Graduate Public Finance
Overview of Public Finance: Fiscal Policy, Equity, Efficiency

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Princeton
Spring 2020

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
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
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
Theme 2: Quasi-Experimental Empirical Methods

Examples

- Research in public economics exploits a variety of quasi-experimental research designs to identify parameters of interest
  - 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
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

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
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<tbody>
<tr>
<td>Total # of NBER Working Papers</td>
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<td>665</td>
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<td>Total # of Working Papers in Public Economics</td>
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### Public Economics Working Papers by Methodology

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<td>Theory</td>
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<td>37.3%</td>
<td>30.1%</td>
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<tr>
<td>Both</td>
<td>29.1%</td>
<td>11.8%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Other (survey of the literature, research methodology, etc)</td>
<td>3.6%</td>
<td>4.6%</td>
<td>12.1%</td>
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### Public Economics Working Papers by Topic

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<td>28.1%</td>
<td>15.3%</td>
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<tr>
<td>Spending</td>
<td>5.5%</td>
<td>13.7%</td>
<td>20.8%</td>
</tr>
<tr>
<td>Tax and Spending</td>
<td>0.0%</td>
<td>7.8%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Other (Education, Regulation, etc)*</td>
<td>30.9%</td>
<td>50.3%</td>
<td>62.8%</td>
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### Public Economics Working Papers on Taxation: Corporate vs. Individual

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<td>Individual</td>
<td>47.1%</td>
<td>79.2%</td>
<td>88.9%</td>
</tr>
<tr>
<td>Corporate</td>
<td>41.2%</td>
<td>13.2%</td>
<td>7.4%</td>
</tr>
<tr>
<td>Both</td>
<td>11.8%</td>
<td>7.5%</td>
<td>3.7%</td>
</tr>
</tbody>
</table>
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?

![Chart showing the percentage of different types of words in the tax topic.](chart.png)

Note: The chart shows the frequency of different words as a fraction of all words in the taxonomy. See here for a list.
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

Graduate Public Finance (Econ 524)
Public Finance Overview
Lecture 1a
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 incentive 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.


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

**Figure 10.14. The rise of the fiscal State in rich countries 1870-2015**

**Interpretation.** Total fiscal revenues (all taxes and social contributions included) made less than 10% of national income in rich countries during the 19th century and until World War 1, before rising strongly from the 1910s-1920s until the 1970s-1980s and then stabilizing at different levels across countries: around 30% in the U.S., 40% in Britain and 45%-55% in Germany, France and Sweden.

**Sources and series:** see piketty.pse.ens.fr/ideology.

Source: Piketty (2020)
Evolution of Government Expenditures

Figure 10.15. The rise of the social State in Europe, 1870-2015

<table>
<thead>
<tr>
<th>Uses of fiscal revenues as % of national income</th>
</tr>
</thead>
<tbody>
<tr>
<td>60%</td>
</tr>
<tr>
<td>50%</td>
</tr>
<tr>
<td>40%</td>
</tr>
<tr>
<td>30%</td>
</tr>
<tr>
<td>20%</td>
</tr>
<tr>
<td>10%</td>
</tr>
<tr>
<td>0%</td>
</tr>
</tbody>
</table>

- Other social spending: 47%
- Social transfers (family, unemployment, etc.): 6%
- Health (health insurance, hospitals, etc.): 5%
- Retirement and disability pensions: 9%
- Education (primary, secondary, tertiary): 11%
- Army, police, justice, administration, etc.: 6%

*Interpretation.* In 2015, fiscal revenues represented 47% of national income on average in Western Europe and were used as follows: 10% of national income for regalian expenditure (army, police, justice, general administration, basic infrastructure; roads, etc.); 6% for education; 11% for pensions; 9% for health; 5% for social transfers (other than pensions); 6% for other social spending (housing, etc.). Before 1914, regalian expenditure absorbed almost all fiscal revenues. *Note.* The evolution depicted here is the average of Germany, France, Britain and Sweden (see figure 10.14). *Sources and series:* see piketty.pse.ens.fr/ideology.

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
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

Outline:

1. Fiscal Overview of Federal Government
2. Federal Tax Revenue
3. Federal Government Spending
Federal Revenue, Spending, and Deficits: 1980-2018

Year | Spending | Revenues | Deficit | Percentage of GDP
--- | --- | --- | --- | ---
1980 | $4.1T | $3.3T | $0.8T | 15%
1984 | $4.1T | $3.3T | $0.8T | 15%
1988 | $4.1T | $3.3T | $0.8T | 15%
1992 | $4.1T | $3.3T | $0.8T | 15%
1996 | $4.1T | $3.3T | $0.8T | 15%
2000 | $4.1T | $3.3T | $0.8T | 15%
2004 | $4.1T | $3.3T | $0.8T | 15%
2008 | $4.1T | $3.3T | $0.8T | 15%
2012 | $4.1T | $3.3T | $0.8T | 15%
2016 | $4.1T | $3.3T | $0.8T | 15%

Source: White House Office of Management and Budget

Graduate Public Finance (Econ 524)

Public Finance Overview

Lecture 1a
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:

  $$ Debt_{t+1} = Debt_t + Deficit_t = Debt_t \cdot (1 + r_t) + Spending_t - Revenue_t $$

  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 Revenue Share of GDP (%)


2016-2026 CBO Budget Outlook

2018-2028 CBO Budget Outlook

14 16 18 20

Source: CBO Budget and Economic Outlook

Graduate Public Finance (Econ 524)
Federal Tax Revenue and Progressivity
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)

Source: White House Office of Management and Budget

Graduate Public Finance (Econ 524)
Total Federal Revenue by Source, 2018 ($T)

- Individual income tax: 1.7
- Social insurance taxes: 1.2
- Corporate income tax: 0.2
- Other: 0.3

Source: White House Office of Management and Budget
The hardest thing in the world to understand is income taxes.

(Albert Einstein)

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.

Individual Income Tax

T(z) is continuous in z

T(0) = 0

slope 10%

slope 15%

slope 39.6%

Source: Saez.
Federal US Income marginal tax schedule (pre-TCJA)

Marginal Income Tax

$T'(z)$ is a step function

Source: Saez.
TCJA change in top marginal rates

FIGURE 1
Marginal Tax Rate by Taxable Income

Graduate Public Finance (Econ 524)
Changes in income tax schedule since late 1990s

Federal US top income tax rate
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
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
## Table 4. Conventional distributional measures, 2022

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<thead>
<tr>
<th>Income group</th>
<th>Baseline</th>
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<th>Proposal</th>
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<tr>
<td></td>
<td>Average expanded income</td>
<td>Average</td>
<td>Average after-tax income</td>
<td>Average</td>
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<tr>
<td></td>
<td></td>
<td>federal tax</td>
<td></td>
<td>tax change</td>
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<tr>
<td></td>
<td></td>
<td>liability</td>
<td></td>
<td>increase</td>
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<tr>
<td>Bottom quintile</td>
<td>$3,150</td>
<td>-$155</td>
<td>$3,305</td>
<td>-$145</td>
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<tr>
<td>Second quintile</td>
<td>$26,395</td>
<td>$230</td>
<td>$26,165</td>
<td>-$775</td>
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<tr>
<td>Middle quintile</td>
<td>$53,415</td>
<td>$5,370</td>
<td>$48,045</td>
<td>-$110</td>
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<td>Fourth quintile</td>
<td>$98,395</td>
<td>$13,040</td>
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<td>80-90%</td>
<td>$160,910</td>
<td>$26,590</td>
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<td>90-95%</td>
<td>$234,445</td>
<td>$43,780</td>
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<td>95-99%</td>
<td>$405,360</td>
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<td>$881,585</td>
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<td>Top 0.1%</td>
<td>$10,389,425</td>
<td>$2,916,660</td>
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<td>Percent change in after tax income</td>
<td>-4.4%</td>
<td>Share of taxes paid</td>
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<td>percent change in after tax income</td>
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<td>0.2%</td>
<td>Share of federal taxes paid</td>
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<td></td>
<td></td>
<td>100%</td>
<td>Share of federal taxes paid</td>
<td>23%</td>
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</table>

Source: Zidar Zwick (2020).
## 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

<table>
<thead>
<tr>
<th>Expanded cash income percentile</th>
<th>Tax Units</th>
<th>Percent change in after-tax income</th>
<th>Share of total federal tax change</th>
<th>Average federal tax change ($)</th>
<th>Average Federal Tax Rate</th>
<th>Change in federal tax (%)</th>
<th>Under the proposal</th>
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<tr>
<td>Lowest quintile</td>
<td>48,780</td>
<td>27.7</td>
<td>0.4</td>
<td>1.0</td>
<td>-60</td>
<td>-0.4</td>
<td>3.7</td>
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<tr>
<td>Second quintile</td>
<td>38,760</td>
<td>22.0</td>
<td>1.2</td>
<td>5.2</td>
<td>-380</td>
<td>-1.1</td>
<td>7.6</td>
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<tr>
<td>Middle quintile</td>
<td>34,290</td>
<td>19.5</td>
<td>1.6</td>
<td>11.2</td>
<td>-930</td>
<td>-1.4</td>
<td>12.4</td>
</tr>
<tr>
<td>Fourth quintile</td>
<td>28,870</td>
<td>16.4</td>
<td>1.9</td>
<td>18.4</td>
<td>-1,810</td>
<td>-1.6</td>
<td>15.8</td>
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<td>Top quintile</td>
<td>24,300</td>
<td>13.8</td>
<td>2.9</td>
<td>65.3</td>
<td>-7,640</td>
<td>-2.2</td>
<td>23.3</td>
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<tr>
<td>All</td>
<td>176,100</td>
<td>100.0</td>
<td>2.2</td>
<td>100.0</td>
<td>-1,610</td>
<td>-1.8</td>
<td>18.1</td>
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</table>

**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
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

Source: William Gale

Source: William Gale
State Income Tax Progressivity

Source: Fajgelbaum et al, 2019
Progressivity over Time

Total Tax rates, 1962 (by pre-tax national income)

% of pre-tax income

Sales taxes
Payroll taxes
Individual income taxes
Corporate & property taxes
Estate tax

Source: Saez Zucman (2019)
Progressivity over Time

Total Tax rates, 2018 (by pre-tax national income)

Source: Saez Zucman (2019)
Simulated Progressivity of Presidential Candidates Tax Plans

Proposed tax plans (as of January 20, 2020)
(including private health insurance as tax)

Source: Saez Zucman (2020). See here for details: https://eml.berkeley.edu/~saez/taxsimsummary_v2.pdf
Total Federal Spending by Function (% of GDP)

Source: White House Office of Management and Budget

Graduate Public Finance (Econ 524)  Public Finance Overview  Lecture 1a
Total Federal Spending by Function, 2018 ($T)

Source: White House Office of Management and Budget
$967B in 2018
- Composed of Old-Age and Survivors Insurance (1935) and Disability Insurance (1956)
- 60M Americans ($\approx \frac{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

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<tr>
<th>Program</th>
<th>Monthly Beneficiaries</th>
<th>Annual Cost</th>
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</thead>
<tbody>
<tr>
<td>Veterans’ benefits</td>
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<td>SNAP</td>
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</tr>
<tr>
<td>TANF</td>
<td>3.6M</td>
<td>$16.5B</td>
</tr>
</tbody>
</table>

- 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
  - ≈ 1/2 is on defense
  - ≈ 1/4 is on investments (education, training, science, infrastructure)
  - ≈ 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

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

State General Revenue
By source, 2015

Source: US Census Bureau.
Note: Sales taxes include selective sales taxes (e.g., cigarette taxes).

Source: Urban state and local backgrounders
https://www.urban.org/policy-centers/cross-center-initiatives/state-local-finance-initiative/state-and-local-backgrounders
State tax system varies across states
State tax rates (and tax structure) vary across states
Local revenue sources

Local General Revenue
By source, 2015

Source: US Census Bureau.
Note: Sales taxes include selective sales taxes (e.g., cigarette taxes).

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

State and Local General Spending
By functional category, fiscal year 2015

- Elementary and secondary education: 22%
- Public welfare: 21%
- Higher education: 10%
- Health and hospitals: 9%
- Police and corrections: 6%
- Highways and roads: 6%

Note: Excludes spending on government-run liquor stores, utilities, and insurance trusts. Medicaid spending is divided between the public welfare and health and hospitals functional categories, with the majority allocated to the former.

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

State versus Local Direct Spending
As percent of total direct general expenditures, fiscal year 2015

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

State and Local Per Capita Spending
Direct general spending, fiscal year 2015

Note: Excludes spending on government-run liquor stores, utilities, and insurance trusts. Medicaid spending is divided between the public welfare and health and hospitals functional categories.
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

![Graph showing Amy's and Bob's consumption relationship](image-url)

- Amy's Consumption
- Bob's Consumption
Second Role for Gov: Improve Distribution

Amy's Consumption

Bob's Consumption
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 → 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
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.
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

Quantity

$27.0
$22.5
$19.5
$15.0

$7.50

Consumer Burden = $4.50
Supplier Burden = $3.00

C
A
D
B

D+t

D
S

Graduate Public Finance (Econ 524)  
Public Finance Overview

Lecture 1a
Consumer Burden = $4.50
Supplier Burden = $3.00

Price
Quantity

$22.5 $22.5
$19.5
$27.0

$7.50

$30.0

Consumer Burden = $4.50
Supplier Burden = $3.00

Tax Levied on Producers

Public Economics Lectures: Part 2: Tax Incidence

Public Finance Overview
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 \( \tau \) 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

Price

Consumer burden

$27.0
$22.5
$7.50

Quantity

1500

Public Economics Lectures
Part 2: Tax Incidence
Perfectly Elastic Demand

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<th>Quantity</th>
<th>Price</th>
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<td>D</td>
<td>$7.50</td>
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<td>Supplier burden</td>
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**Public Economics Lectures**

Part 2: Tax Incidence

**Graduate Public Finance (Econ 524)**

Public Finance Overview

Lecture 1a
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 $\alpha t$ 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

Labor Supply

$w_1$

$L_1$

$S$

$D_1$
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
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 is approximately *quadratic* in the tax amount

- $\text{DWL} = \frac{1}{2} t \cdot \Delta Q$
- $\Delta Q$ 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
  - $\text{DWL} = \frac{1}{2} t \cdot \Delta Q$
  - More elastic supply and demand mean larger $\Delta Q$ 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: $\tau P$
- The height of the triangle (measured horizontally) is the change in quantities: $Q\%\Delta Q$

Social Cost is:

\[
\text{Social Cost} = \frac{1}{2} \tau P Q \left( \%\Delta Q \right)
\]

\[
= \frac{1}{2} \tau P Q \left( \tau \frac{1}{\epsilon D} - \frac{1}{\epsilon S} \right)
\]

\[
= \frac{1}{2} \tau^2 P Q \left( \frac{1}{\epsilon D} - \frac{1}{\epsilon S} \right)
\]

Social Cost from increasing taxes is:

\[
\frac{d(\text{Social Cost})}{d\tau} = \tau TR \left( \frac{1}{\epsilon D} - \frac{1}{\epsilon S} \right).
\]
<table>
<thead>
<tr>
<th>Tax</th>
<th>Elasticity of Demand</th>
<th>Elasticity of Supply</th>
<th>Change in Buyer's Price</th>
<th>Change in Seller's price</th>
<th>Change in Output</th>
<th>Social Cost (% of TR)</th>
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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 quantitative measure meant of deadweight loss
Appendix:
elasticities and taxes with multiple goods
Extending the framework to two goods: Gas & Cars

Application: effects of gas tax in short run versus long run

The demand system for gas and cars is:

\[ \hat{GAS} = a\hat{P}_{GAS} + b\hat{P}_{CAR} \]
\[ \hat{CAR} = c\hat{P}_{GAS} + d\hat{P}_{CAR} \]

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

Become more elastic over time.
Extending the framework to two goods: Gas & Cars

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

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

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

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

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

**Direct effect**

**Indirect effect**

**Takeaways:**

1. Gas price declines can bid up the price of cars, which can reduce overall responsiveness of $\hat{\text{GAS}}$ to $\hat{P}_{\text{GAS}}$ 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 $\hat{CAR} = \varepsilon^S \hat{P}_{CAR}$.

\[
\begin{align*}
\hat{GAS} &= a \hat{P}_{GAS} + b \hat{P}_{CAR} \\
\varepsilon^S \hat{P}_{CAR} &= c \hat{P}_{GAS} + d \hat{P}_{CAR} \Rightarrow \hat{P}_{CAR} = \frac{c}{\varepsilon^S - d} \hat{P}_{GAS}
\end{align*}
\]

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

\[
\begin{align*}
\hat{GAS} &= \underbrace{a \hat{P}_{GAS}}_{\text{direct effect}} + \underbrace{b \left( \frac{c}{\varepsilon^S - d} \hat{P}_{GAS} \right)}_{\text{indirect effect}}
\end{align*}
\]

**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 $\varepsilon^{LR} = a$. 