Graduate Public Economics
Introduction and Road Map

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PUBLIC ECONOMICS DEFINITION

Public economics = Study of the role of the government in the economy

Government is instrumental in most aspects of economic life:

1) Government in charge of huge regulatory structure

2) Taxes: governments in advanced economies collect 30-50% of National Income in taxes

3) Expenditures: tax revenue funds traditional public goods (infrastructure, public order and safety, defense), and welfare state (education, retirement benefits, health care, income support)

4) Macro-economic stabilization through central bank (interest rate, inflation control), fiscal stimulus, bailout policies
Total tax revenues were less than 10% of national income in rich countries until 1900-1910; they represent between 30% and 55% of national income in 2000-2010. Sources and series: see piketty.pse.ens.fr/capital21c.

Source: Piketty (2014)
Bigger view on government

Economists have a narrow minded view of individual behavior: selfish, rational, and utility based on own consumption only.

But social interactions critical for humans: we cooperate at many levels: families, communities, nation states, global treaties; Beyond subsistence, value of income is always relative.

Governments are a formal way to organize cooperation.

Archaic human societies depended on social cooperation for protection and taking care of the young, sick, and old.

⇒ Explains best why our modern nation states have defense and provide education, health care, and retirement benefits.

Replacing social institutions by markets does not always work.
E.g., Retirement benefits: Saving for your own retirement is economically rational but in practice most people unable to do so unless institutions (employers/government) help them.
For Economists:
Two General Rules for Government Intervention

1) Failure of 1st Welfare Theorem: Government intervention can help if there are market or individual failures

2) Fallacy of the 2nd Welfare Theorem: Distortionary Government intervention is required to reduce economic inequality
Role 1: 1st Welfare Theorem Failure

1st Welfare Theorem: If (1) no externalities, (2) perfect competition, (3) perfect information, (4) agents are rational, then private market equilibrium is Pareto efficient.

Government intervention may be desirable if:

1) Externalities require government interventions (Pigouvian taxes/subsidies, public good provision)

2) Imperfect competition requires regulation (typically studied in Industrial Organization)

3) Imperfect or Asymmetric Information (e.g., adverse selection may call for mandatory insurance)

4) Agents are not rational (= individual failures analyzed in behavioral economics, field in huge expansion): e.g., myopic or hyperbolic agents may not save enough for retirement
Role 2: 2nd Welfare Theorem Fallacy

Even with no market failures, free market might generate substantial inequality. Inequality is an issue because of people care about their relative situation.

2nd Welfare Theorem: Any Pareto Efficient outcome can be reached by (1) Suitable redistribution of initial endowments [individualized **lump-sum** taxes based on indiv. characteristics and not behavior], (2) Then letting markets work freely

⇒ No conflict between efficiency and equity [1st best taxation]

Redistribution of initial endowments is not feasible (information pb) ⇒ govt needs to use **distortionary** taxes and transfers ⇒ Trade-off between efficiency and equity [2nd best taxation]

This class will focus primarily but not exclusively on role 2
Illustration of 2nd Welfare Theorem Fallacy

Suppose economy is populated 50% with disabled people unable to work (hence they earn $0) and 50% with able people who can work and earn $100

**Free market outcome:** disabled have $0, able have $100

**2nd welfare theorem:** govt is able to tell apart the disabled from the able [even if the able do not work]

⇒ can tax the able by $50 [regardless of whether they work or not] to give $50 to each disabled person ⇒ the able keep working [otherwise they’d have zero income and still have to pay $50]

**Real world:** govt can’t tell apart disabled from non working able

⇒ $50 tax on workers + $50 transfer on non workers destroys all incentives to work ⇒ govt can no longer do full redistribution ⇒ Trade-off between equity and size of the pie
Normative vs. Positive Public Economics

**Normative Public Economics:** Analysis of How Things Should be (e.g., should the government intervene in health insurance market? how high should taxes be?, etc.)

**Positive Public Economics:** Analysis of How Things Really Are (e.g., Does govt provided health care crowd out private health care insurance? Do higher taxes reduce labor supply?)

Positive Public Economics is a required 1st step before we can complete Normative Public Economics.

Positive analysis is primarily empirical and Normative analysis is primarily theoretical.

Positive Public Economics overlaps with Labor Economics.

**Political Economy** is a positive analysis of govt outcomes [public choice is political economy from a libertarian view]
Individual Failures vs. Paternalism

In many situations, individuals may not or do not seem to act in their best interests [e.g., many individuals are not able to save for retirement]

Two Polar Views on such situations:

1) **Individual Failures [Behavioral Economics View]** Individual Failures exist: Self-control problems, Cognitive Limitations

2) **Paternalism [Libertarian Chicago View]** Individual failures do not exist and govt wants to impose on individuals its own preferences against individuals’ will

Key way to distinguish those 2 views: Under Paternalism, individuals should be opposed to govt programs such as Social Security. If individuals understand they have failures, they will tend to support govt programs such as Social Security.
Plan for 230B Lectures

1) Labor Income Taxation and Redistribution (SAEZ):
   (a) Normative Aspects: Optimal Income Taxes and Transfers,
   (b) Empirical Aspects: Labor Supply and Taxes and Transfers,
   (c) Social security retirement and disability benefits

2) Wealth inequality and taxing capital income (ZUC-MAN):
   (a) Wealth inequality, (b) Taxation of capital income,
   (c) International tax and tax enforcement issues

3) Environmental Economics (JOE SHAPIRO): Guest lecture, last day of class
**Income Inequality: Labor vs. Capital Income**

Individuals derive market income (before tax) from **labor** and **capital**: \( z = wl + rk \) where \( w \) is wage, \( l \) is labor supply, \( k \) is wealth, \( r \) is rate of return on wealth

1) **Labor income inequality** is due to differences in working abilities (education, talent, physical ability, etc.), work effort (hours of work, effort on the job, etc.), and luck (labor effort might succeed or not)

2) **Capital income inequality** is due to differences in wealth \( k \) (due to past saving behavior and inheritances received), and in rates of return \( r \) (varies dramatically overtime and across assets)

Entrepreneurs start with labor which then transmutes into wealth (e.g., Zuckerberg with Facebook)
Macro-aggregates: Labor vs. Capital Income

Labor income \( w_l \approx 70-75\% \) of national income \( z \)

Capital income \( r_k \approx 25-30\% \) of national income \( z \) (has increased in recent decades)

Wealth stock \( k \approx 400-500\% \) of national income \( z \) (is increasing)

Rate of return on capital \( r \approx 6\% \)

\( \alpha = \beta \cdot r \) where \( \alpha = r_k/z \) share of capital income and \( \beta = k/z \) wealth to income ratio

In GDP, gross capital share is higher (35-40\%) because it includes depreciation of capital (\( \approx 10\% \) of GDP)

National Income = GDP - depreciation of capital + net foreign income
Income Inequality: Labor vs. Capital Income

Capital Income (or wealth) is more concentrated than Labor Income. In the US:

Top 1% wealth holders have 40% of total wealth (Saez-Zucman 2016). Bottom 50% wealth holders hold almost no wealth.

Top 1% incomes earn about 20% of total national income on a pre-tax basis (Piketty-Saez-Zucman, 2018)

Top 1% labor income earners have about 15% of total labor income
Inequality can be measured by indexes such as Gini, log-variance, quantile income shares which are functions of the income distribution $F(z)$

Gini = 2 * area between 45 degree line and Lorenz curve

Lorenz curve $L(p)$ at percentile $p$ is fraction of total income earned by individuals below percentile $p$

$0 \leq L(p) \leq p$

Gini=0 means perfect equality

Gini=1 means complete inequality (top person has all the income)
Gini Coefficient California pre-tax income, 2000, Gini=62.1%

Source: Annual Report 2001 California Franchise Tax Board
Key Empirical Facts on Income/Wealth Inequality

1) In the US, labor income inequality has increased substantially since 1970: due to skilled biased technological progress vs. institutions (min wage and Unions) [Autor-Katz’99]

2) US top income shares dropped dramatically from 1929 to 1950 and increased dramatically since 1980. Bottom 50% incomes have stagnated in real terms since 1980 [Piketty-Saez-Zucman ’18 distribute full National Income]

3) Fall in top income shares from 1900-1950 happened in most OECD countries. Surge in top income shares has happened primarily in English speaking countries, and not as much in Continental Europe and Japan [Atkinson, Piketty, Saez JEL’11]
Figure 1: Gini coefficient

Source: Kopczuk, Saez, Song QJE'10: Wage earnings inequality
Men still make 85% of the top 1% of the labor income distribution.

Share of women in the employed population, by fractile of labor income

Source: Appendix Table II-F1.
Share of pre-tax national income going to top 10% adults

Source: Piketty, Saez, and Zucman (2018)
Average national income per adult: 61% growth from 1980 to 2014

Bottom 90% pre-tax: 30% growth from 1980 to 2014

Bottom 50% pre-tax: 1% growth from 1980 to 2014
Measuring Intergenerational Income Mobility

Strong consensus that children’s success should not depend too much on parental income [Equality of Opportunity]

Studies linking adult children to their parents can measure link between children and parents income

Simple measure: average income rank of children by income rank of parents [Chetty et al. 2014]

1) US has less mobility than European countries (especially Scandinavian countries such as Denmark)

2) Substantial heterogeneity in mobility across cities in the US

3) Places with low race/income segregation, low income inequality, good K-12 schools, high social capital, high family stability tend to have high mobility [these are correlations and do not imply causality]
FIGURE II: Association between Children's Percentile Rank and Parents' Percentile Rank

A. Mean Child Income Rank vs. Parent Income Rank in the U.S.

Rank-Rank Slope (U.S) = 0.341 (0.0003)

B. United States vs. Denmark

Rank-Rank Slope (Denmark) = 0.180 (0.0063)

Notes: These figures present non-parametric binned scatter plots of the relationship between child and parent income ranks. Both figures are based on the core sample (1980-82 birth cohorts) and baseline family income definitions for parents and children. Child income is the mean of 2011-2012 family income (when the child was around 30), while parent income is mean family income from 1996-2000. We define a child's rank as her family income percentile rank relative to other children in her birth cohort and his parents' rank as their family income percentile rank relative to other parents of children in the core sample. Panel A plots the mean child percentile rank within each parental percentile rank bin. The series in triangles in Panel B plots the analogous series for Denmark, computed by Boserup, Kopczuk, and Kreiner (2013) using a similar sample and income definitions (see text for details). The series in circles reproduces the rank-rank relationship in the U.S. from Panel A as a reference. The slopes and best-fit lines are estimated using an OLS regression on the micro data for the U.S. and on the binned series (as we do not have access to the micro data) for Denmark. Standard errors are reported in parentheses.

Source: Chetty, Hendren, Kline, Saez (2014)
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Source: Chetty, Hendren, Kline, Saez (2014)
Probability that a child born to parents in the bottom fifth of the income distribution reaches the top fifth:

- **USA**: 7.5% (Chetty, Hendren, Kline, Saez 2014)
- **UK**: 9.0% (Blanden and Machin 2008)
- **Denmark**: 11.7% (Boserup, Kopczuk, and Kreiner 2013)
- **Canada**: 13.5% (Corak and Heisz 1999)

→ Chances of achieving the “American Dream” are almost two times higher in Canada than in the U.S.
The Geography of Upward Mobility in the United States
Probability of Reaching the Top Fifth Starting from the Bottom Fifth

US average 7.5% [kids born 1980-2]

Source: Chetty et al. (2014)

Note: Lighter Color = More Upward Mobility
Download Statistics for Your Area at www.equality-of-opportunity.org

Map showing the probability of reaching the top fifth from the bottom fifth across the United States, with lighter colors indicating higher upward mobility. The map is color-coded with the following legend:

- > 16.8%
- 12.9% - 16.8%
- 11.3% - 12.9%
- 9.9% - 11.3%
- 9.0% - 9.9%
- 8.1% - 9.0%
- 7.1% - 8.1%
- 6.1% - 7.1%
- 4.8% - 6.1%
- < 4.8%
- Insufficient Data

Note: Lighter Color = More Upward Mobility
Download Statistics for Your Area at www.equality-of-opportunity.org
The Geography of Upward Mobility in the United States
Odds of Reaching the Top Fifth Starting from the Bottom Fifth

US average 7.5% [kids born 1980-2]

Source: Chetty et al. (2014)
that much of the variation in upward mobility across areas. The second factor we explore is income inequality. CZs with larger Gini coefficients have less upward mobility, consistent with the "Great Gatsby curve" documented across countries.7

Fourth, social capital indices 8—which are proxies for the strength of social networks and community involvement in an area—are very strongly correlated with mobility. For instance, areas of high upward mobility tend to have higher fractions of racial and income segregation and upward mobility.

One mechanism for such a community-level effect of race is that much of the spatial variation in children's outcomes emerges with respect to parent income is very similar to the spatial variation in intergenerational income mobility. Hence it may be effective to tackle social mobility at the community level. If we can make every city in the United States become one of the most upwardly mobile countries in the world.

We explore such factors by correlating the spatial variation in intergenerational mobility with less sprawl, as measured by commute times to work. Moreover, we also find that upward mobility is higher in cities with higher test scores (controlling for income levels), lower dropout rates, and smaller class sizes have higher rates of upward mobility. In addition, areas with higher local tax rates, which are predominantly used to finance public schools, have higher rates of upward mobility.

Note: This table reports selected statistics from a sample of the 50 largest commuting zones (CZs) according to their populations in the 2000 Census. The columns report the percentage of children whose family income is in the top quintile of the national distribution of child family income conditional on having parent family income in the bottom quintile of the parental national income distribution—these probabilities are taken from Online Data Table VI of Chetty et al., 2014a.

Source: Chetty et al., 2014a.

### Table 1. Upward Mobility in the 50 Largest Metro Areas: The Top 10 and Bottom 10

<table>
<thead>
<tr>
<th>Rank</th>
<th>Commuting Zone</th>
<th>Odds of Reaching Top Fifth from Bottom Fifth</th>
<th>Rank</th>
<th>Commuting Zone</th>
<th>Odds of Reaching Top Fifth from Bottom Fifth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>San Jose, CA</td>
<td>12.9%</td>
<td>41</td>
<td>Cleveland, OH</td>
<td>5.1%</td>
</tr>
<tr>
<td>2</td>
<td>San Francisco, CA</td>
<td>12.2%</td>
<td>42</td>
<td>St. Louis, MO</td>
<td>5.1%</td>
</tr>
<tr>
<td>3</td>
<td>Washington, D.C.</td>
<td>11.0%</td>
<td>43</td>
<td>Raleigh, NC</td>
<td>5.0%</td>
</tr>
<tr>
<td>4</td>
<td>Seattle, WA</td>
<td>10.9%</td>
<td>44</td>
<td>Jacksonville, FL</td>
<td>4.9%</td>
</tr>
<tr>
<td>5</td>
<td>Salt Lake City, UT</td>
<td>10.8%</td>
<td>45</td>
<td>Columbus, OH</td>
<td>4.9%</td>
</tr>
<tr>
<td>6</td>
<td>New York, NY</td>
<td>10.5%</td>
<td>46</td>
<td>Indianapolis, IN</td>
<td>4.9%</td>
</tr>
<tr>
<td>7</td>
<td>Boston, MA</td>
<td>10.5%</td>
<td>47</td>
<td>Dayton, OH</td>
<td>4.9%</td>
</tr>
<tr>
<td>8</td>
<td>San Diego, CA</td>
<td>10.4%</td>
<td>48</td>
<td>Atlanta, GA</td>
<td>4.5%</td>
</tr>
<tr>
<td>9</td>
<td>Newark, NJ</td>
<td>10.2%</td>
<td>49</td>
<td>Milwaukee, WI</td>
<td>4.5%</td>
</tr>
<tr>
<td>10</td>
<td>Manchester, NH</td>
<td>10.0%</td>
<td>50</td>
<td>Charlotte, NC</td>
<td>4.4%</td>
</tr>
</tbody>
</table>
Govt Redistribution with Taxes and Transfers

Government taxes individuals based on income and consumption and provides transfers: $z$ is pre-tax income, $y = z - T(z) + B(z)$ is post-tax income

1) If inequality in $y$ is less than inequality in $z \iff$ tax and transfer system is redistributive (or progressive)

2) If inequality in $y$ is more than inequality in $z \iff$ tax and transfer system is regressive

a) If $y = z \cdot (1 - t)$ with constant $t$, tax/transfer system is neutral

b) If $y = z \cdot (1 - t) + G$ where $G$ is a universal (lumpsum) allowance, then tax/transfer system is progressive

c) If $y = z - T$ where $T$ is a uniform tax (poll tax), then tax/transfer system is regressive

Current tax/transfer systems in rich countries look roughly like b)
US Distributional National Accounts


Pre-tax income is income before taxes and transfers.

Post-tax income is income net of all taxes and adding all transfers and public good spending.

Both concepts add up to national income and provide a comprehensive view of the mechanical impact of government redistribution.
<table>
<thead>
<tr>
<th>Income group</th>
<th>Number of adults</th>
<th>Average income</th>
<th>Income share</th>
<th>Average income</th>
<th>Income share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Population</td>
<td>234,400,000</td>
<td>$64,600</td>
<td>100%</td>
<td>$64,600</td>
<td>100%</td>
</tr>
<tr>
<td>Bottom 50%</td>
<td>117,200,000</td>
<td>$16,200</td>
<td>12.5%</td>
<td>$25,000</td>
<td>19.4%</td>
</tr>
<tr>
<td>Middle 40%</td>
<td>93,760,000</td>
<td>$65,400</td>
<td>40.5%</td>
<td>$67,200</td>
<td>41.6%</td>
</tr>
<tr>
<td>Top 10%</td>
<td>23,440,000</td>
<td>$304,000</td>
<td>47.0%</td>
<td>$252,000</td>
<td>39.0%</td>
</tr>
<tr>
<td>Top 1%</td>
<td>2,344,000</td>
<td>$1,300,000</td>
<td>20.2%</td>
<td>$1,010,000</td>
<td>15.6%</td>
</tr>
<tr>
<td>Top 0.1%</td>
<td>234,400</td>
<td>$6,000,000</td>
<td>9.3%</td>
<td>$4,400,000</td>
<td>6.8%</td>
</tr>
<tr>
<td>Top 0.01%</td>
<td>23,440</td>
<td>$28,100,000</td>
<td>4.4%</td>
<td>$20,300,000</td>
<td>3.1%</td>
</tr>
<tr>
<td>Top 0.001%</td>
<td>2,344</td>
<td>$122,000,000</td>
<td>1.9%</td>
<td>$88,700,000</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

National Income Distribution 2014 from Piketty, Saez, and Zucman NBER '16

Pre-tax income | Post-tax income
Top 10% national income share: pre-tax vs. post-tax

% of national income

Pre-tax

Post-tax (after taxes and adding transfers and govt spending)

Source: Piketty, Saez, Zucman (2018)
Average national income per adult: 61% growth from 1980 to 2014

Bottom 50% pre-tax: 1% growth from 1980 to 2014

Bottom 50% post-tax: 21% growth from 1980 to 2014
US tax/transfer System: Progressivity and Evolution

0) US Tax/Transfer system is progressive overall: pre-tax national income is less equally distributed than post-tax/post-transfer national income

1) Medium Term Changes: Federal Tax Progressivity has declined since 1970 but govt redistribution through transfers has increased (Medicaid, Social Security retirement, DI, UI various income support programs)

2) Long Term Changes: Before 1913, US taxes were primarily tariffs, excises, and real estate property taxes [slightly regressive], minimal welfare state (and hence small govt)

http://www.treasury.gov/education/fact-sheets/taxes/ustax.shtml
The macro rate of tax rose until the 1960s and has been constant since then.

Source: Piketty, Saez, Zucman (2016)
Tax progressivity has declined since the 1960s

Average tax rates by pre-tax income group

% of pre-tax income

Source: Appendix Table II-G1.

Source: Piketty, Saez, Zucman (2016)
Federal US Tax System (2/3 of total taxes)

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 (on consumption) [regressive] (3% of revenue)

Fed agencies (CBO, Treasury, Joint Committee on Taxation) and think-tanks (Tax Policy Center) provide distributional Fed tax tables
State+Local Tax System (1/3 of total taxes)

Decentralized governments can experiment, be tailored to local views, create tax competition and make redistribution harder (famous Tiebout 1956 model) hence favored by conservatives

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

2) Sales taxes + Excise taxes (tax on consumption) [regressive] (1/3 of revenue)

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


US Census provides Census of Government data
REFERENCES CITED


Alvaredo, F., Atkinson, A., T. Piketty, E. Saez, and G. Zucman *World Inequality Database*, (web)


**Piketty, Thomas, Emmanuel Saez, and Gabriel Zucman, “Distribu-


GENERAL BOOK REFERENCES

Graduate Level


Under-Graduate Level


REFERENCES ON EMPIRICAL METHODS:


