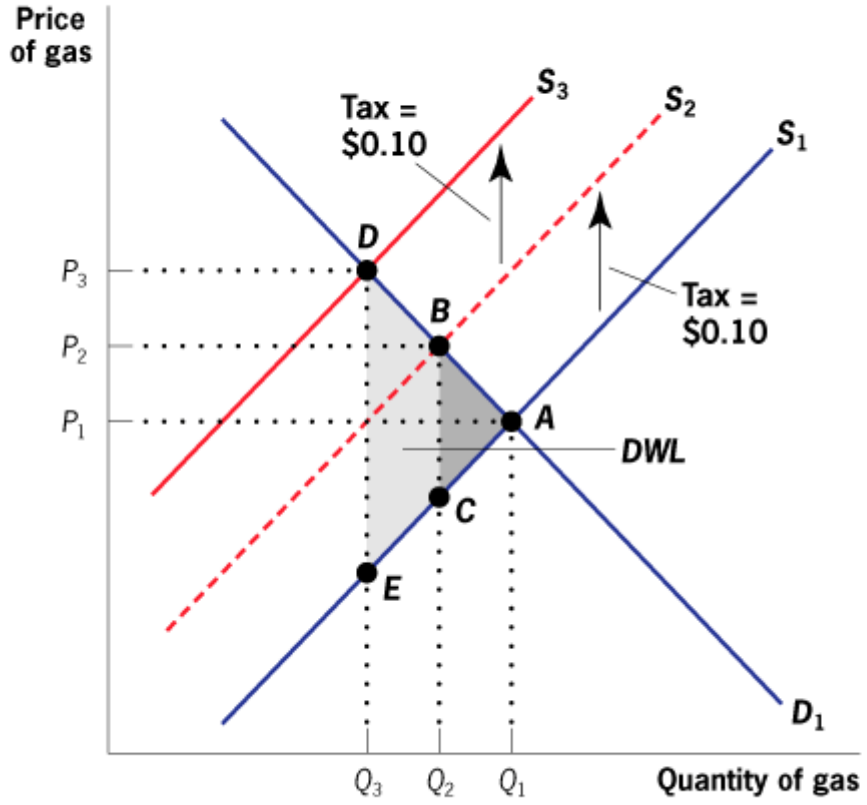
Deadweight Loss Rises with Elasticities • The deadweight loss of a given tax is smaller when the demand curve is less elastic, as in panel (a), than when it is more elastic, as in panel (b).

20.1

Taxation and Economic Efficiency

Determinants of Deadweight Loss

■ FIGURE 20-3



Marginal Deadweight Loss Rises with Tax Rate • An initial $0.10 tax on suppliers causes a deadweight loss triangle *BAC*. An additional $0.10 tax causes a much larger deadweight loss, *DAE*. The trapezoid *DBCE* is the marginal deadweight that is added to the initial deadweight loss of triangle *BAC*.

Efficiency Costs of Taxation

$$DWB = \frac{1}{2} \cdot \frac{\varepsilon_S \cdot \varepsilon_D}{\varepsilon_S - \varepsilon_D} \cdot \frac{Q}{p}(dt)^2$$

1) $DWB \uparrow$ with the size of elasticities $\varepsilon_S > 0$ and $-\varepsilon_D > 0$

$\Rightarrow$ More efficient to tax relatively inelastic goods

2) DWB increases with the square of the tax rate t: small taxes have relatively small efficiency costs, large taxes have relatively large efficiency costs

$\Rightarrow$ More efficient to spread taxes across all goods to keep tax rates low

$\Rightarrow$ Better to fund large one time govt expense (such as a war) with debt and repay slowly afterwards

3) Pre-existing distortions (such as a positive externality that is not corrected) makes the cost of taxation higher: move from the triangle to trapezoid

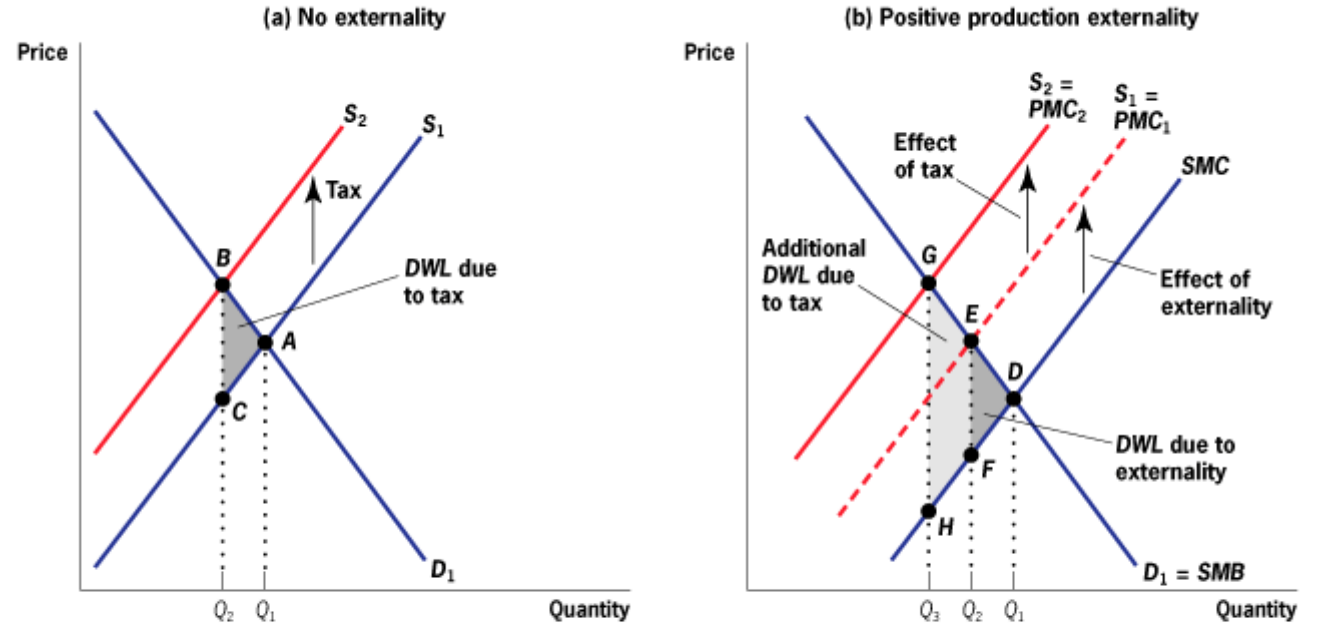
20.1

Taxation and Economic Efficiency

Deadweight Loss and the Design of Efficient Tax Systems

A Tax System's Efficiency Is Affected by a Market's Preexisting Distortions

■ FIGURE 20-4



Preexisting Distortions Matter • In panel (a), a tax in a market with no preexisting distortions (such as externalities) creates a deadweight loss equal to triangle *BAC*. In panel (b), a positive externality in the market has created a deadweight loss triangle *EDF*; imposing a tax on this market results in a deadweight loss that is larger by the area of trapezoid *GEFH*. The total *DWL* in the market with a positive externality and a tax is the area of triangle *GDH*.

Application: Optimal Commodity Taxation

Ramsey (1927) asked by Pigou to solve the following problem:

Consider one consumer who consumes K different goods

What are the tax rates $t_1, .., t_K$ that raise a given amount of revenue while minimizing the welfare loss to the individual?

Uniform tax rates $t = t_1 = .. = t_K$ is not optimal if the individual has more elastic demand for some goods than for others

Optimum is called the **Ramsey tax rule**: optimal tax rates are such that the marginal DWB is the same across all goods
$\Rightarrow$ Tax less elastic goods more, tax more elastic goods less

Tax Incidence: Empirical Application

Doyle and Sampatharank (2008) study the Gas Tax Holidays in Indiana (IN) and Illinois (IL).

Are gas tax cuts passed through to consumers? or do producers pocket the tax cut and leave consumer price unchanged?

Study this question using state-level gas tax reforms

Gas prices spike above $2.00 in 2000

IN suspends 5% gas tax on July 1. Reinstated on Oct 30.

IL suspends 5% gas tax on July 1. Reinstated on Dec 31.

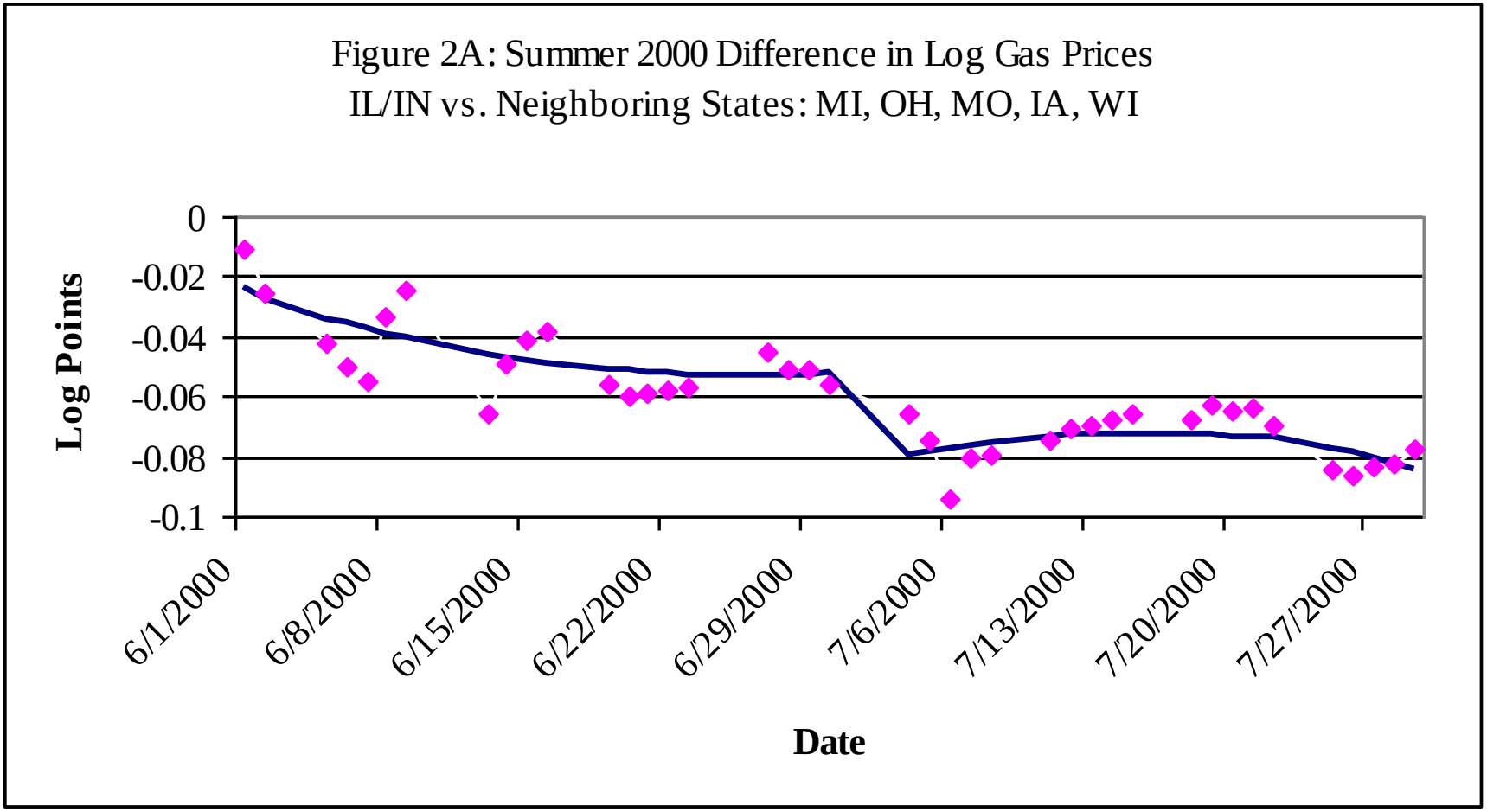
Tax Incidence: Empirical Application

Empirical approach in paper: difference-in-difference (DD), compare treated states with neighboring states (MI, OH, MO, IA, WI) before and after tax change

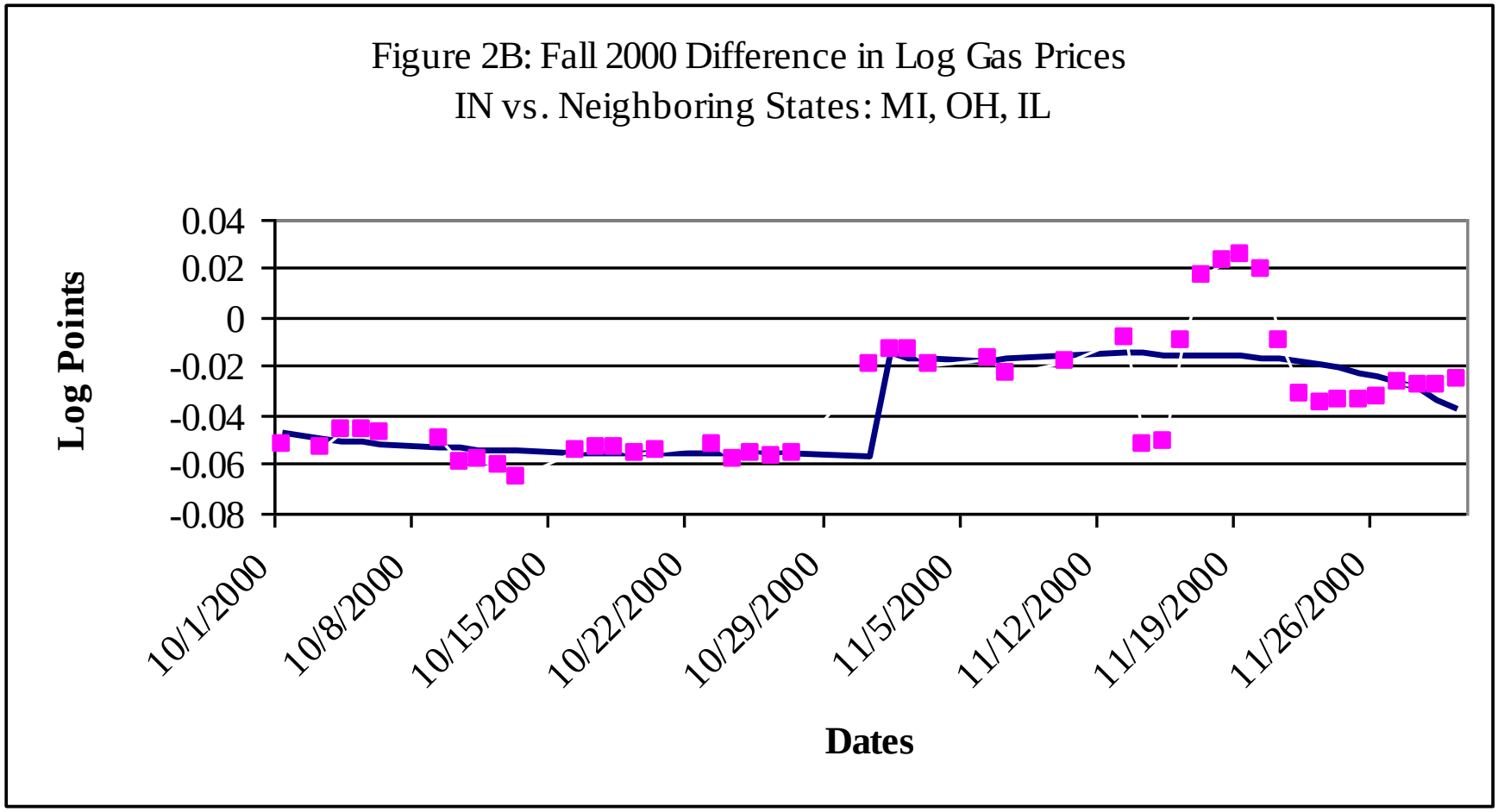
Graphical evidence is most transparent. Findings:

1) 10 cent increase in gas tax $\Rightarrow$ 7 cent increase in price paid by consumers

2) Consumers bear 70% of incidence of the gas tax (and conversely, get 70% of the benefit of a gas tax cut)



Source: Doyle and Samphantharak 2008.



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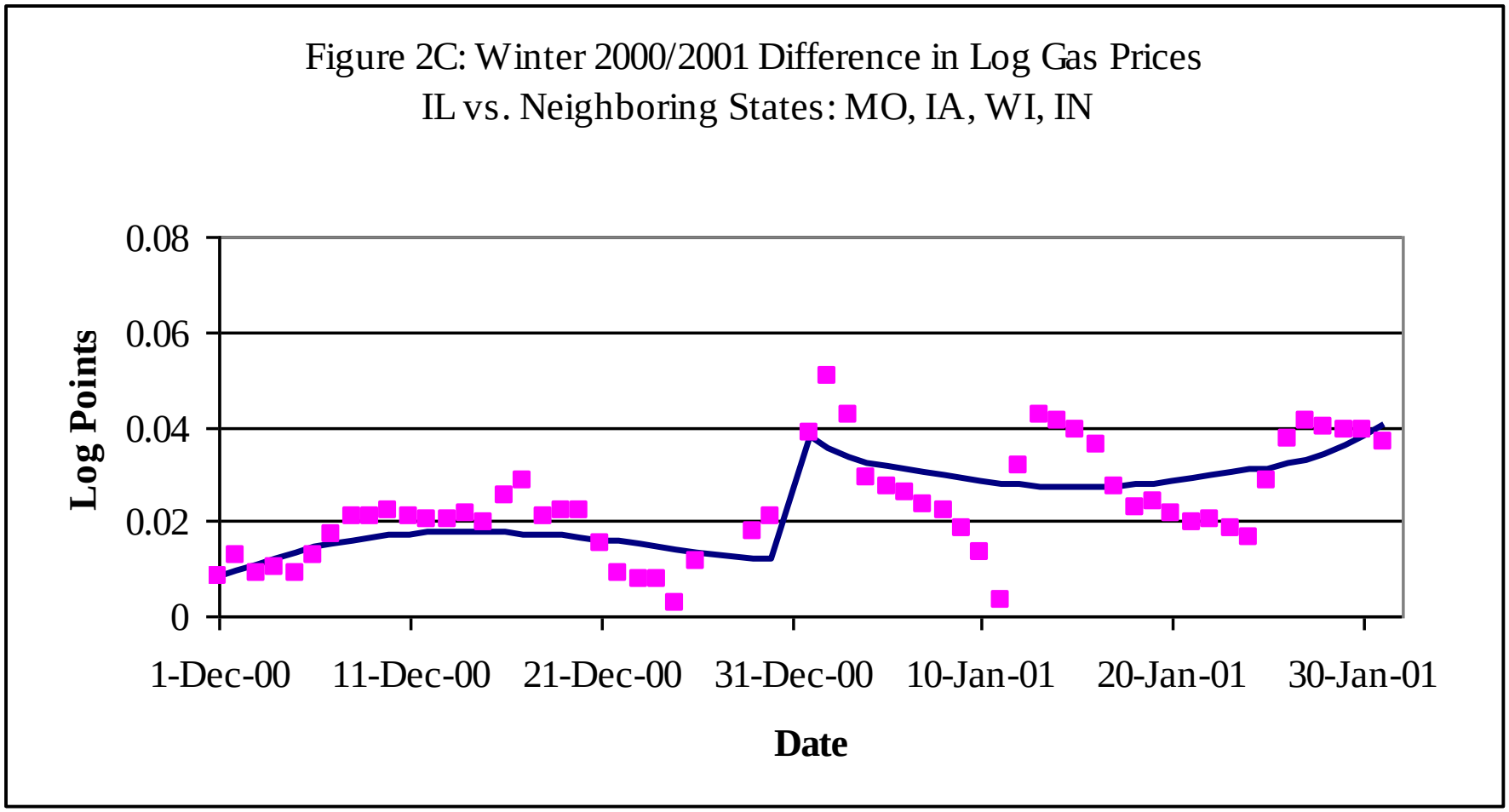


Source: Doyle and Samphantharak 2008.

19.4

The Incidence of Taxation in the United States

EMPIRICAL EVIDENCE

THE INCIDENCE OF EXCISE TAXATION

Analysts can compare the change in goods prices in the states raising their excise tax relative to states not changing their excise tax, to measure the effect of each 1¢ rise in excise taxes on goods prices.

An excellent example is excise taxes on cigarettes.

The excise tax on cigarettes varies widely across the U.S. states, from a low of 2.5¢ per pack in Virginia to a high of $1.51 per pack in Connecticut and Massachusetts.

Since 1990, New Jersey has increased its tax rate nearly sixfold (from 27¢ per pack to $1.50), while Arizona has increased its tax nearly eightfold (from 15¢ to $1.18).

A number of studies have examined the change in cigarette prices when there are excise tax increases on cigarettes, comparing states increasing their tax to other states that do not raise taxes.

These studies uniformly conclude that the price of cigarettes rises by the full amount of the excise tax.

General Equilibrium Tax Incidence

Examples so far have focused on **partial equilibrium** incidence which considers impact of a tax on one market in isolation

General equilibrium models consider the effects on related markets of a tax imposed on one market

E.g. imposition of a tax on cars may reduce demand for steel $\Rightarrow$ additional effects on prices in equilibrium beyond car market.

General Equilibrium Tax Incidence: Example: Restaurant Tax

Consider the market for restaurants in Berkeley

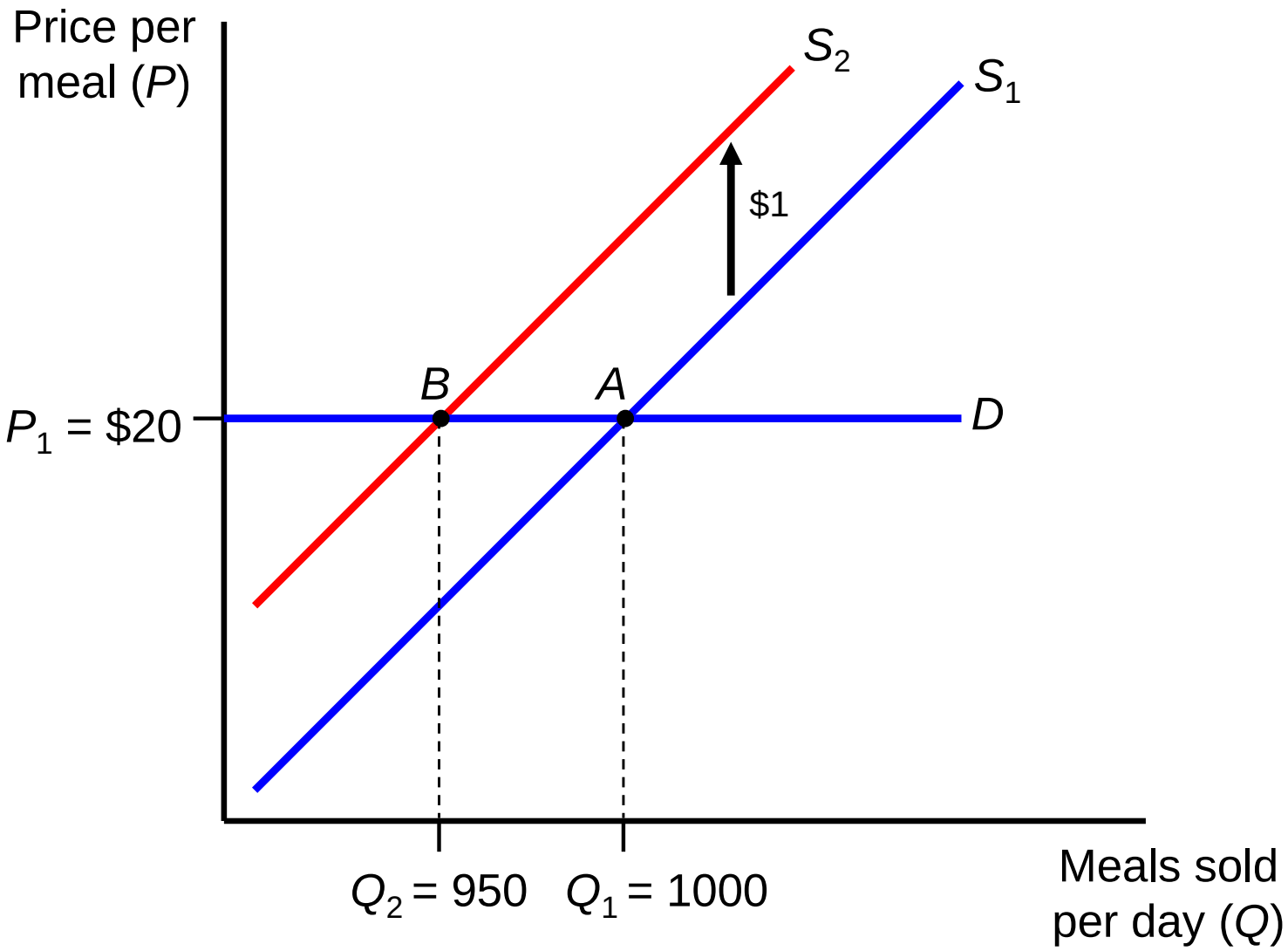
Demand for restaurants in Berkeley is likely to be highly elastic: if price of restaurants in Berkeley goes up, go to Oakland.

Consider extreme case of perfectly elastic demand and traditional model with fully perceived taxes.

Suppose Berkeley imposes a restaurant tax

Who bears the incidence?

Figure 10


Price per meal (P)
S2
S1
$1
B
A
D
P1 = $20
Q2 = 950
Q1 = 1000
Meals sold per day (Q)

General Equilibrium Tax Incidence: Example: Restaurant Tax

1) Restaurants bear the full burden of the tax.

2) But restaurants are not self-contained entities

Companies are just a technology for combining capital and labor to produce an output.

Restaurant owner owns capital: land, physical inputs like building, kitchen equipment, tables, etc.

Labor: cooks, waitstaff, etc.

3) Ultimately, these two factors capital or labor must bear the loss in profits due to the tax.

General Equilibrium Tax Incidence: Example: Restaurant Tax

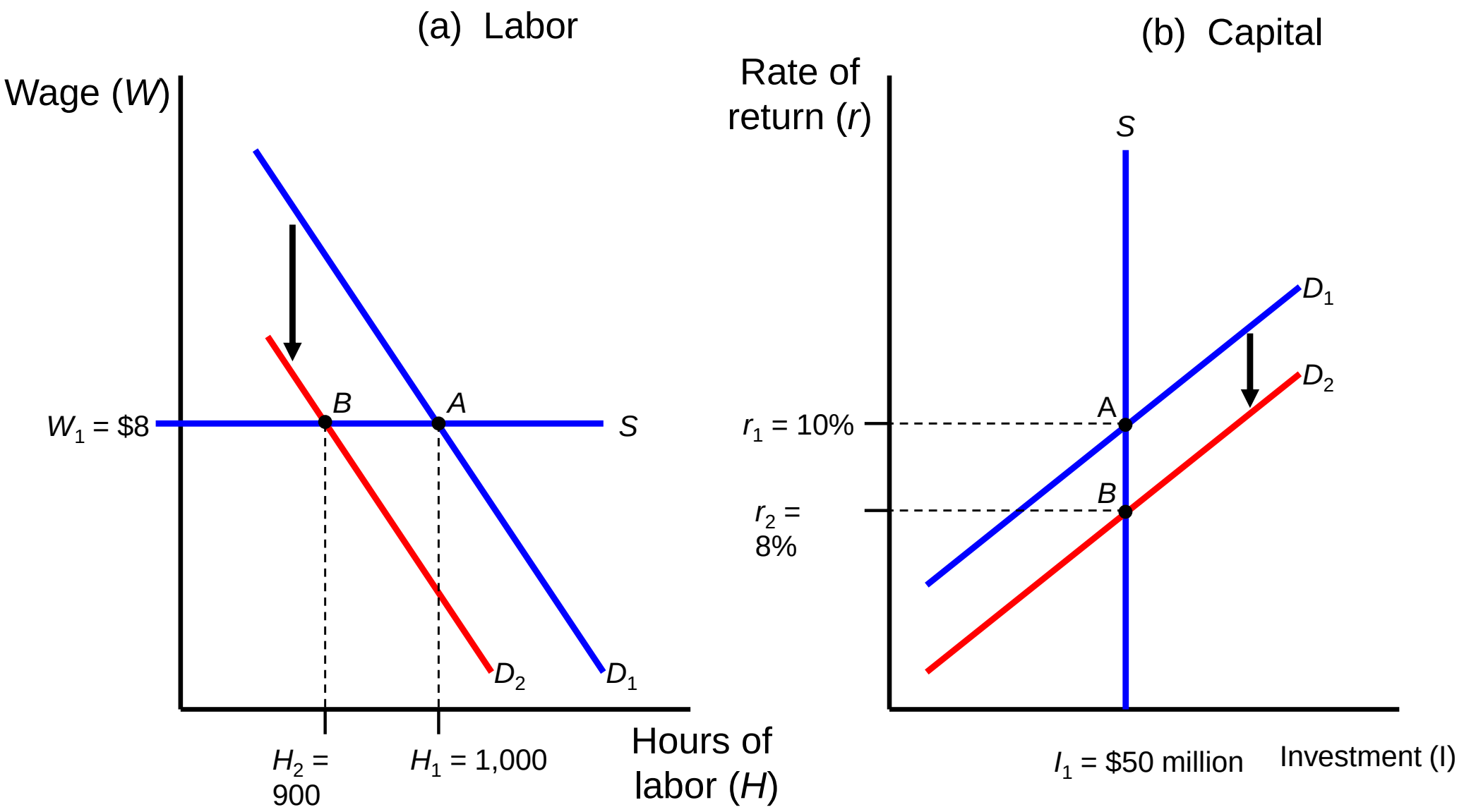
Incidence is "shifted backward" to capital and labor.

Assume that labor supply is perfectly elastic cooks can always go and work in Oakland if they get paid less in Berkeley

Capital, in contrast, is perfectly inelastic in short-run: you cannot pick up the restaurant and move it in the short run.

To understand who bears incidence, consider markets for these inputs

Figure 11


(a) Labor
Wage (W)
W1 = $8
B
A
S
D2
D1
H2 = 900
H1 = 1,000
Hours of labor (H)
(b) Capital
Rate of return (r)
S
D1
D2
r1 = 10%
r2 = 8%
A
B
I1 = $50 million
Investment (I)

General Equilibrium Tax Incidence: Example: Restaurant Tax

In short run, capital bears tax because it is completely inelastic $\Rightarrow$ restaurant owners lose (not consumers or workers)

In the longer-run, the supply of capital is also likely to be highly elastic.

Investors can close or sell the restaurant, take their money, and invest it elsewhere.

There are many good substitutes for investing in a particular restaurant in a particular town.

General Equilibrium Tax Incidence: Long-run effects

If both labor and capital are highly elastic in the long run, who bears the tax?

The one additional inelastic factor in the restaurant production process is land.

The supply is clearly fixed.

When both labor and capital can avoid the tax, the only way restaurants will remain in Berleley is if they pay a lower rent on their land.

$\Rightarrow$ Tax on restaurants intended to take money from businesses ends up hurting Berkeley landowners in general equilibrium

This if of course an idealized example, in practice, it can take a very long-time for incidence to fall on land

CBO INCIDENCE ASSUMPTIONS

The Congressional Budget Office (CBO) analysis considers the incidence of the full set of taxes levied by the federal government. Their key assumptions follow:

1. *Income taxes* are borne fully by the households that pay them.

2. *Payroll taxes* are borne fully by workers, regardless of whether these taxes are paid by the workers or by the firm.

3. *Excise taxes* are fully shifted to prices and so are borne by individuals in proportion to their consumption of the taxed item.

4. *Corporate taxes* are fully shifted to the owners of capital (not only shareholders but owners of capital in general) and so are borne in proportion to each individual's capital income [controversial]

19.4

The Incidence of Taxation in the United States

Results of CBO Incidence Analysis

■ TABLE 19-1

Effective Tax Rates

	1979	1985	1990	1995	2000	2006
	Total effective tax rate					
All households	22.2%	20.9%	21.5%	22.6%	23.0%	20.7%
Bottom quintile	8.0%	9.8%	8.9%	6.3%	6.4%	4.3%
Top quintile	27.5%	24.0%	25.1%	27.8%	28.0%	25.8%
	Effective income tax rate					
All households	11.0%	10.2%	10.1%	10.2%	11.8%	9.1%
Bottom quintile	0.0%	0.5%	−1.0%	−4.4%	−4.6%	−6.6%
Top quintile	15.7%	14.0%	14.4%	15.5%	17.5%	14.1%
	Effective payroll tax rate					
All households	6.9%	7.9%	8.4%	8.5%	7.9%	7.5%
Bottom quintile	5.3%	6.6%	7.3%	7.6%	8.2%	8.5%
Top quintile	5.4%	6.5%	6.9%	7.2%	6.3%	5.8%
	Effective corporate tax rate					
All households	3.4%	1.8%	2.2%	2.8%	2.4%	3.4%
Bottom quintile	1.1%	0.6%	0.6%	0.7%	0.5%	0.5%
Top quintile	5.7%	2.8%	3.3%	4.4%	3.7%	5.4%
	Effective excise tax rate					
All households	1.0%	0.9%	0.9%	1.0%	0.9%	0.7%
Bottom quintile	1.6%	2.2%	2.0%	2.4%	2.3%	1.9%
Top quintile	0.7%	0.7%	0.6%	0.7%	0.5%	0.4%

The top panel of this table shows the total effective federal tax rate on all households and on the top and bottom quintiles of the income distribution. The other panels show the effective tax rates of various other types of federal taxes.

19.4

The Incidence of Taxation in the United States

Results of CBO Incidence Analysis

■ TABLE 19-2

Top and Bottom Quintile's Share of Income and Tax Liabilities

	1979	1985	1990	1995	2000	2006
			Top quintile			
Share of income	45.5%	48.6%	49.5%	50.2%	54.8%	55.7%
Share of tax liabilities	56.4%	55.8%	57.9%	61.9%	66.6%	69.3%
			Bottom quintile			
Share of income	5.8%	4.8%	4.6%	4.6%	4.0%	3.9%
Share of tax liabilities	2.1%	2.3%	1.9%	1.3%	1.1%	0.8%
			Top 1%			
Share of income	9.3%	11.5%	12.1%	12.5%	17.8%	18.8%
Share of tax liabilities	15.4%	14.8%	16.2%	20.1%	25.5%	28.3%

This table shows the share of income and tax liabilities accruing to the top and bottom income quintiles over time.

Asset Price Approach to Incidence

General Equilibrium Incidence is hard to calculate empirically because of large number of effects in equilibrium

One potential solution: look at asset prices, e.g. the value of stocks or houses (capitalization)

Consider an increase in tax on car companies

Incidence could partly be shifted to consumers, workers, etc.

Summers, Cutler: can easily summarize overall net effect on GM by looking at how its stock price changes when tax is announced.

Limitation of asset price approach: can only be used for capital owners (Applications: corporate tax, environmental policy)

Asset Price Approach to Incidence
Empirical Application: Costs of Crime

Rockoff and Linden (2008) apply asset price incidence approach to estimate costs of crime

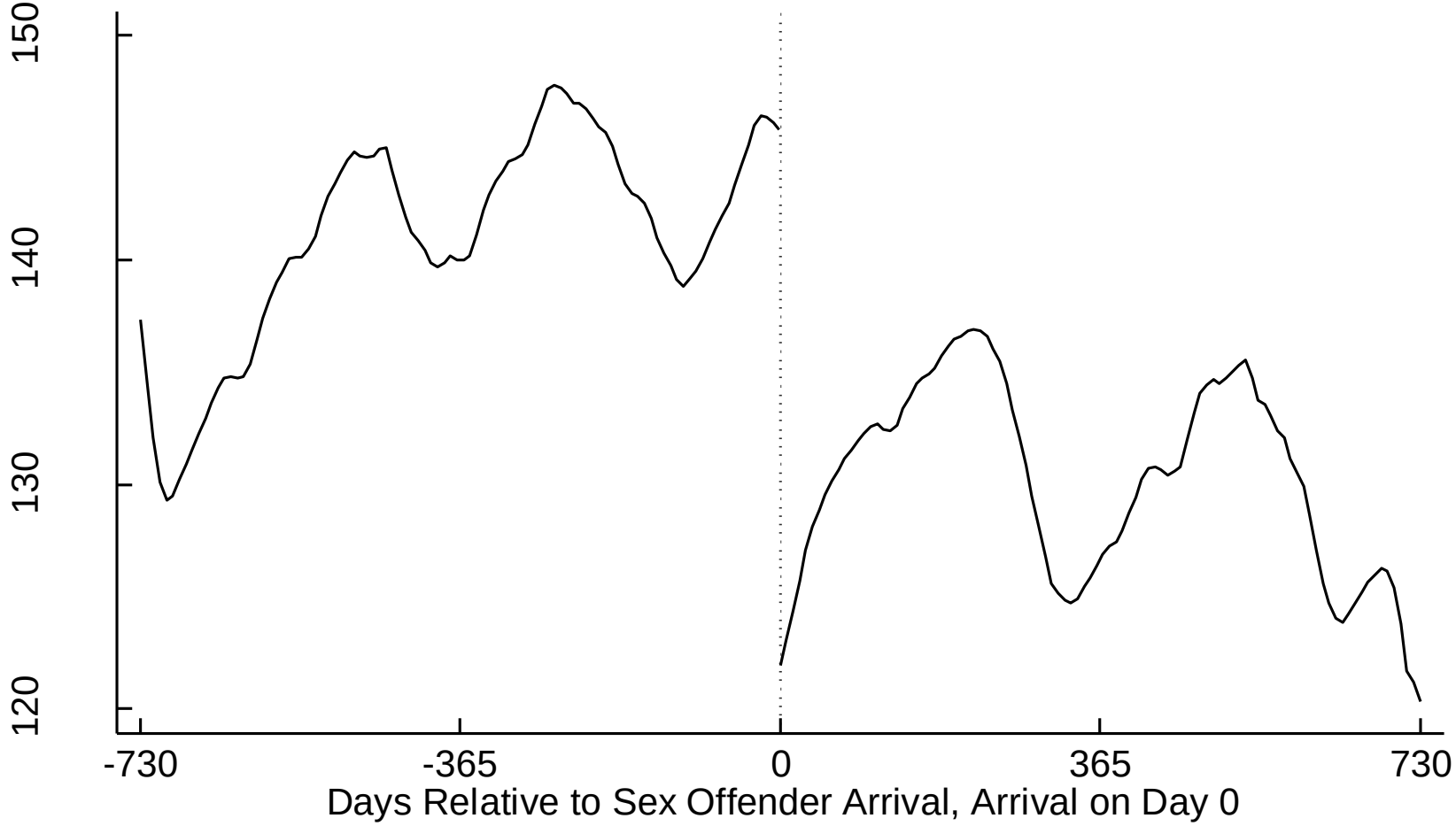
Idea: look at how house prices change when a registered sex offender moves into a neighborhood

Data: public records on offenders addresses and property values in North Carolina.

Illustration of Identification Strategy

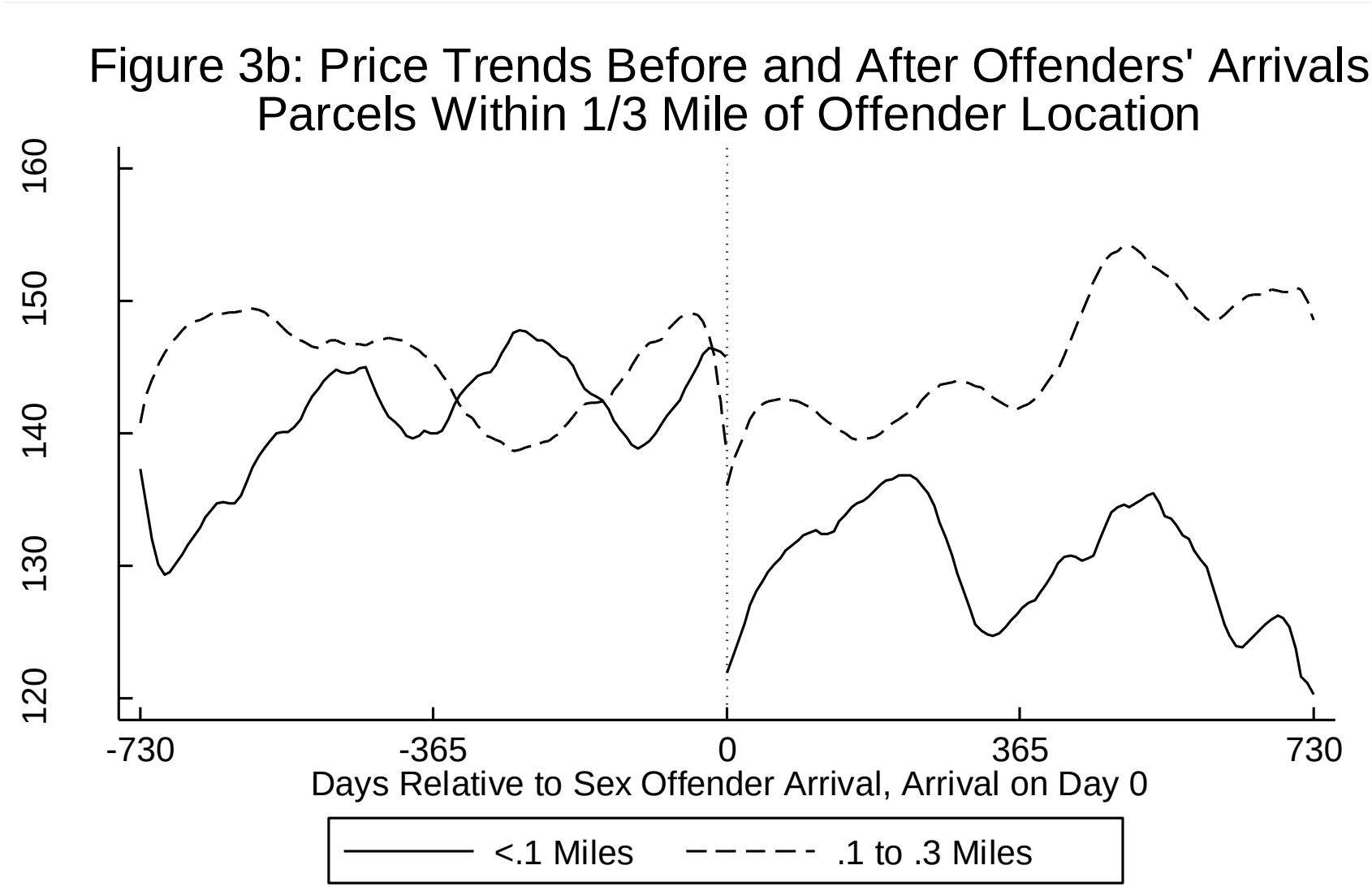
Source: Linden and Rockoff 2008.

Figure 3a: Price Trends Before and After Offenders' Arrivals
Parcels Within Tenth Mile of Offender Location



Note: Results from local polynomial regressions (bandwidth=90 days) of sale price on days before/after offender arrival.

Source: Linden and Rockoff 2008.



Source: Linden and Rockoff 2008.

Asset Price Approach to Incidence
Empirical Application: Costs of Crime

Finding: house prices fall by 4% ($5500) when a sex offender is located within 0.1 miles of a house

Implied cost of an offense (given probabilities of repeat offense): $1.2 mil.

$\Rightarrow$ Suggests that cost of such crimes is far higher than what is used by Department of Justice

Caveats: are you really measuring cost of the crime or a psychological overreaction? Why does price fall only within 0.1 mile radius?

Mandated Benefits

Now consider incidence of a mandated benefit instead of a tax

Examples: (a) requirement that employers pay for healthcare (employers with 50+ employees required to do that with new Obamacare law or pay a fine), (b) workers compensation benefits

Affects firms like a tax

But effect of mandated benefits on equilibrium wages and employment differently than a tax (Summers 1989) because workers value the mandated benefit

Suppose workers value \$1 of mandated benefit at \$ $\alpha \geq 0$

Could have $\alpha < 1$ if benefit not as valuable as cash

Could have $\alpha > 1$ if benefit more valuable than cash (e.g., can't buy health insurance on individual market)

If $\alpha = 1$ then no change in employment

Figure 1: Mandated Benefit

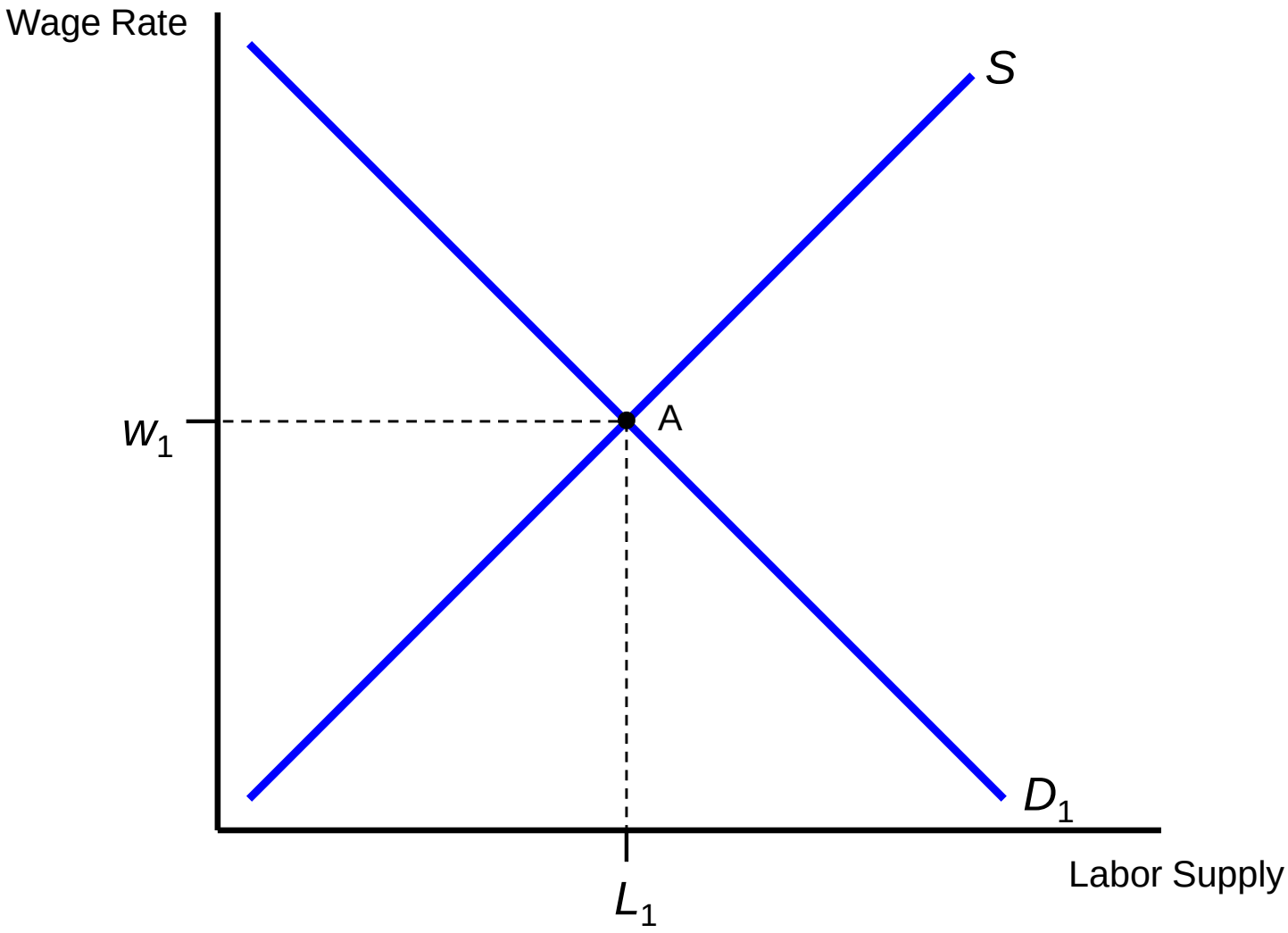


Figure 1: Mandated Benefit

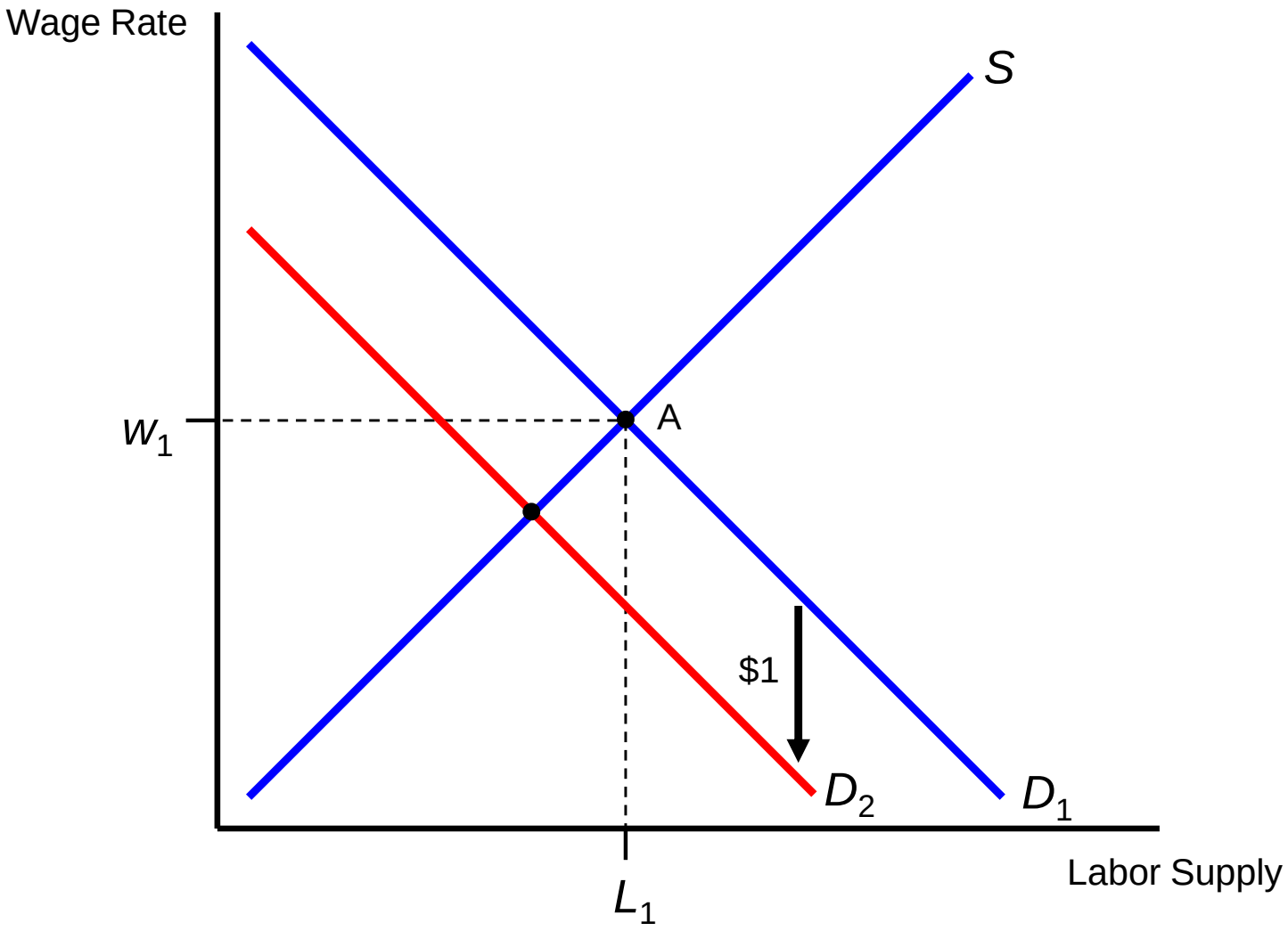
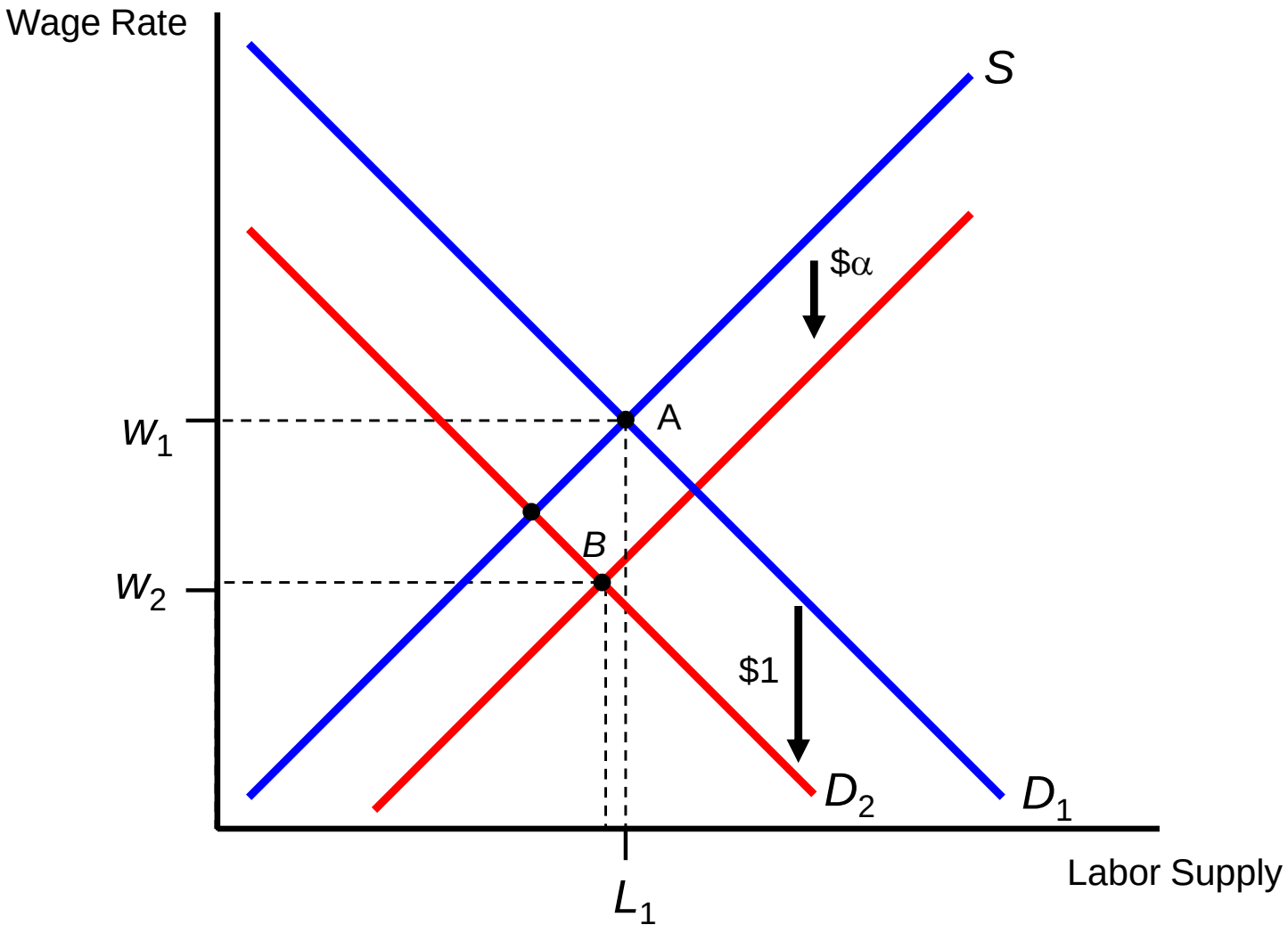


Figure 1: Mandated Benefit



Tax Salience: A New Theory

Traditional model assumes that all individuals are fully aware of taxes that they pay

Is this true in practice? May not be because (unlike gas tax) many taxes are not fully salient.

Do you know your exact marginal income tax rate?

Do you think about it when choosing a job?

Chetty, Looney, Kroft AER '09: test this assumption in the context of commodity taxes and develop a theory of taxation with inattentive consumers

Tax Salience: A New Theory

Chetty, Looney, Kroft AER'09 develop two empirical strategies to test whether salience matters for sales tax incidence.

Sales tax is paid at the counter and not displayed on price tags in stores

1) Randomized field experiment with a chain of supermarket stores

In one treatment store: they display new price tags showing the level of sales tax and total price was displayed on a subset of products

Compare shopping behavior in for treated products vs control products in treated store, before and after new tags are implemented (DD strategy)

Repeat the analysis in control stores as a placebo DD strategy

2) Policy experiment using variation in beer excise and sales taxes across states

Excise tax is salient because built into posted price while sales tax is not salient

Source: Chetty, Looney, Kroft (2009)

Effect of Posting Tax-Inclusive Prices: Mean Quantity Sold

TREATMENT STORE

Period	Control Categories	Treated Categories	Difference
Baseline	26.48	25.17	-1.31
	(0.22)	(0.37)	(0.43)
Experiment	27.32	23.87	-3.45
	(0.87)	(1.02)	(0.64)
Difference	0.84	-1.30	**DD_{TS} = -2.14**
over time	(0.75)	(0.92)	(0.64)

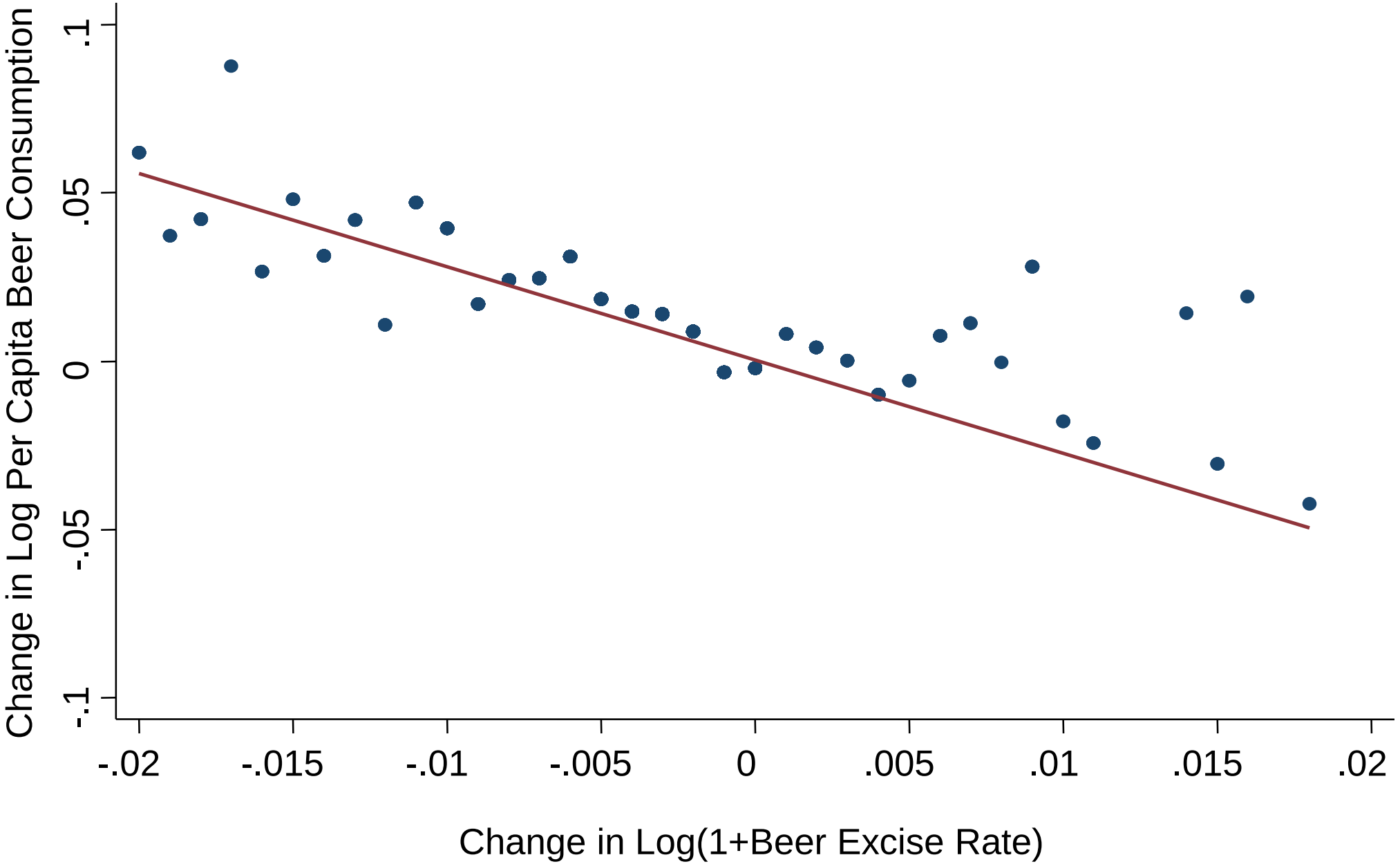
CONTROL STORES

Period	Control Categories	Treated Categories	Difference
Baseline	30.57	27.94	-2.63
	(0.24)	(0.30)	(0.32)
Experiment	30.76	28.19	-2.57
	(0.72)	(1.06)	(1.09)
Difference	0.19	0.25	**DD_{CS} = 0.06**
over time	(0.64)	(0.92)	(0.90)
		DDD Estimate	***-2.20***
			(0.58)

Source: Chetty, Looney, Kroft (2009)

Figure 2a

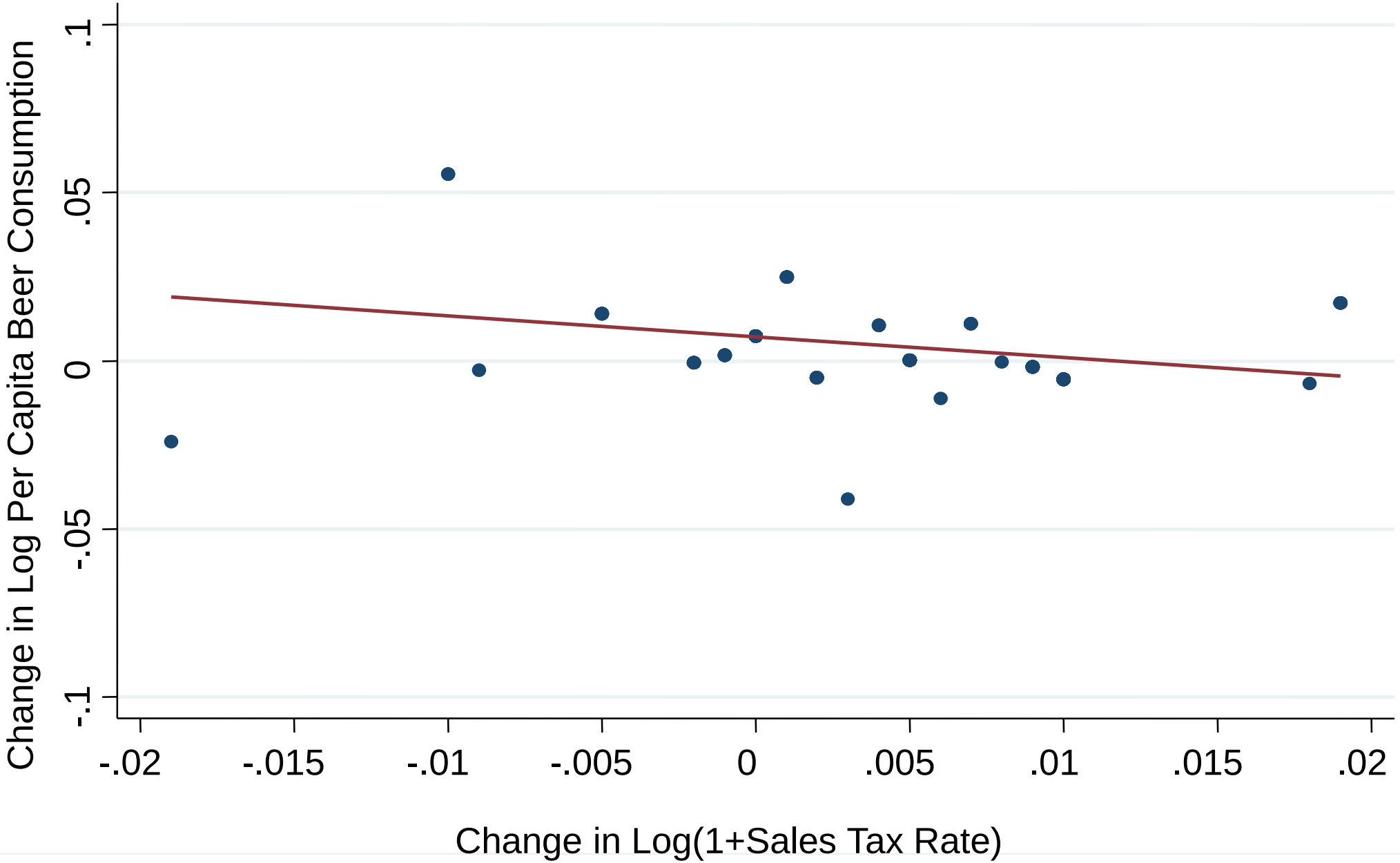
Per Capita Beer Consumption and State Beer Excise Taxes



Source: Chetty, Looney, Kroft (2009)

Figure 2b

Per Capita Beer Consumption and State Sales Taxes



Source: Chetty, Looney, Kroft (2009)

Effect of Excise and Sales Taxes on Beer Consumption

Dependent Variable: Change in Log(per capita beer consumption)

	Baseline	Bus Cyc, Alc Regs.	3-Year Diffs	Food Exempt
	(1)	(2)	(3)	(4)
ΔLog(1+Excise Tax Rate)	**-0.87**	**-0.89**	**-1.11**	**-0.91**
	(0.17)***	(0.17)***	(0.46)**	(0.22)***
ΔLog(1+Sales Tax Rate)	**-0.20**	**-0.02**	**-0.00**	**-0.14**
	(0.30)	(0.30)	(0.32)	(0.30)
Business Cycle Controls		x	x	x
Alcohol Regulation Controls		x	x	x
Year Fixed Effects	x	x	x	x
F-Test for Equality of Coeffs.	0.05	0.01	0.05	0.04
Sample Size	1,607	1,487	1,389	937

Note: Estimates imply $\theta_\tau \approx 0.06$

Source: Chetty, Looney, Kroft (2009)

Tax Salience: A New Theory

Key Empirical Result: **Salience matters**

1) Posting sales taxes reduces demand for those goods

2) Beer consumption is elastic to excise tax rate (built in posted price) but not to the sales tax rate (not built in the posted price)

A number of recent empirical studies show that individuals are not fully informed and fully rational and this has large consequences for policy