Graduate Public Finance

Overview of Public Finance: Fiscal Policy, Equity, Efficiency

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Princeton
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Lecture 1a

Outline

1. Overview
   - Introductions, logistics, schedule, goals of course
   - What is public finance/ why study it?
   - Trends and open areas of research
2. Fiscal policy and background facts
   - Federal Tax Revenue and Progressivity
   - Federal Government Spending
   - State and Local Government: Taxes and Spending
3. Government Intervention in the Economy
   - Equity consequences of taxation
   - Incidence of Mandated Benefits
   - Efficiency consequences of taxation

Introductions: who am I/ who are you?

1. **My background**
   - Ph.D. from UC Berkeley, BA from Dartmouth
   - Staff Economist at Council of Economic Advisers
   - Previously an Assistant Professor at Chicago Booth
   - Co-chair NBER business tax group

2. **Research fiscal policy topics**
   - Incidence and efficiency costs of corporate taxation
   - Economic impacts of taxing high-income earners
   - Effect of state tax system on U.S. economy
   - The structure of state corporate taxation
   - Business taxation and ownership in the U.S.
   - Who profits from patents? Rent sharing at innovative firms
   - Business Income and U.S. income inequality
   - State and local business location subsidies
   - The distribution and taxation of wealth

Logistics and Goals

Logistics:

1. Class schedule
2. Problem Sets
3. Written response papers

Goals:

1. Provide context and guidance on open research questions
2. Help you to think actively, critically, and constructively about research
3. Present benchmark models and new research
4. Enhance your applied modeling and empirical skills

Course Outline

1. **Overview and some applied tools**
2. **Spatial Public Finance and Place-Based Policies**
   1. Rosen-Roback spatial model
   2. Place-based policies and local economic development
   3. Sorting, Fiscal federalism
3. **Capital Taxation**
   1. Overview of capital taxes: property, wealth, and corporate taxation
   2. The distribution and taxation of wealth
   3. The Harberger model and evidence on corporate tax incidence
   4. Business tax policy and firm location
4. **Tax policy and economic growth**
   1. Investment and corporate financial policy
   2. Entrepreneurship, Innovation, and Top earners

Assignments

1. Nothing due today
2. Response to Albouy (2009) due before lecture 2
3. Problem Set on spatial taxation due before lecture 3
4. Response to Bayer, Ferreira, and McMillan (2007) before lecture 4
5. Response to Jakobsen Jakobsen Kleven, Zucman (2020) before lecture 5
6. Problem Set on Wealth Tax before lecture 6
7. Problem Set on Million Dollar Plants due before lecture 7
8. Problem Set on Base versus Rates before lecture 8

What is Public Finance?

Answers two types of questions:

1. How do government policies affect the economy?
2. How should policies be designed to maximize welfare?

Motivation:

1. Practical Relevance
2. Academic Interest
3. Methods

Motivation 1: Practical Relevance

- Interest in improving economic welfare $\rightarrow$ interest in public economics
- Almost every economic intervention through government policy (i.e., involves public economics) via two channels
  1. Price intervention: taxes, welfare, social insurance, public goods
  2. Regulation: min wages, FDA , regulation, zoning, labor laws, environment, min education laws
- Macro-economic stabilization through central bank (interest rate, inflation control), fiscal stimulus, bailout policies
- Government directly employees one sixth of the US workforce

Motivation 1: Practical Relevance

- Stakes are very big because of broad scope of policies
  - E.g., tax reforms that immediately affect hundreds of millions
- Contentious debate on the appropriate role of government in society
  1. How big should government be? What should it provide?
  2. What should we tax? At what rate? With what structure?
  3. Example. Replacing Medicare with decentralized private insurance will:
     - improve health outcomes and reduce costs OR
     - worsen health outcomes and raise costs
- Only one of these views can be correct.
- Injecting science into these debates has great practical value

Motivation 2: Academic Interest

- Public economics is typically the end point for many other subfields
- Macro, development, labor, urban, and corporate finance questions often ultimately motivated by a public economics question
- Understanding public finance can help ensure that you work on relevant topics

Motivation 3: Methods

- Public economics is at the frontier of a methodological transformation in applied microeconomics
- Data-driven approach to answering important policy questions
  1. Combines a broad set of skills: applied theory, applied econometrics, simulation methods
  2. Useful skill set for many applied fields in economics
- Topics in the course reflect a broad set of methodological themes

Theme 1: Connecting Theory to Data

- Modern public economics tightly integrates theory with empirical evidence to derive quantitative predictions about policy
  1. What is the optimal income tax rate?
  2. Who benefits from corporate tax cuts?
- Traditional approach: theoretical models and numerical simulations
  1. Theory often makes weak predictions: optimal tax rate between 0 and 100%
  2. Numerical simulations rely on strong assumptions
- Recent work derives formulas that can be implemented using well-identified empirical estimates
- Ideally, you can derive the empirical regression specification from economic primitives to (1) understand the error term, (2) focus on key forces, (3) quantify responses/ understand magnitudes

Theme 1: Connecting Theory to Data

Examples

- Skill biased technical change example (Katz-Murphy QJE 1992) in part 1b
- Gravity expressions in trade (see Treb Allen's lecture 1 (equations 1 to 13), which derives the gravity regression specification)
- Spatial PF
  1. Rosen-roback
  2. Who benefits from corporate tax cuts?
  3. State taxes and spatial misallocation
- Who profits from patents?
- Many many others

Examples

- Research in public economics exploits a variety of quasi-experimental research designs to identify parameters of interest
  1. Event studies, regression discontinuity, synthetic control
- Good way to learn practical lessons in applied econometrics
- Emphasis on non-parametric graphical techniques rather than parametric regression models

Theme 3: Big Data (but also big questions!)

Examples

- Compelling implementation of quasi-experimental methods requires a lot of data
- Recent availability of very large datasets has transformed research in applied microeconomics
  1. Scanner data on consumer purchases
  2. Header data on credit reports
  3. tax and social security records
  4. school district info
  5. credit card data

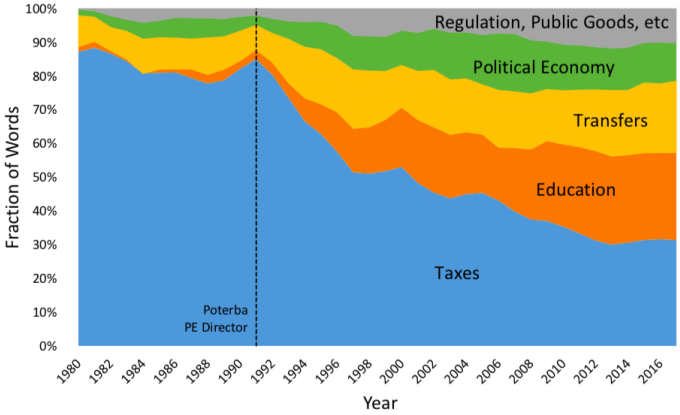
Theme 4: Revival of classic PF questions?

- 1990s credibility revolution led to a lot of focus on establishing well-identified facts on questions of individual behavior (e.g., effect of UI on job spells)
- Renewed interest in capital taxation, state and local, urban PF, fiscal federalism, public goods, and many other classic PF topics

Theme 4: Revival of classic PF questions?

Overview			
	1990	2000	2010
Total # of NBER Working Papers	398	665	1025
Total # of Working Papers in Public Economics	55	153	183
Share of Working Papers in Public Economics	13.8%	23.0%	17.9%
Public Economics Working Papers by Methodology			
	1990	2000	2010
Empirical	29.1%	46.4%	52.5%
Theory	38.2%	37.3%	30.1%
Both	29.1%	11.8%	5.5%
Other (survey of the literature, research methodology, etc)	3.6%	4.6%	12.1%
Public Economics Working Papers by Topic			
	1990	2000	2010
Tax	63.6%	28.1%	15.3%
Spending	5.5%	13.7%	20.8%
Tax and Spending	0.0%	7.8%	1.1%
Other (Education, Regulation, etc)*	30.9%	50.3%	62.8%
Public Economics Working Papers on Taxation: Corporate vs. Individual			
	1990	2000	2010
Individual	47.1%	79.2%	88.9%
Corporate	41.2%	13.2%	7.4%
Both	11.8%	7.5%	3.7%

What have people been working on in PF?

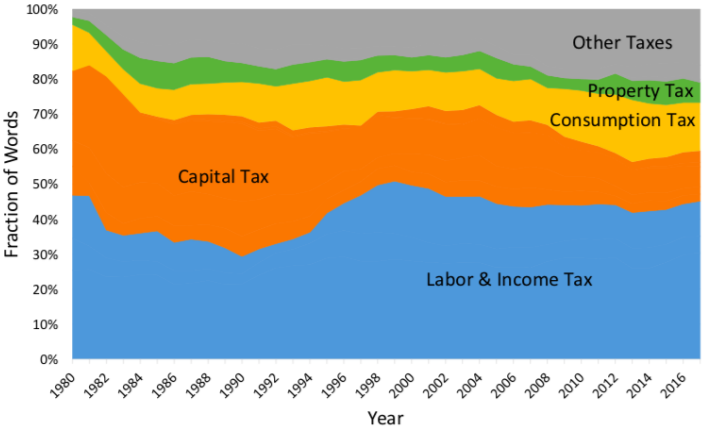


Note: The graph shows the frequency of words within different topics as a fraction of all words across topics. See here for a list of words included in each category. The graph shows 3-year moving averages.

Source: Henrik Kleven

What have people been working on in PF?

When We Do Talk About Taxes, Which Taxes Do We Talk About?



Some great topics for JMPs

1. Taxation of multinationals/structure of corporate taxation
2. Redistribution in a federal system
3. The size and scope of local government
4. Policy responses to rising inequality/ spatial disparities in opportunity
5. Pension reform (e.g., minimum generosity)/ state and local fiscal health
6. PF of declining regions/aging societies
7. Municipal bonds/finance
8. Inherited versus self made wealth
9. How savings respond to taxation
10. Business location subsidies and local economic development
11. Effect of property taxes
12. Taxation and the supply of capital
13. Taxes and economic growth
14. Structure of the safety net
15. Effect of government spending on productivity
16. Tax competition

Hendren's top 12 "open" questions

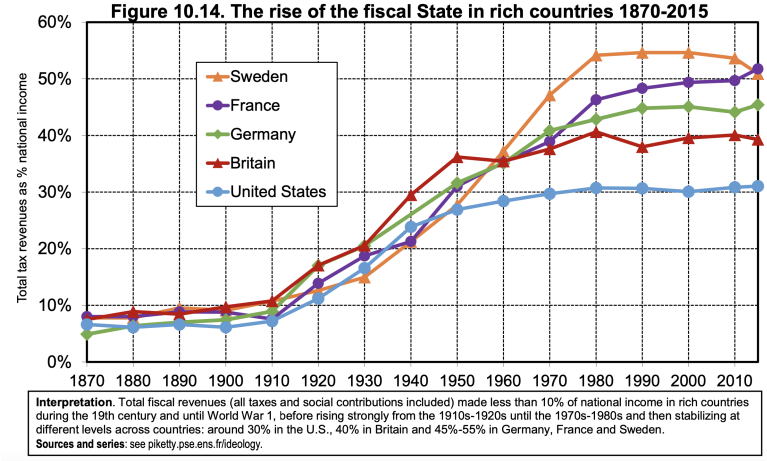
1. Why and how does childhood exposure to places impact children?
2. Incidence of capital taxation
3. How should we respond to geographic shocks (e.g. china/robots/ etc)
4. Desirability of place-based versus national policy
5. Political economy constraints (e.g., optimal decentralization)
6. Why don't people take up social benefits (and should incent them?)
7. What other markets are missing because of private information and what are the welfare implications (credit? income insurance?)
8. Distortionary costs of racial and gender bias on economic outcomes/ Impact of policies that reduce gender bias/ anti-racism policies
9. Integrating social insurance with optimal tax: how much should we redistribute "in-kind" or through social programs vs through taxes?
10. Competition in insurance markets? What happens when insurers have asymmetric info (and know more than the applicant)?
11. Government versus markets – should the government, e.g., provide schooling directly or fund charter schools?

Background facts on fiscal policy

Key facts on the growth of government

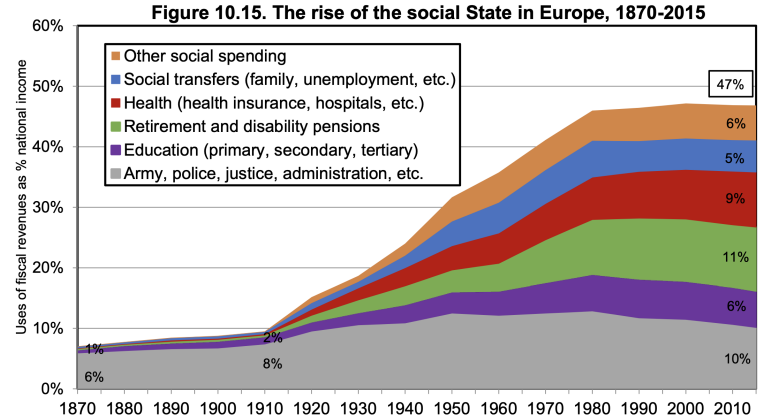
1. **Government Growth:** Size of government relative to National Income grows dramatically over the process of development from less than 10% in less developed economies to 30-50% in most advanced economies
2. **Government Size Stable** in richest countries after 1980
3. **Government Growth** is due to the expansion of the **welfare state:** (a) public education, (b) public retirement benefits, (c) public health insurance, (d) income support programs
4. **Govt spending** $>$ **Taxes:** Most rich countries run deficits and have significant public debt (relative to GDP), particularly during Great Recession of 2008-10

Growth of government in rich countries



Source: Piketty (2020)

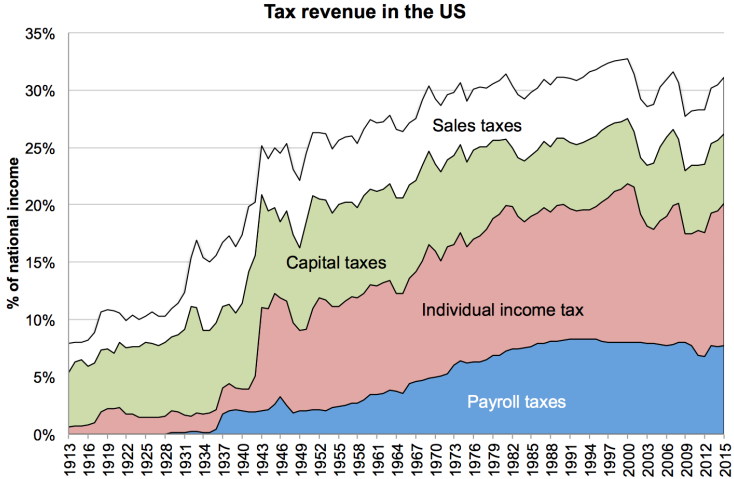
Evolution of Government Expenditures



Source: Piketty (2020)

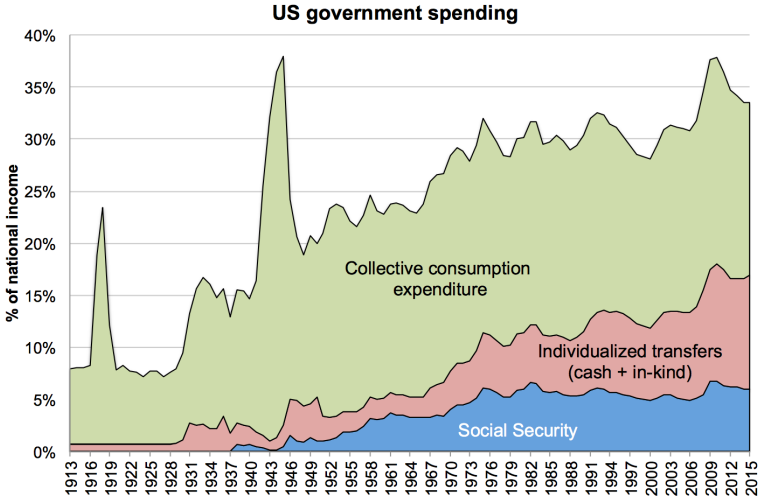
Background facts on US fiscal policy (i.e., Fed + State + Local)

Total U.S. Tax Revenue (i.e., Fed + State + Local)



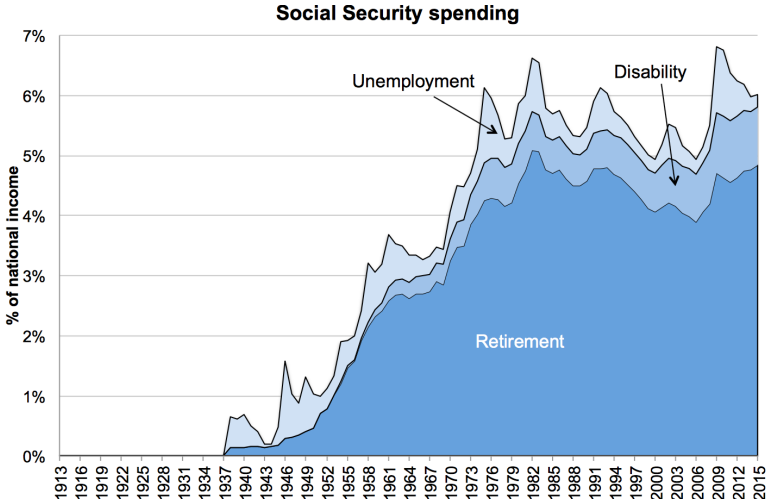
Source: G. Zucman

Total U.S. Government Spending (i.e., Fed + St+ Local)



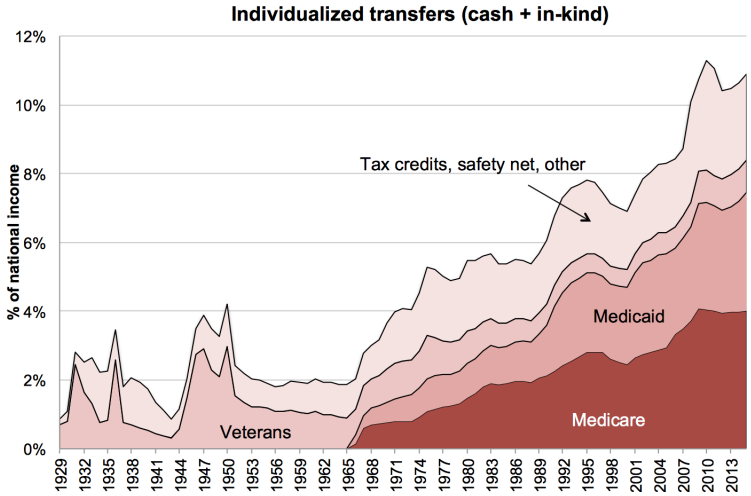
Source: G. Zucman

Social Security Spending



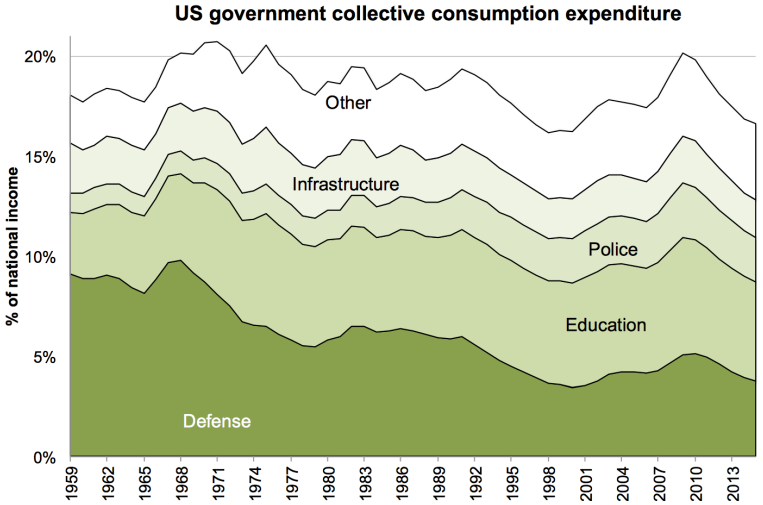
Source: G. Zucman

Individualized transfers (cash + in-kind)



Source: G. Zucman

US government collective consumption expenditure



Source: G. Zucman

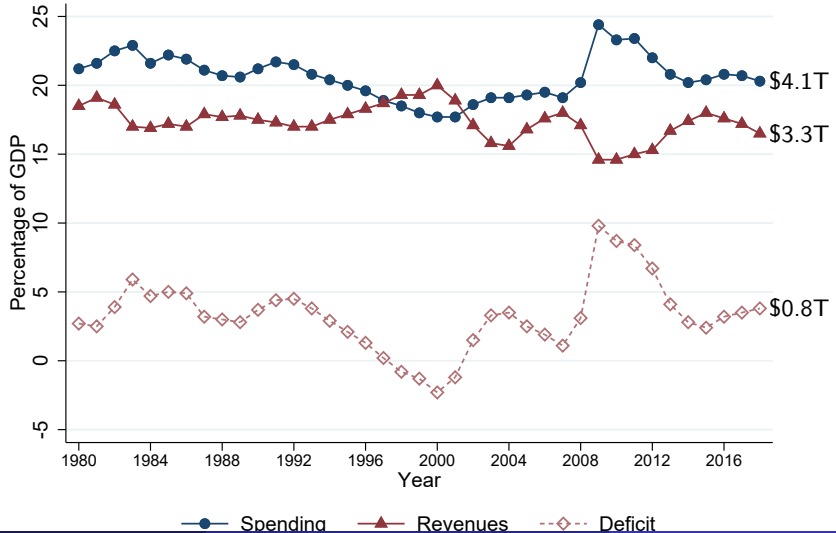
Fiscal Policy in the US at the Federal Level

Fiscal Policy in the US at the Federal Level

Outline:

1. Fiscal Overview of Federal Government
2. Federal Tax Revenue
3. Federal Government Spending

Federal Revenue, Spending, and Deficits: 1980-2018



Government Budgeting

In 2019: US Federal debt (held outside govt) is \$16Tr around 80% of GDP (\$20Tr), US deficit is large 5.0% (\$1Tr) of GDP

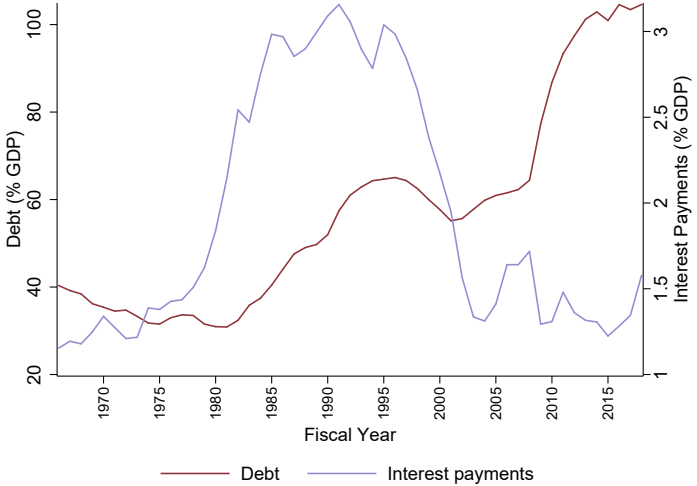
- **Debt**: The amount borrowed by government through bonds to individuals, firms, or foreign governments. Debt is a **stock**
- **Deficit**: government's spending + interest payments on debt minus government revenues in a given year. A negative deficit is called a surplus. Deficit is a **flow**
- Evolution of debt from year to year:

$$\text{Debt}_{t+1} = \text{Debt}_t + \text{Deficit}_t = \text{Debt}_t \cdot (1 + r_t) + \text{Spending}_t - \text{Revenue}_t$$

  with r_t interest paid on government debt

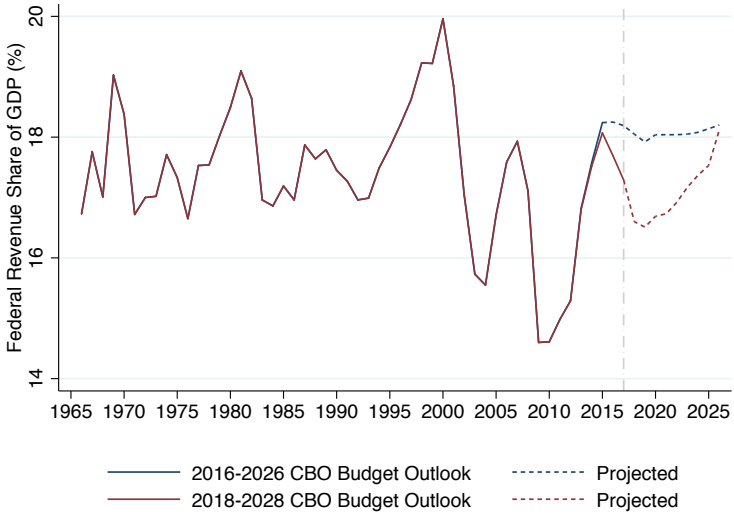
- Primary Deficit = Spending - Revenue

Debt and interest payments



Data: FRED, CBO

Federal Revenue Projections: Pre and Post 2017 Tax Cuts Jobs Act



Federal Tax Revenue and Progressivity

Federal Tax System Overview

Federal US Tax System: Overview

1) Individual income tax (on both labor+capital income) [progressive](40% of fed tax revenue)

2) Payroll taxes (on labor income) financing social security programs [about neutral] (40% of revenue)

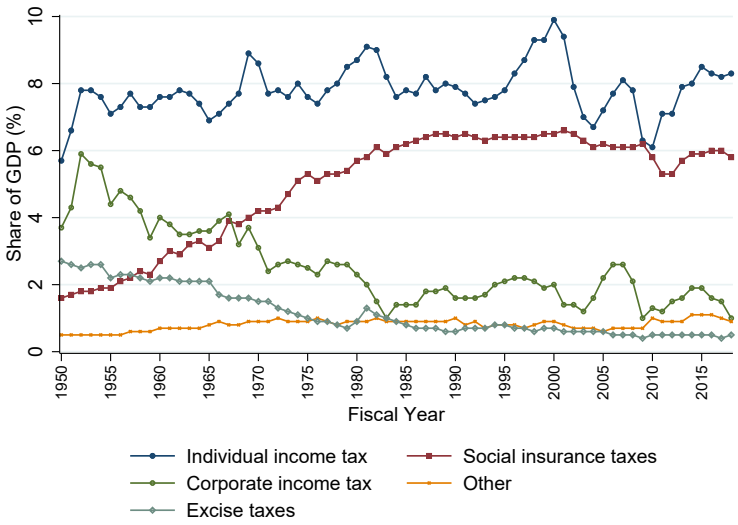
3) Corporate income tax (on capital income) [progressive if incidence on capital income] (15% of revenue)

4) Estate taxes (on capital income) [very progressive] (1% of revenue)

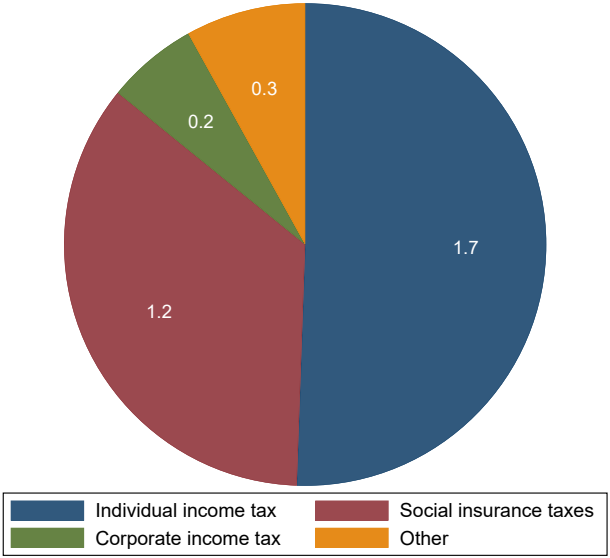
5) Minor excise taxes [regressive] (3% of revenue)

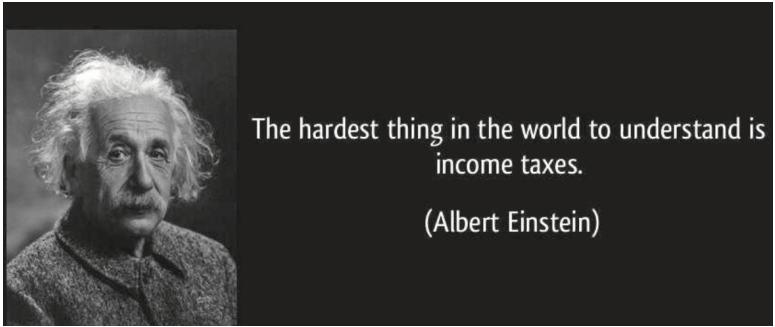
Source: E. Saez

Total Federal Revenue by Source (% of GDP)



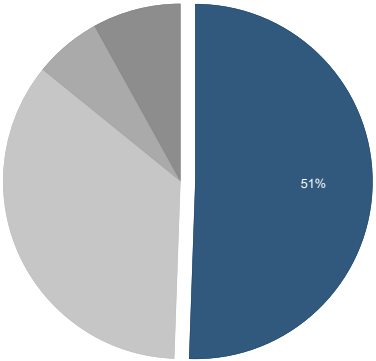
Total Federal Revenue by Source, 2018 ($T)





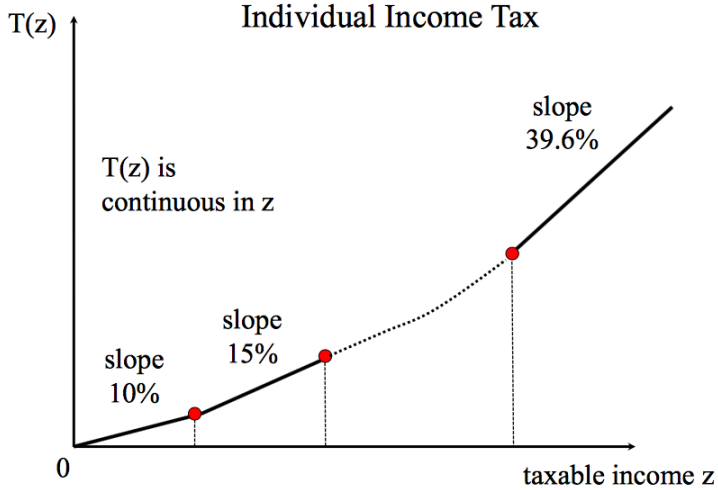
Credit to Heathcote Storesletten Violante (QJE, forthcoming) for the quote.

Federal Revenue: Individual Income Tax



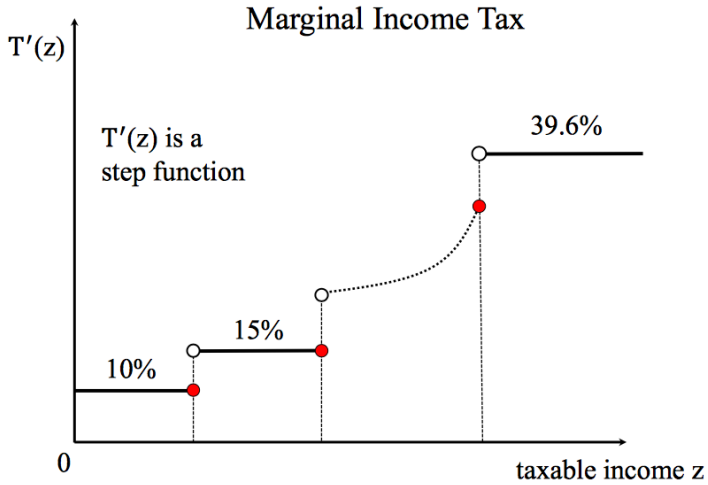
- **Revenue:** Accounted for $1.7T (8% of GDP) in 2018
- **Base:** Applied to wages, salaries, some investment earnings, profits of pass-through businesses
- **Structure:** Progressive. $24K standard deduction, additional income taxed at rates from 10-37%. High income households pay 3.8% surtax on income from interest, dividends, capital gains, and other passive income

Federal US Income tax schedule (pre-TCJA)



Source: Saez.

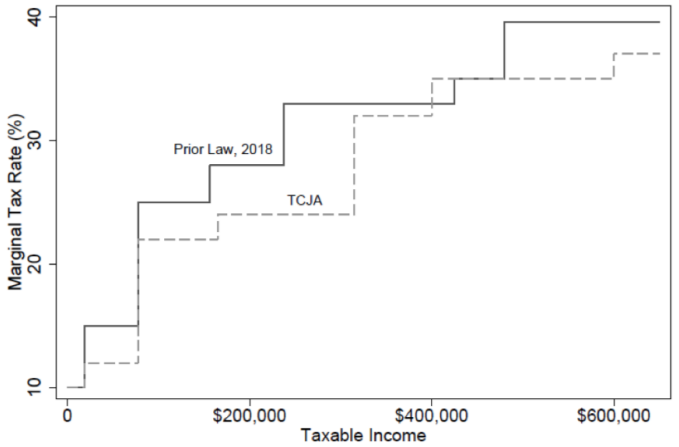
Federal US Income marginal tax schedule (pre-TCJA)



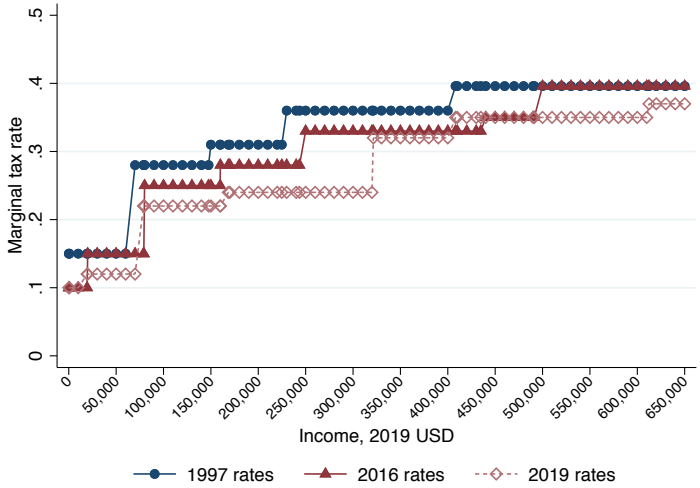
Source: Saez.

TCJA change in top marginal rates

FIGURE 1
Marginal Tax Rate by Taxable Income

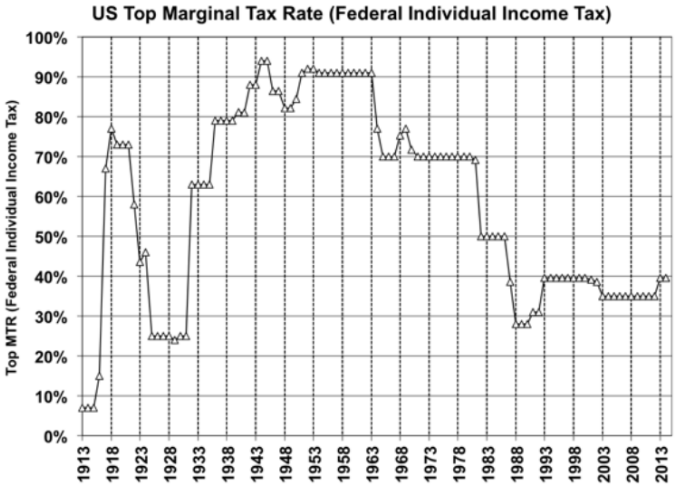


Changes in income tax schedule since late 1990s



Source: Zidar Zwick (2019).

Federal US top income tax rate



Federal Revenue: Individual Income Tax (part 2)

Tax Expenditures

- Include tax credits, deductions, lower tax rates for certain types of income
- Cost in 2018 was 6.3% of GDP, or $1.3T (80% as large as revenue from individual income tax)
- Largest tax expenditures, FY 2019:
  1. Exclusion for employer-provided health insurance ($173B)
  2. Reduced tax rate for capital gains ($127B)
  3. Child/other dependent tax credit ($122B)
  4. Tax benefit for employer defined contribution plans ($122B)
  5. Tax benefit for defined benefit plans ($91B)
  6. Earned income credit ($73B)
- Refundability: some tax credits (e.g. child credit, EITC) provide cash refunds to people with no tax liability

Calculating Federal US Income tax liabilities

- US income tax assessed on **annual family** income (not individual) [most other OECD countries have shifted to individual assessment]
- Sum all cash income sources from family members (both from labor and capital income sources) = called **Adjusted Gross Income (AGI)**
- Main exclusions: fringe benefits (health insurance, pension contributions), imputed rent of homeowners, unrealized capital gains

Federal US Income tax (pre-TCJA)

- Taxable income = AGI - personal exemptions - deduction
- personal exemptions = \$4K * # family members (in 2016)
- deduction is max of standard deduction or itemized deductions
- Standard deduction is a fixed amount depending on family structure (\$12.6K for couple, \$6.3K for single in 2016)
- Itemized deductions: (a) state and local taxes paid, (b) mortgage interest payments, (c) charitable giving, various small other items
- About 10% of AGI lost through itemized deductions, called tax expenditures

Going back to 1997+ Distributional Table

Table 4. Conventional distributional measures, 2022

	Baseline			Proposal					
Income group	Average expanded income	Average federal tax liability	Average after-tax income	Average tax change	Share with tax increase	Percent change in after tax income	Share of tax change	Share of federal taxes paid	Change in share of federal taxes paid
Bottom quintile	$3,150	-$155	$3,305	-$145	1%	4.4%	-1%	0%	-0.2%
Second quintile	$25,385	$230	$25,155	-$775	8%	3.1%	-5%	0%	-1.0%
Middle quintile	$53,415	$5,370	$48,045	-$110	46%	0.2%	-1%	6%	-1.6%
Fourth quintile	$98,395	$13,040	$85,355	$2,120	81%	-2.5%	11%	16%	-1.0%
80-90%	$160,910	$26,590	$134,320	$5,770	100%	-4.3%	13%	14%	-0.3%
90-95%	$234,445	$43,780	$190,665	$12,810	100%	-6.7%	13%	11%	0.4%
95-99%	$405,360	$88,535	$316,825	$29,930	100%	-9.5%	24%	19%	1.2%
99-99.9%	$1,222,415	$340,825	$881,585	$128,295	100%	-14.6%	23%	17%	1.5%
Top 0.1%	$10,389,425	$2,916,660	$7,472,765	$1,054,650	100%	-14.2%	23%	18%	1.1%

Source: Zidar Zwick (2020).

TCJA Distributional Table

TABLE 4

Conference Agreement for H.R. 1, The Tax Cuts and Jobs Act
Distribution of Federal Tax Change by Expanded Cash Income Percentile
2018; Summary Table; Baseline: Current Law

Expanded cash income percentile [a,b]	Tax Units		Percent change in after-tax income[c]	Share of total federal tax change	Average federal tax change ($)	Average Federal Tax Rate[d]	
	Number (thousands)	Percent of total				Change (% points)	Under the proposal
Lowest quintile	48,780	27.7	0.4	1.0	-60	-0.4	3.7
Second quintile	38,760	22.0	1.2	5.2	-380	-1.1	7.6
Middle quintile	34,290	19.5	1.6	11.2	-930	-1.4	12.4
Fourth quintile	28,870	16.4	1.9	18.4	-1,810	-1.6	15.8
Top quintile	24,300	13.8	2.9	65.3	-7,640	-2.2	23.3
All	176,100	100.0	2.2	100.0	-1,610	-1.8	18.1
Addendum							
80–90	12,490	7.1	2.0	13.1	-2,970	-1.6	18.5
90–95	6,020	3.4	2.2	9.6	-4,550	-1.8	20.2
95–99	4,650	2.6	4.1	22.1	-13,480	-3.1	22.2
Top 1 percent	1,140	0.7	3.4	20.5	-51,140	-2.3	30.3
Top 0.1 percent	120	0.1	2.7	7.9	-193,380	-1.8	31.6

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0217-1).

Notes: Calendar year. Baseline is current law. Excludes effects of reduction in ACA Individual Shared Responsibility Payment to zero.
http://www.taxpolicycenter.org/taxtopics/Baseline-Definitions.cfm

Number of AMT Taxpayers (millions). Baseline: 5.2; Proposal: 0.2

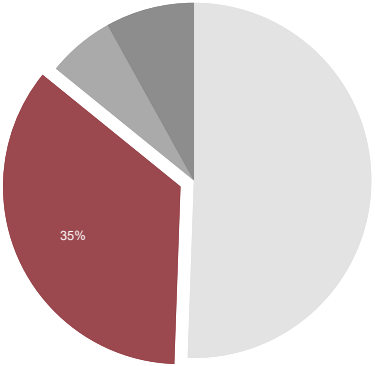
(a) Includes both filing and nonfiling units but excludes those that are dependents of other tax units. Tax units with negative adjusted gross income are excluded from their respective income class but are included in the totals. For a description of expanded cash income, see http://www.taxpolicycenter.org/TaxModel/income.cfm

(b) The income percentile classes used in this table are based on the income distribution for the entire population and contain an equal number of people, not tax units. The breaks are (in 2017 dollars): 20% $25,000; 40% $48,600; 60% $86,100; 80% $149,400; 90% $216,800; 95% $307,900; 99% $732,800; 99.9% $3,439,900.

(c) After-tax income is expanded cash income less: individual income tax net of refundable credits; corporate income tax; payroll taxes (Social Security and Medicare); estate tax; and excise taxes.

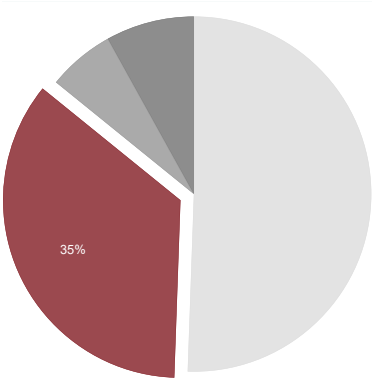
(d) Average federal tax (includes individual and corporate income tax, payroll taxes for Social Security and Medicare, the estate tax, and excise taxes) as a percentage of average expanded cash income.

Federal Revenue: Social Insurance Taxes



- **Revenue:** \$1.2T in 2018
- **Payroll taxes:** 1/2 paid by employer, 1/2 by employee
  - Social Security: Taxes 12.4% of wages up to \$128K cap. Cap increases with average national wages
  - Medicare: Taxes 2.9% of wages. High income households pay added 0.9% surtax
- **Other:** e.g. employer-paid tax funding unemployment insurance

Federal Revenue: Social Insurance Taxes

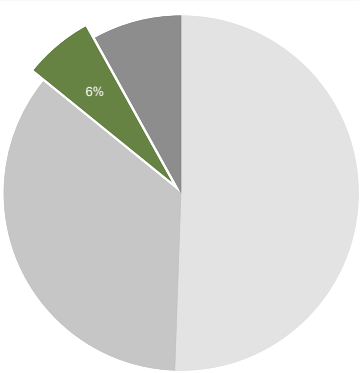


How payroll taxes differ from income taxes:

- Revenue enters trust fund
- Apply only to wages
- Flat rate tax
- Few exemptions
- Applies from the first $ of earnings

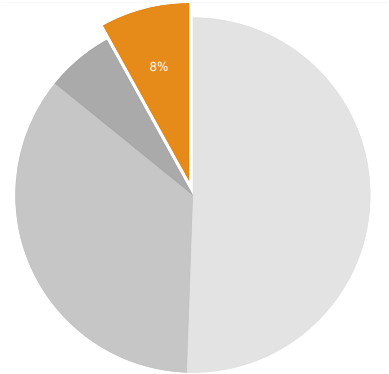
Payroll taxes exceed income taxes among the bottom 80% of income distribution on average

Federal Revenue: Corporate Income Taxes



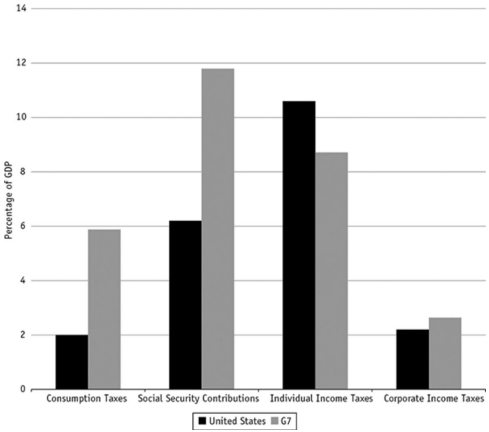
- **Revenue:** $242B in 2018
- Return to this later in the course

Federal Revenue: Other Taxes



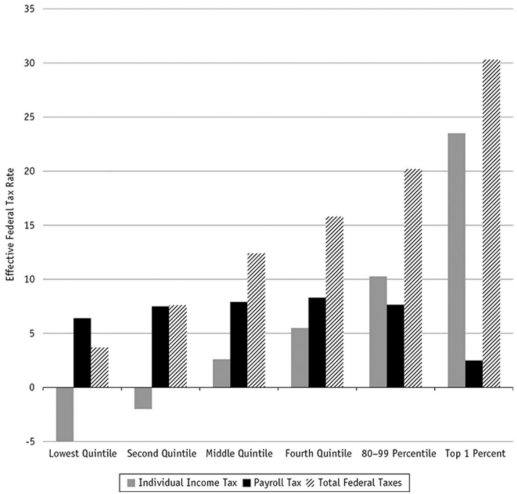
- **Revenue:** $278B
- **Examples:**
  - Gas tax: 18.4 ¢/gallon unleaded, 24.4 ¢/gallon diesel
  - Alcohol and tobacco ("sin") taxes
  - Estate tax: First $22.4M exempt for married couple, so paid by fewer than 1/1000 people who die
  - Gift tax

International Comparison: Government Revenue (2015)



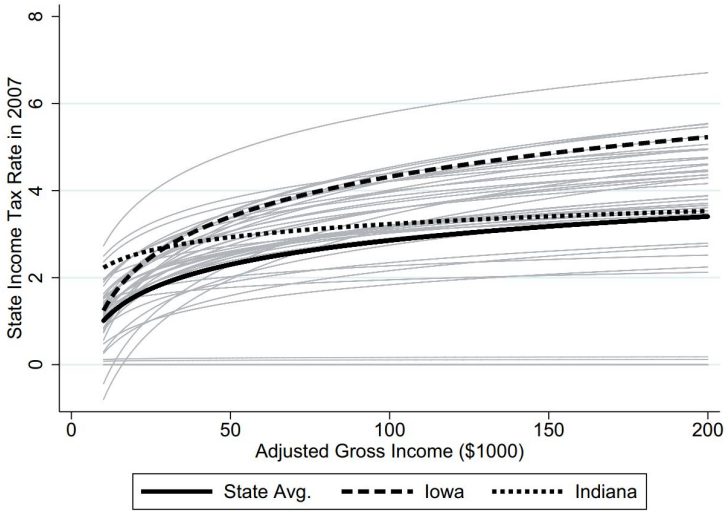
Source: William Gale

Federal Revenue: Progressivity (2018)



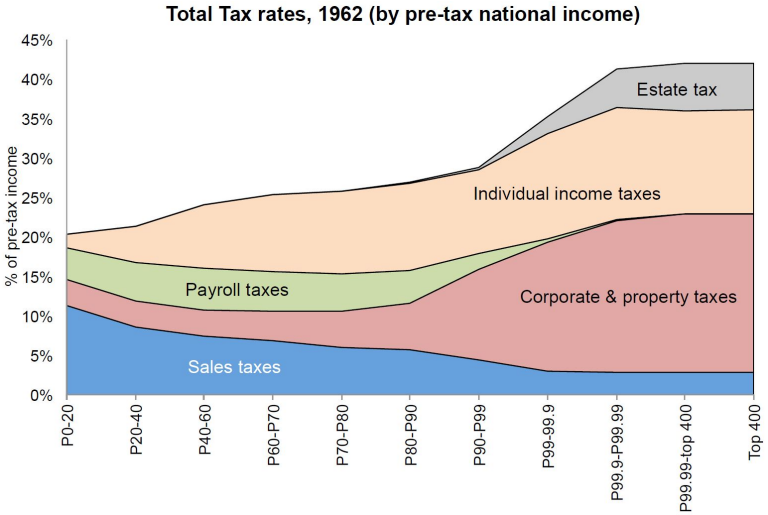
Source: William Gale

State Income Tax Progressivity



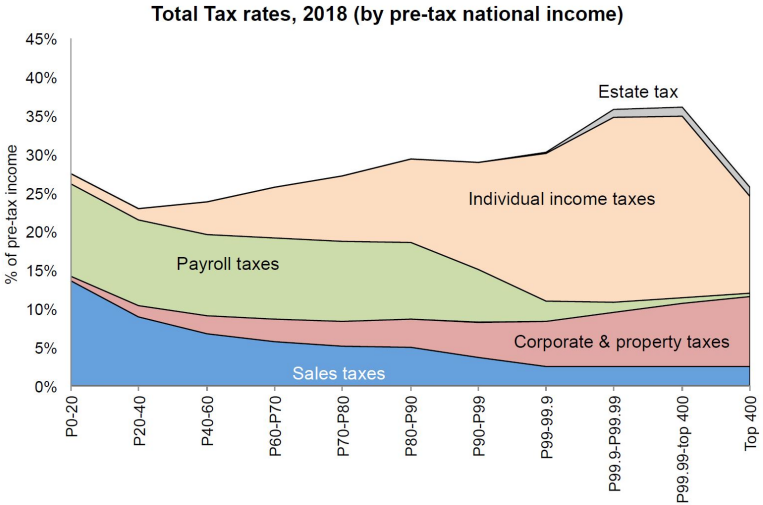
Source: Fajgelbaum et al, 2019

Progressivity over Time



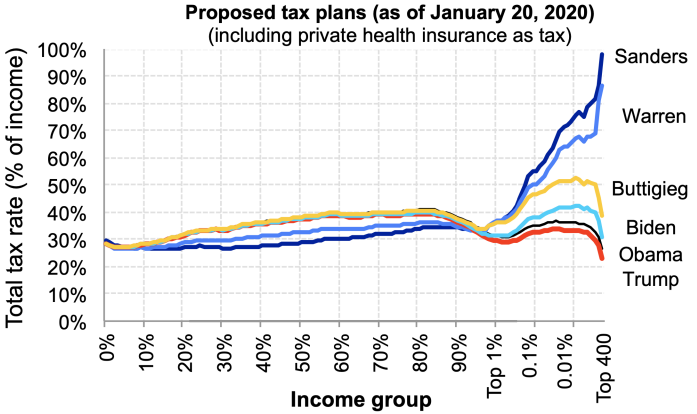
Source: Saez Zucman (2019)

Progressivity over Time



Source: Saez Zucman (2019)

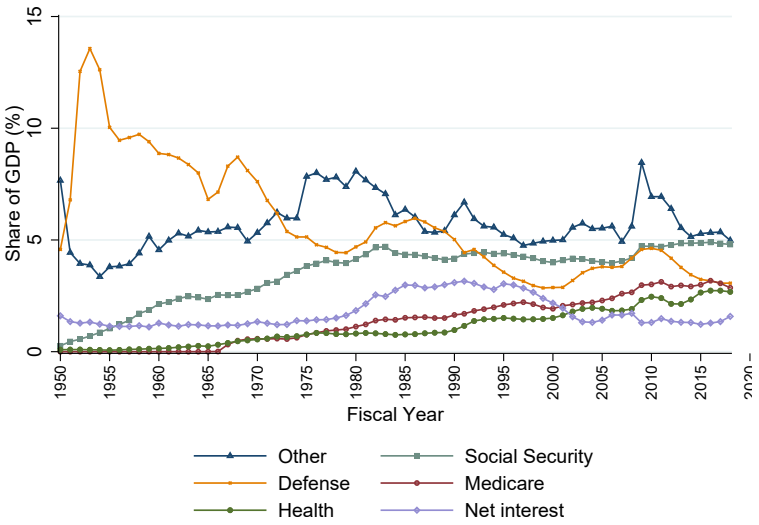
Simulated Progressivity of Presidential Candidates Tax Plans



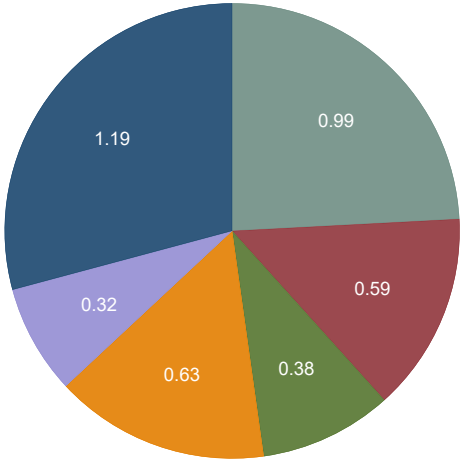
Source: Saez Zucman (2020). See here for details: `https://eml.berkeley.edu/~saez/taxsimsummary_v2.pdf`

Federal Government Spending

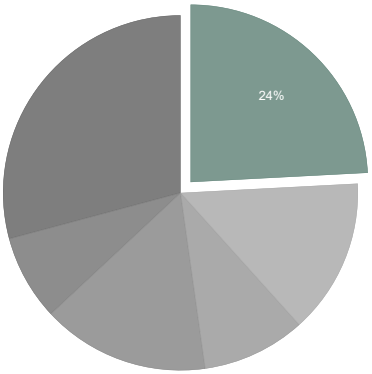
Total Federal Spending by Function (% of GDP)



Total Federal Spending by Function, 2018 ($T)

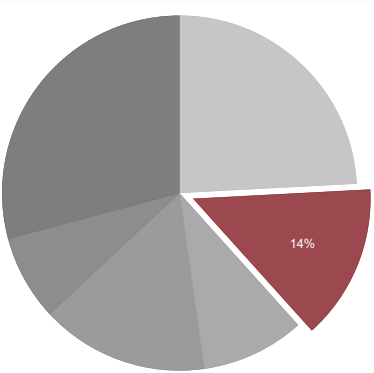


Federal Spending: Social Security



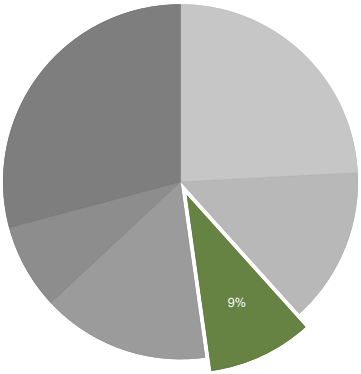
- $967B in 2018
- Composed of Old-Age and Survivors Insurance (1935) and Disability Insurance (1956)
- 60M Americans ($\approx 1/5$ of pop) get benefits each year, mostly through retirement program
- In 2016, Social Security helped 26M people avoid poverty
- Program provides majority of retirement income for most elderly households

Federal Spending: Medicare



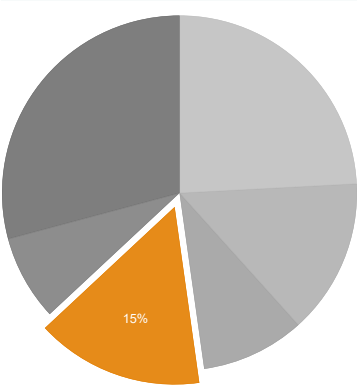
- $583B in 2018
- Began 1965 to provide elderly with basic health insurance
- George W. Bush added prescription drug coverage (Medicare Part D) in 2003
- Covers 60M beneficiaries in a given year
- Financed through combination of payroll taxes, insurance premiums, and general tax revenue

Federal Spending: Medicaid



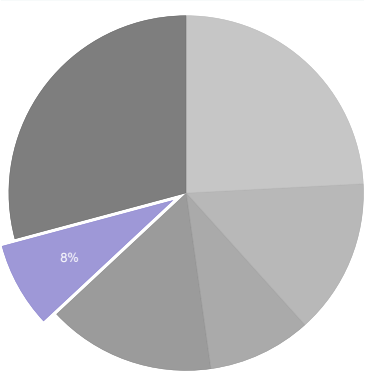
- $583B in 2018
- Began 1965 to provide medical coverage to some low-income families ($1/3$ of spending), disabled people, and the elderly
- Covered 74M beneficiaries in 2018
- Funded jointly by federal and state governments, administered by states
- Separate but related programs:
  - Subsidies to buy private insurance
  - Children's Health Insurance Program (CHIP)

Federal Spending: Defense



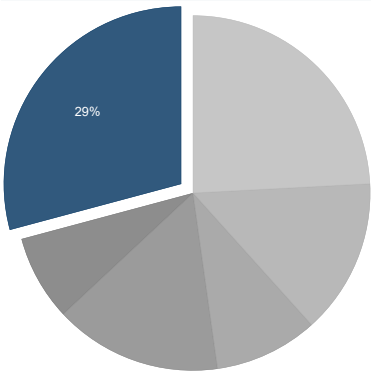
- $622B in 2018
- 20% of core Defense Dep't budget (excludes cost of overseas operations) goes to procurement
- Rest of core budget: operations, maintenance, personnel, R&D

Federal Spending: Interest



- $316B in 2018
- Size of payments depends on debt and interest rate
- Interest rates have been low in recent years (2018 averaged 2.2%)

Federal Spending: Everything Else



- **Safety net programs:** ≈10% of total spending in 2018, lifted as many as 18M people out of poverty in 2016
- **Other domestic programs:** ≈16% of total spending in 2018. Many of these programs are investments such as education, training, social services, and infrastructure.
- **Core functions:** includes running executive departments (e.g. Justice, Homeland Security) and agencies (e.g. EPA, National Park Service)

Federal Spending: Everything Else

- Select safety net programs

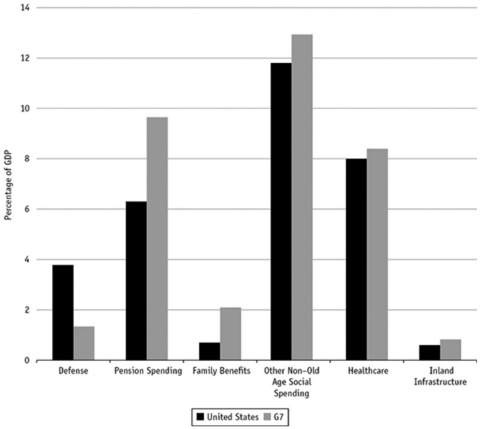
Program	Monthly Beneficiaries	Annual Cost
Veterans' benefits	5.0M	$81.6B
SNAP	40.9M	$69.2B
Suppl. Security Income (SSI)	8.3M	$54.7B
Unemployment insurance (UI)	10M	$46.5B
Housing assistance	5.4M	$28.7B
TANF	3.6M	$16.5B

- Select investment programs
  - **Education, training, social services:** state and local grants, Department of Labor training programs, Pell Grants
  - **Science, medical, and tech research:** NASA, NIH, NSF
  - **Transportation and infrastructure:** grants to states for highway maintenance

Federal Spending

- Mandatory spending
  - Net interest payments (8% of spending)
  - Mandatory programs, AKA entitlements (61% of spending)
    - Law determines a person's eligibility, and then all eligible people receive benefits
    - Continue under terms set in law until laws are changed
    - Examples: Social Security, Medicare, Medicaid, TANF, farm subsidies
- Discretionary spending
  - Authorized only for set period, usually one year
  - $\approx 1/2$ is on defense
  - $\approx 1/4$ is on investments (education, training, science, infrastructure)
  - $\approx 1/4$ is on housing, environmental protection, food safety, government operations (e.g. enforcement, tax collection), etc.

International Comparison: Government Spending (2013)



Source: William Gale

Background facts on state and local fiscal policy in the US

State and Local Tax System Overview

State+Local Tax System: Overview

1) Individual+Corporate income taxes [progressive] (1/3 of state+local tax revenue)

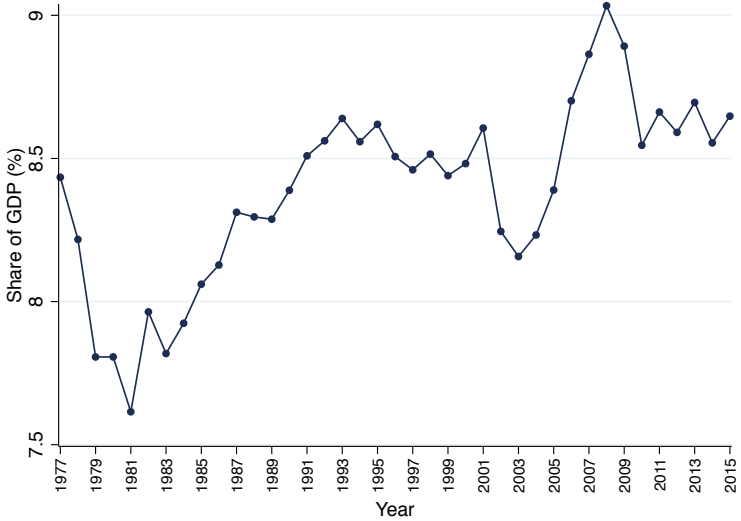
2) Sales + Excise taxes (tax on consumption = income - savings) [about neutral] (1/3 of revenue)

3) Real estate property taxes (on capital income) [slightly progressive] (1/3 of revenue)

http://www.census.gov/govs/www/qtax.html

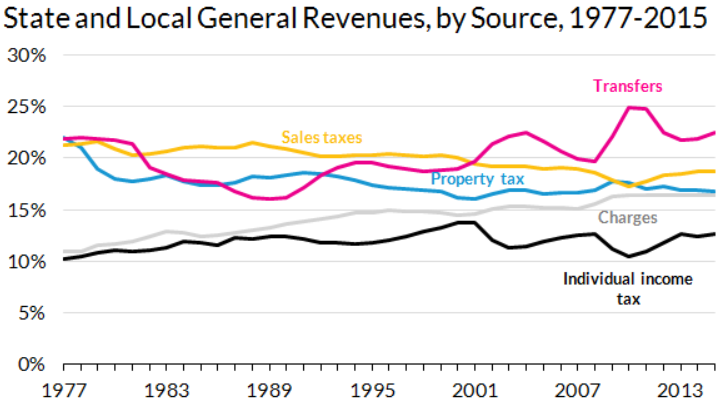
Source: E. Saez

State & Local Tax Revenue (% of GDP)



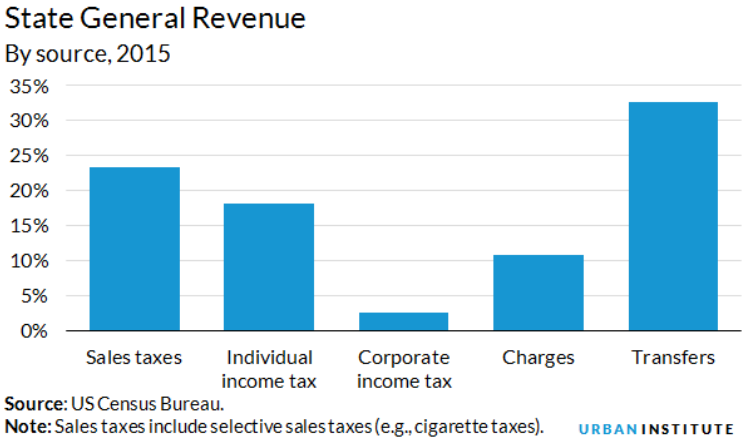
Source: State and Local Government Finance; Bureau of Economic Analysis (BEA)

State & Local Tax Rev (and Fed Transfers) by source



Source: Urban state and local backgrounders
`https://www.urban.org/policy-centers/cross-center-initiatives/state-local-finance-initiative/state-and-local-backgrounders`

State revenue sources



Source: Urban state and local backgrounders
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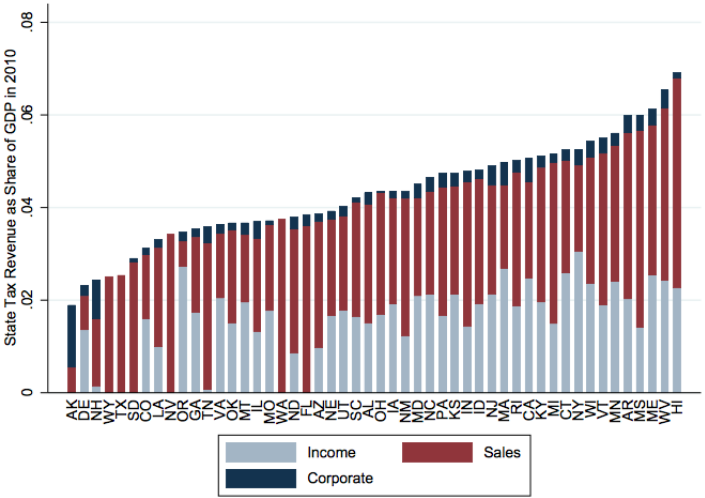
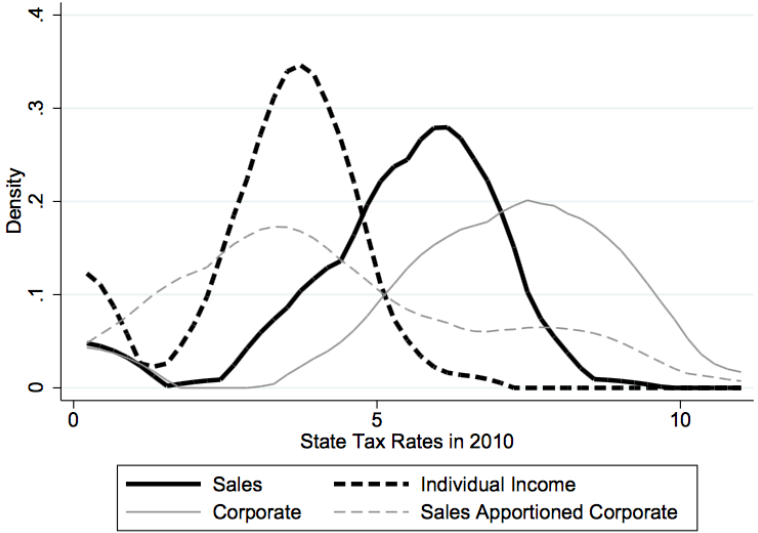
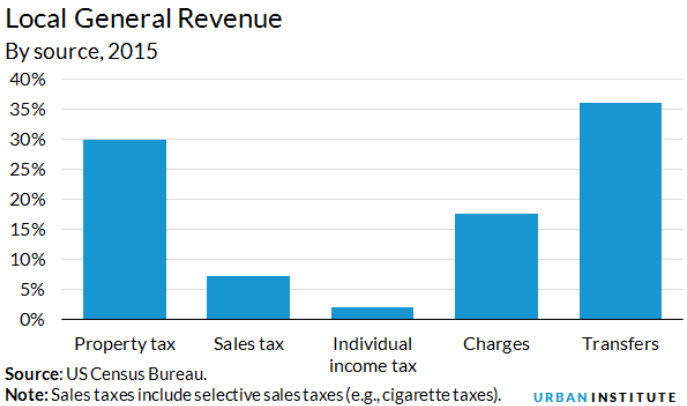
State tax system varies across states



State tax rates (and tax structure) vary across states

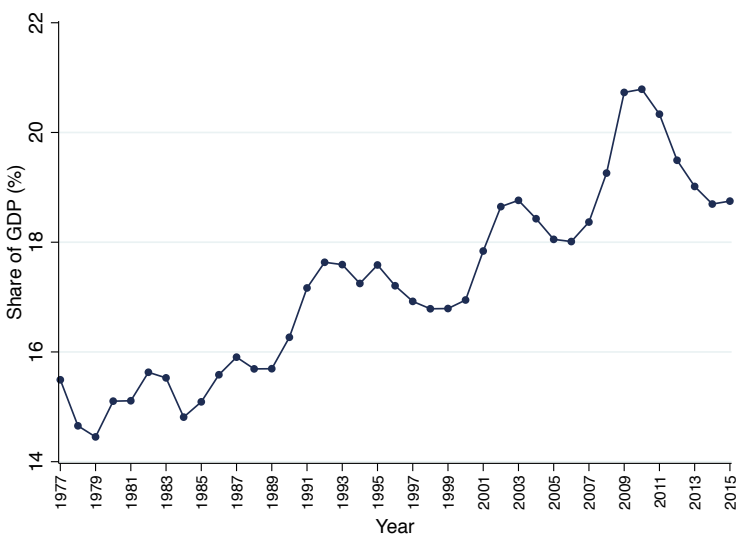


Local revenue sources



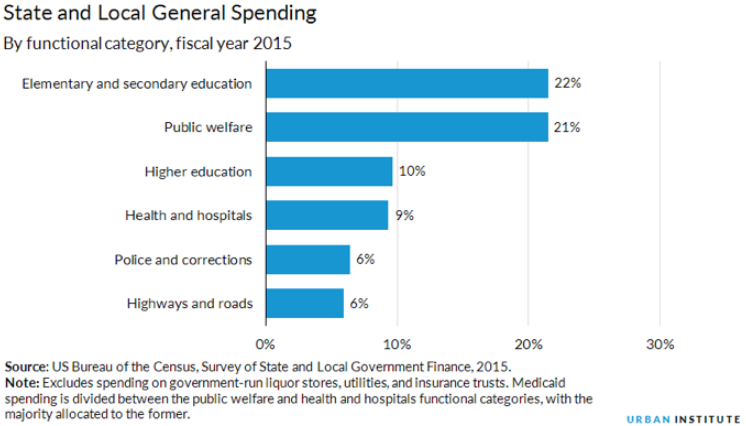
Source: Urban state and local backgrounders
`https://www.urban.org/policy-centers/cross-center-initiatives/state-local-finance-initiative/state-and-local-backgrounders`

State & Local Direct Spending (% of GDP)



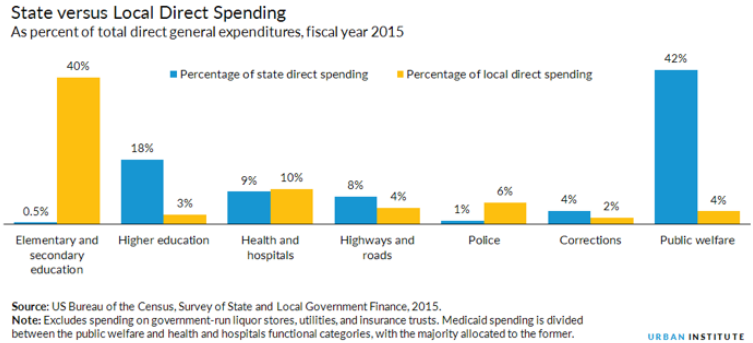
Source: State and Local Government Finance; Bureau of Economic Analysis (BEA). Figure does not include transfers

State & Local spending by type



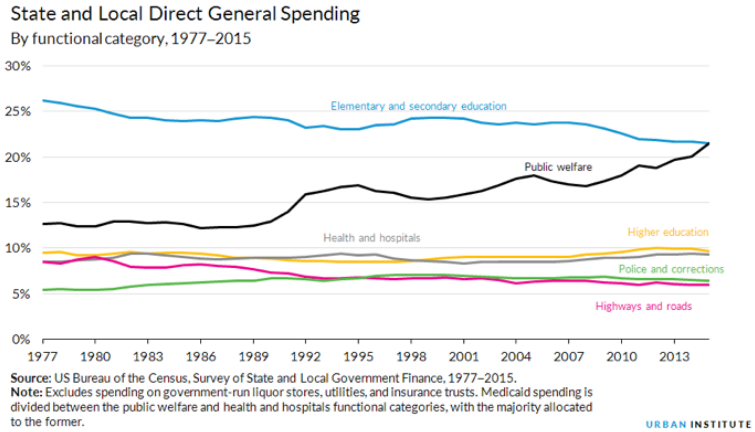
Source: Urban state and local backgrounders
`https://www.urban.org/policy-centers/cross-center-initiatives/state-local-finance-initiative/state-and-local-backgrounders`

State vs Local spending by type



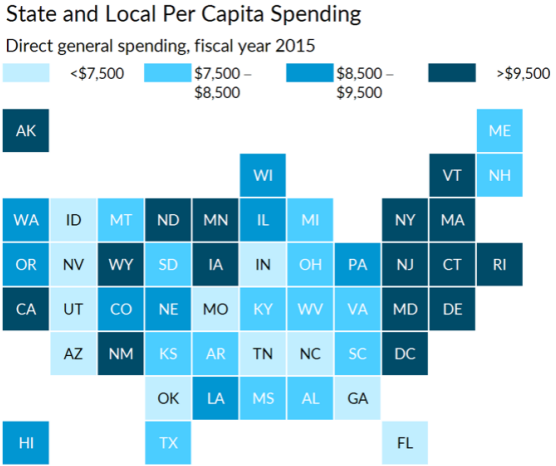
Source: Urban state and local backgrounders
`https://www.urban.org/policy-centers/cross-center-initiatives/state-local-finance-initiative/state-and-local-backgrounders`

State & Local spending overtime



Source: Urban state and local backgrounders
`https://www.urban.org/policy-centers/cross-center-initiatives/state-local-finance-initiative/state-and-local-backgrounders`

State & Local spending across states

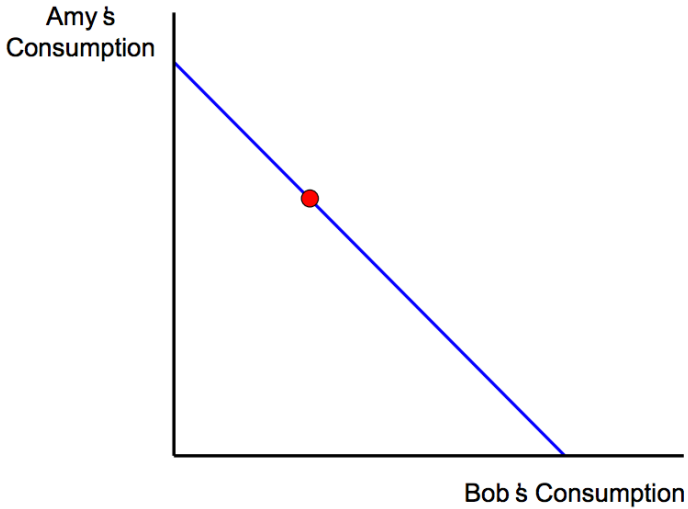


Government Intervention in the Economy

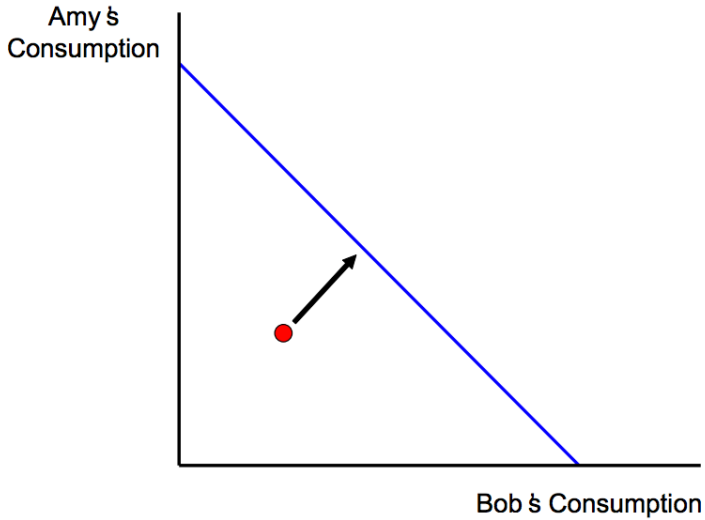
Government Intervention in the Economy

- Organizing framework: "When is government intervention necessary in a market economy?"
  - Market first, govt. second approach
  - Why? Private market outcome is efficient under broad set of conditions (1st Welfare Thm)
- Analysis often split into two parts:
  1. How can govt. improve efficiency when private market is inefficient?
  2. What can govt. do if private market outcome is undesirable due to redistributional concerns?

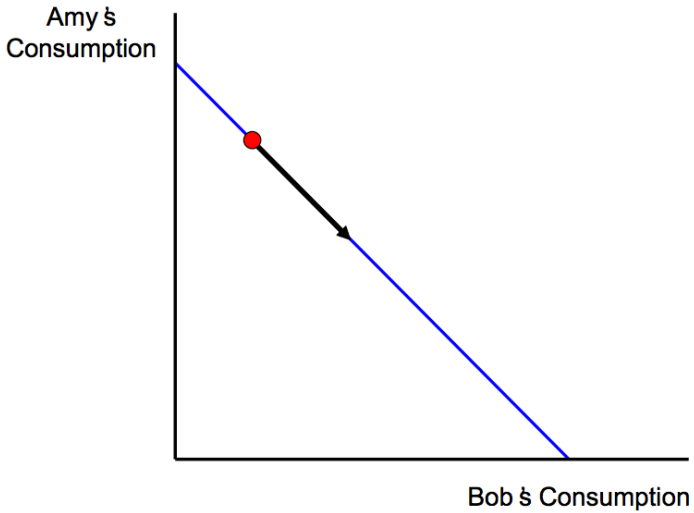
Efficient Private Market Allocation of Goods



First Role for Gov: Improve Efficiency



Second Role for Gov: Improve Distribution



First Welfare Theorem

- Private market provides a Pareto efficient outcome under three conditions:
  1. No externalities
  2. Perfect information
  3. Perfect competition
- Theorem tells us when the government should intervene

Failure 1: Externalities

- Market may be incomplete due to lack of prices (e.g., pollution)
  - Achieving efficient Coasian solution requires an organization to coordinate individuals - that is, a government
- This is why govt. funds public goods (highways, education, defense)
- Questions: What public goods to provide and how to correct externalities?

Failure 2: Asymmetric Information and Incomplete Markets

- When some agents have more information than others, markets fail
- Ex. 1: Adverse selection in health insurance
  - Healthy people drop out of private market $\rightarrow$ unraveling
  - Mandated coverage could make everyone better off
- Ex. 2: capital markets (credit constraints) and subsidies for education
- Ex. 3: Markets for intergenerational goods
  - Future generations' interests may not be fully reflected in market outcomes

Failure 3: Imperfect Competition

- When markets are not competitive, there is role for govt. regulation
  - Ex: natural monopolies such as electricity and telephones
- This topic is traditionally left to courses on industrial organization and is not covered in this course
- But taking the methodological approach of public economics to problems traditionally analyzed in IO is a very promising area

Individual Failures

- If agents do not optimize, government intervention (e.g. by forcing saving via social security) may be desirable
- This is an "individual" failure rather than a market failure
- Conceptual challenge: how to avoid paternalism critique
  - Why does govt. know better what's desirable for you (e.g. wearing a seatbelt, not smoking, saving more)
- Difficult but central issues for optimal policy design

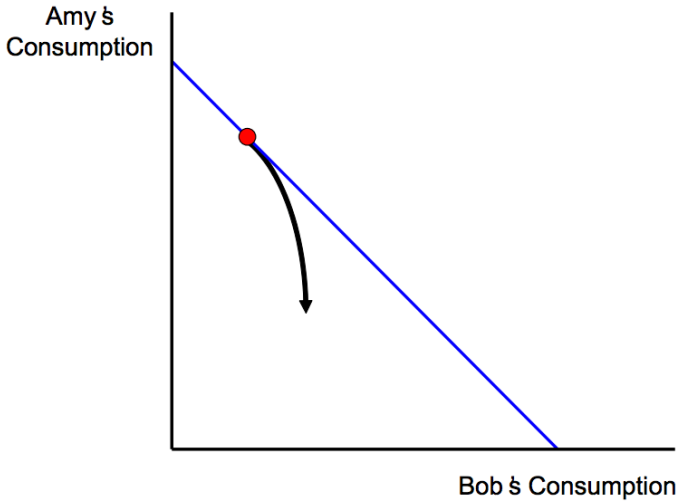
Redistributional Concerns

- Even when the private market outcome is efficient, may not have good distributional properties
- Efficient markets generally seem to deliver very large rewards to small set of people (top incomes)
- Government can redistribute income through tax and transfer system

Why Limit Government Intervention

- One solution to these issues would be for the government to oversee all production and allocation in the economy (socialism).
- Serious problems with this solution
  1. Information: how does government aggregate preferences and technology to choose optimal production and allocation?
  2. Government policies distort incentives (behavioral responses in private sector)
- In practice, there are sharp tradeoffs between costs and benefits of government intervention

Equity-Efficiency Trade-off



Three Types of Questions in Public Economics

1. Positive analysis: What are the observed effects of government programs and interventions?
2. Normative analysis: What should the government do if we can choose optimal policy?
3. Public choice/Political economy
   - Develops theories to explain why the government behaves the way it does and identify optimal policy given political economy concerns
   - Criticism of normative analysis: fails to take political constraints into account

Equity consequences of taxation

Incidence

Definition

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

Incidence

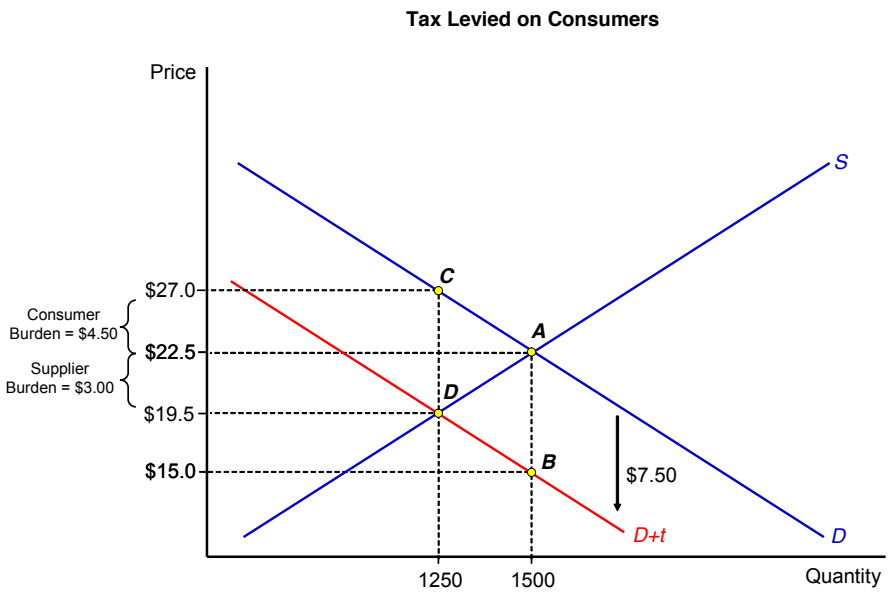
- Ideally, we would characterize the effect of a tax change on utility levels of all agents in the economy
- Useful simplification in practice: aggregate economic agents into a few groups
- Incidence analyzed at a number of levels:
  1. Producer vs. consumer (tax on cigarettes)
  2. Source of income (labor vs. capital)
  3. Income level (rich vs. poor)
  4. Region or country (local property taxes)
  5. Across generations (social security reform)

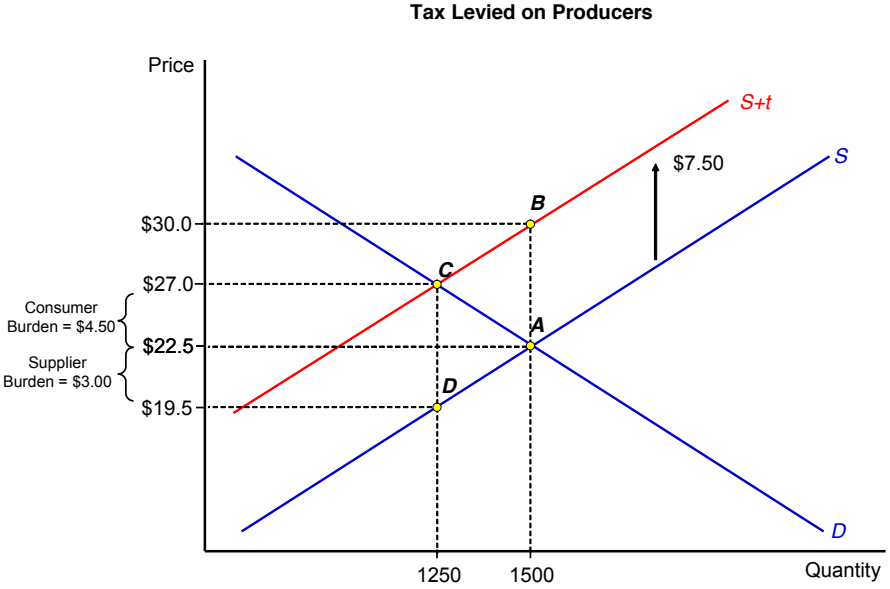
Key Lessons about Tax Incidence

1. Economic tax incidence separate from "legal incidence"

Key Lessons about Tax Incidence

1. Economic tax incidence separate from "legal incidence"
2. Taxing consumers and producers results in same economic impact (If taxes are fully salient (Chetty, Looney, Kroft (2009)). Recall $\hat{P}_D = \hat{P}_S + \tau$)


Tax Levied on Consumers
Price
$27.0
$22.5
$19.5
$15.0
Consumer
Burden = $4.50
Supplier
Burden = $3.00
C
A
D
B
$7.50
S
D
D+t
1250
1500
Quantity


Tax Levied on Producers
Price
S+t
S
$7.50
B
$30.0
C
$27.0
Consumer
Burden = $4.50
$22.5
A
Supplier
Burden = $3.00
D
$19.5
D
1250
1500
Quantity

Analytical Framework

We know a three things:

$$\hat{P}_D = \hat{P}_S + \tau$$
$$\hat{Q}^D = \varepsilon^D \hat{P}_D$$
$$\hat{Q}^S = \varepsilon^S \hat{P}_S$$

where $\hat{Q}$ is the percentage change in quantity generated by the tax and τ is also measured in percentage terms

We also have market clearing:

$$\hat{Q}^D = \hat{Q}^S$$
$$\varepsilon^D \hat{P}_D = \varepsilon^S (\hat{P}_D - \tau)$$

Analytical framework: Implications

$$\hat{P}_D = \tau \frac{\varepsilon^S}{\varepsilon^S - \varepsilon^D}$$

$$\hat{P}_S = \tau \frac{\varepsilon^D}{\varepsilon^S - \varepsilon^D}$$

$$\hat{Q} = \tau \frac{1}{\frac{1}{\varepsilon^D} - \frac{1}{\varepsilon^S}}$$

3 Key Lessons about Tax Incidence

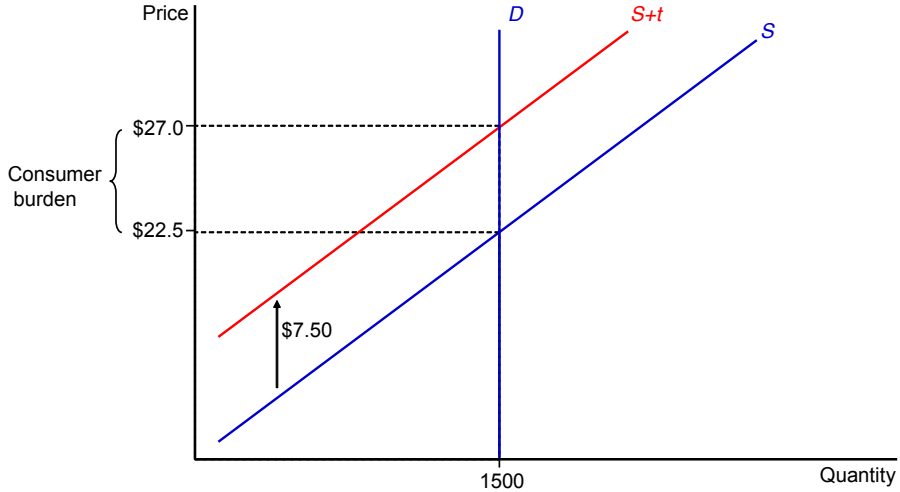
1. Economic tax incidence separate from "legal incidence"
2. Taxing consumers and producers results in same economic impact (If taxes are fully salient (Chetty, Looney, Kroft (2009)). Recall $\hat{P}_D = \hat{P}_S + \tau$)
3. Incidence depends on *relative elasticities*
   - The more elastic agent is more able to avoid burden of the tax

$$\hat{P}_D = \tau \frac{\varepsilon^S}{\varepsilon^S - \varepsilon^D}$$

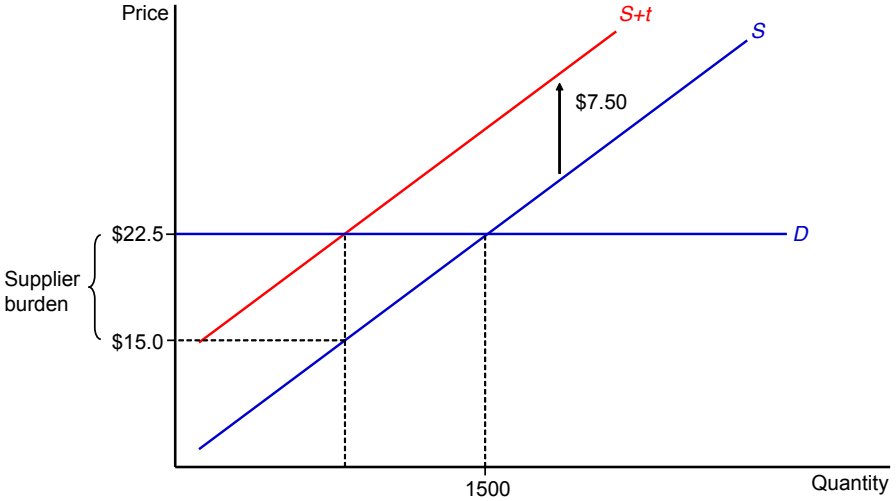
$$\hat{P}_S = \tau \frac{\varepsilon^D}{\varepsilon^S - \varepsilon^D}$$

   - The ratio $\frac{\hat{P}_D}{\hat{P}_S} = \frac{\varepsilon^S}{\varepsilon^D}$ is the inverse of the elasticities
   - If the demand elasticity is twice as large as the supply elasticity, then sellers pay two-thirds of the tax and buyers pay only one-third

Perfectly Inelastic Demand



Perfectly Elastic Demand



Mandated Benefits

- Tempting to view mandates as additional taxes on firms and apply same analysis as above
- But mandated benefits have different effects on equilibrium wages and employment differently than a tax (Summers 1989)
- Key difference: mandates are a benefit for the worker, so effect on market equilibrium depends on benefits workers get from the program
- Unlike a tax, may have no distortionary effect on employment and only an incidence effect (lower wages)

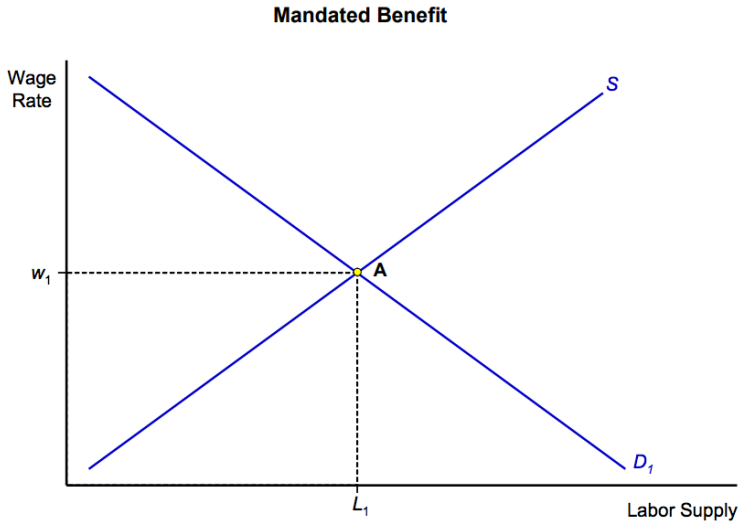
Mandated Benefits: Simple Model

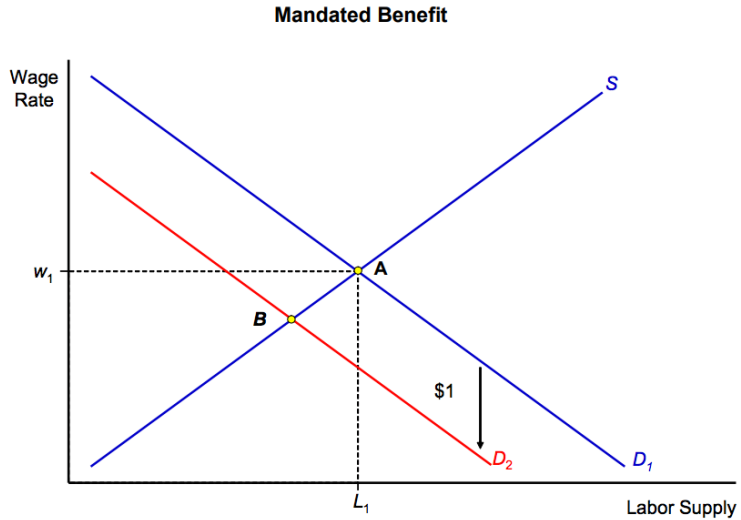
- Labor demand (D) and labor supply (S) are functions of the wage, w
- Initial equilibrium:

$$D(w_0) = S(w_0)$$

- Now, gov mandates employers provide a benefit with cost t
- Worker value benefit at αt dollars
- Typically $0 < \alpha < 1$, but $\alpha > 1$ possible with market failures
- Labor cost is not $w + t$, effective wage $w + \alpha t$
- New equilibrium:

$$D(w + t) = S(w + \alpha t)$$


Mandated Benefit
Wage Rate
S
w_1
A
D_1
L_1
Labor Supply


Mandated Benefit
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w_1
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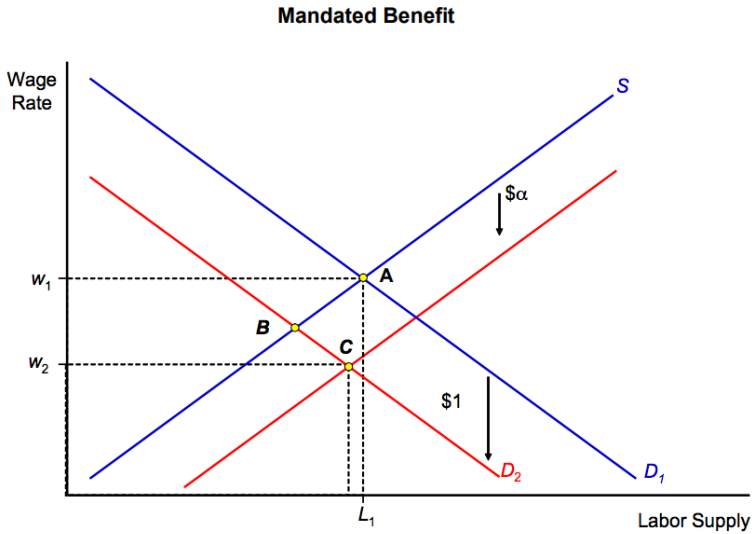
Labor Supply


Mandated Benefit
Wage Rate
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w2
$1
D2
D1
L1
Labor Supply

Efficiency consequences of taxation

Definition

- Incidence: effect of policies on **distribution** of economic pie
- Efficiency or deadweight cost: effect of policies on **size** of the pie
- Focus in efficiency analysis is on quantities, not prices

References

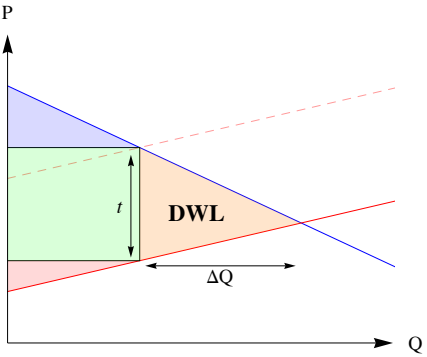
- Auerbach (1985) handbook chapter
- Chetty, Looney, Kroft (AER 2009)
- Chetty (Annual Review 2009)
- Mas-Colell, Whinston, Green Chapter 3 for background on price theory concepts

Efficiency Cost: (very) basic review

- Government raises taxes for one of two reasons:
  1. To raise revenue to finance public goods
  2. To redistribute income
- But to generate $1 of revenue, welfare of those taxed falls by more than $1 because the tax distorts behavior
- How to implement policies that minimize these efficiency costs?
  - Start with positive analysis of how to measure efficiency cost of a given tax system

Deadweight Loss: (very) basic review

Marginal cost of taxation increasing in the tax rate

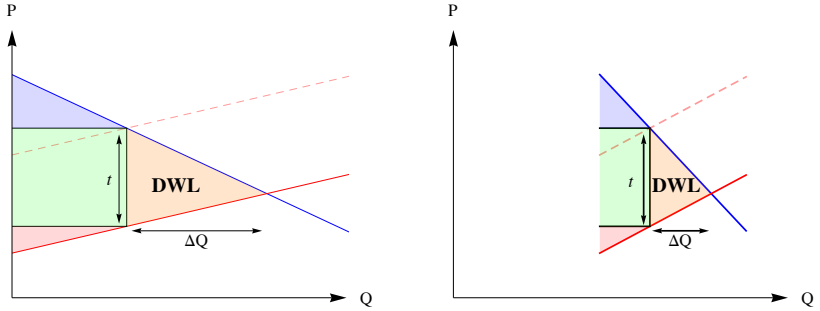


- Deadweight loss is approximately *quadratic* in the tax amount
  - DWL $= \frac{1}{2} t \cdot \Delta Q$
  - ΔQ proportional to t (for linear supply & demand)
  - So DWL goes as t^2

Deadweight Loss: (very) basic review

More elastic supply & demand ⇒ More DWL

Two markets with same P & Q, but different supply and demand curves:



- For a given tax t, DWL is bigger if supply & demand are more elastic
  - DWL $= \frac{1}{2} t \cdot \Delta Q$
  - More elastic supply and demand mean larger ΔQ for a given t
  - Intuition: DWL is caused by loss of transactions
    More elastic S&D means more transactions destroyed

Quantitatively, DWL is a triangle (starting from tax=0)

- Base of the triangle (measured vertically) is the change in prices: τP
- The height of the triable (measured horizontally) is the change in quantities: $Q\%\Delta Q$

Social Cost is:

$$
\begin{aligned}
&= \frac{1}{2}\tau PQ\,(\%\Delta Q) \\
&= \frac{1}{2}\tau PQ\left(\tau \frac{1}{\frac{1}{\varepsilon^D} - \frac{1}{\varepsilon^S}}\right) \\
&= \frac{1}{2}\tau^2 \underbrace{PQ}_{\text{Tax Revenue}} \left(\frac{1}{\frac{1}{\varepsilon^D} - \frac{1}{\varepsilon^S}}\right)
\end{aligned}
$$

Social Cost from increasing taxes is: $\frac{\text{d(Social Cost)}}{\text{d}\tau} = \tau TR\left(\frac{1}{\frac{1}{\varepsilon^D} - \frac{1}{\varepsilon^S}}\right)$.

Tax	Elasticity of Demand	Elasticity of Supply	Change in Buyer's Price	Change in Seller's price	Change in Output	Social Cost (% of TR)
10%	0.0	0.5	10.0%	0.0%	0.0%	0.0%
10%	0.0	1.0	10.0%	0.0%	0.0%	0.0%
10%	0.0	2.0	10.0%	0.0%	0.0%	0.0%
10%	-0.5	0.0	0.0%	-10.0%	0.0%	0.0%
10%	-1.0	0.0	0.0%	-10.0%	0.0%	0.0%
10%	-2.0	0.0	0.0%	-10.0%	0.0%	0.0%
10%	-0.5	0.5	5.0%	-5.0%	-2.5%	-0.1%
10%	-0.5	1.0	6.7%	-3.3%	-3.3%	-0.2%
10%	-0.5	2.0	8.0%	-2.0%	-4.0%	-0.2%
10%	-1.0	0.5	3.3%	-6.7%	-3.3%	-0.2%
10%	-1.0	1.0	5.0%	-5.0%	-5.0%	-0.3%
10%	-1.0	2.0	6.7%	-3.3%	-6.7%	-0.3%
10%	-2.0	0.5	2.0%	-8.0%	-4.0%	-0.2%
10%	-2.0	1.0	3.3%	-6.7%	-6.7%	-0.3%
10%	-2.0	2.0	5.0%	-5.0%	-10.0%	-0.5%
20%	-1.0	1.0	10.0%	-10.0%	-10.0%	-1.0%
30%	-1.0	1.0	15.0%	-15.0%	-15.0%	-2.3%
40%	-1.0	1.0	20.0%	-20.0%	-20.0%	-4.0%

Tax Policy Implications (in a stylized setting)

With many goods, most efficient way to raise revenue is:

1. Tax inelastic goods more (e.g. medical drugs, food), but need to consider effects on other goods and timing (i.e., short run versus long run)
2. Spread taxes across all goods to keep rates relatively low on all goods (broad tax base)

These are two countervailing forces; balancing them requires quantitive measure meant of deadweight loss

Appendix: elasticities and taxes with multiple goods

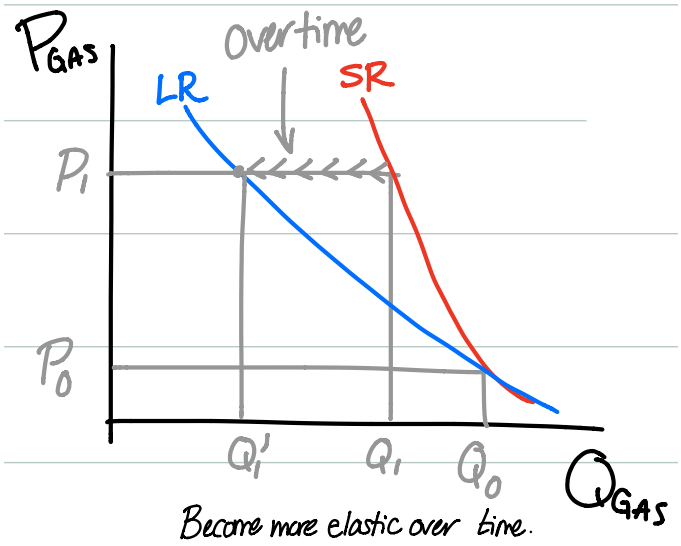
The demand system for gas and cars is:

$$\widehat{GAS} = a\hat{P}_{GAS} + b\hat{P}_{CAR}$$
$$\widehat{CAR} = c\hat{P}_{GAS} + d\hat{P}_{CAR}$$

The long-run elasticity is a, but in short-run people can't adjust as much so there is an indirect impact from the second term, $b\hat{P}_{CAR}$, when the price of gas changes.

Note that $a = \varepsilon_{G,G}$, $b = \varepsilon_{G,C}$, $c = \varepsilon_{C,G}$, and $d = \varepsilon_{C,C}$. Assumed no income growth.

Application: Short Run vs. Long Run Demand for Gas



Extending the framework to two goods: Gas & Cars

This indirect impact can come from the **demand side**. Let $\widehat{CAR} = 0$.

$$\widehat{GAS} = a\hat{P}_{GAS} + b\hat{P}_{CAR}$$

$$0 = c\hat{P}_{GAS} + d\hat{P}_{CAR} \Rightarrow \hat{P}_{CAR} = \frac{-c}{d}\hat{P}_{GAS}$$

The overall short-run impact of changes in gas prices reflects two forces:

$$\widehat{GAS} = \underbrace{a\hat{P}_{GAS}}_{\text{direct effect}} + \underbrace{b\left(\frac{-c}{d}\hat{P}_{GAS}\right)}_{\text{indirect effect}}$$

Takeaways:

1. Gas price declines can bid up the price of cars, which can reduce overall responsiveness of $\widehat{GAS}$ to $\hat{P}_{GAS}$ in the short-run
2. The magnitude of the difference depends on the strength of complementarity (which comes from b and c)

Extending the framework to two goods: Gas & Cars

- The **supply side** will respond to high car prices eventually too
- Let $\widehat{CAR} = \varepsilon^S \hat{P}_{CAR}$.

$$\widehat{GAS} = a\hat{P}_{GAS} + b\hat{P}_{CAR}$$

$$\varepsilon^S \hat{P}_{CAR} = c\hat{P}_{GAS} + d\hat{P}_{CAR} \Rightarrow \hat{P}_{CAR} = \frac{c}{\varepsilon^S - d}\hat{P}_{GAS}$$

The overall short-run impact of changes in gas prices reflects two forces:

$$\widehat{GAS} = \underbrace{a\hat{P}_{GAS}}_{\text{direct effect}} + \underbrace{b\left(\frac{c}{\varepsilon^S - d}\hat{P}_{GAS}\right)}_{\text{indirect effect}}$$

Takeaways:

1. The indirect effect on gas depends on the supply elasticity of cars.
2. If $\varepsilon^S = 0$, then we get the result from the last slide.
3. If $\varepsilon^S = \infty$, then $\hat{P}_{CAR} = 0$ and $\varepsilon^{LR} = a$.