Public Economics Review Session

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Overview of course

First Half: Taxation and redistribution

- First and second fundamental welfare theorems
- Statutory vs economic incidence, excess burden of taxation
- Programs to support low-income households interact with labor supply
- Optimal taxation subject to revenue constraints, individual optimization

Second Half: Market failures

- Govt's role in solving market failures and reallocating resources
- Mkt failures: externalities, public goods, moral hazard, adverse selection
- Health insurance and adverse selection, moral hazard

Overarching questions

- How to trade off efficiency and equity optimally?
- How should taxes be designed to maximize welfare?
- What are the consequences of government interventions in markets?

First and second fundamental welfare theorems

- Pareto efficiency: no one can be made better off without making someone else worse off

$$MRS^1_{A,B} = MRS^2_{A,B}; MRS_{A,B} = -\frac{MU_A}{MU_B}$$

- Competitive equilibrium: prices and quantities such that all markets clear

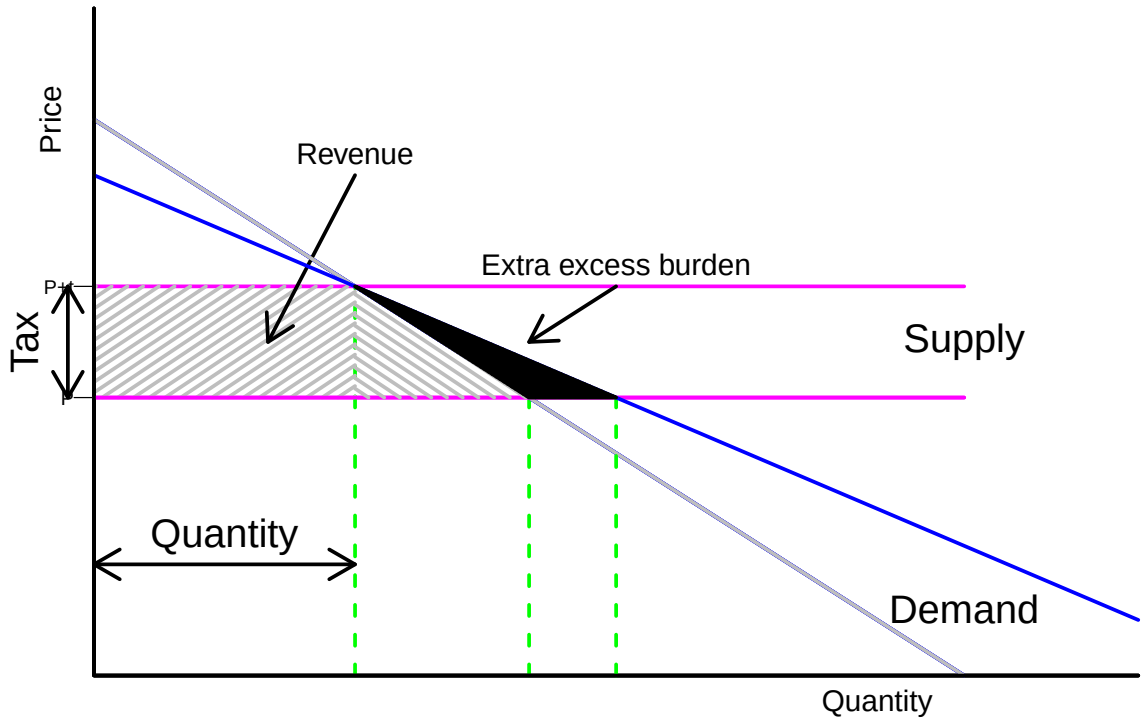
$$MRS^1_{A,B} = -\frac{p_A}{p_B} = MRS^2_{A,B}$$

- 1st fund. welfare theorem: competitive equilibrium is Pareto efficient
- 2nd fund. welfare theorem: any Pareto efficient allocation can be achieved by a competitive equilibrium with lump-sum taxes
- **Key takeaways**:
  - Competitive equilibrium is efficient; not necessarily equitable
  - Excess burden is the deviation from Pareto efficient allocation

Statutory vs economic incidence

- Statutory incidence: who is legally responsible for paying the tax
- Economic incidence: who actually bears the burden of the tax
- **Key takeaways**:
  - Economic incidence is always the same regardless of statutory incidence
  - Economic incidence depends on elasticities (of supply and demand, labor, etc.)

Excess burden/deadweight loss of taxes and subsidies



- **Key takeaway**:
  - More elastic goods have higher excess burden
  - New taxes increase excess burden due to lost (1) tax revenue and (2) economic activity

Low-income support systems

- Low-income support programs interact with taxes to create effective marginal tax rates that swing a lot

Income range		Tax liability (at lower limit)	Marginal tax rate			
			EITC	Tax	Payroll	Total
$0	$16,510	$0.00	-0.4	0	0.0765	-0.3235
$16,510	$20,800	-$5340.98	0	0	0.0765	0.0765
$20,800	$21,650	-$5012.80	0	0.10	0.0765	0.1765
$21,650	$37,700	-$4,433.78	0.2106	0.10	0.0765	0.3871
$37,700	$52,918	$1,504.55	0.2106	0.12	0.0765	0.4071
$52,918	$80,650	$7,654.39	0	0.12	0.0765	0.1965
$80,650		$15,786.93	0	0.22	0.0765	0.2965

- **Key takeaway**: low-income support programs have high effective marginal tax rates, which can discourage work
- **Key takeaway**: government has to balance incentives with equity/social insurance concerns (ordeal mechanisms, etc.)

Goals of optimal taxation

- Horizontal equity: those with equal ability to pay, pay the same in taxes
- Vertical equity: those with greater ability to pay, pay more in taxes
- Efficiency: minimize excess burden of taxation/maximize welfare
- Hard to do all three at once, so we have to make tradeoffs

Optimal taxation leverages individual decision-making

Standard model of individual decision-making:

$$\max_{C,L} U(C, L)$$
$$s.t.\ C = w(1-t)(1-L) + G$$

where C is consumption, L is leisure, w is wage, t is tax rate, G is a government transfer

- Individual maximizes utility, which can be represented as a function of taxes and transfers $U(C(t, G), L(t, G); t, G)$
- Government then picks t and G to maximize social welfare, subject to a revenue constraint
- **Tips:**
  - Substitute, substitute, substitute
  - Treat the budget constraint like an accounting problem

Optimal taxation

- Haig-Simons income: consumption plus change in net worth is income, but we deviate from it a lot
- Optimal taxation derivation leads to recommendations that defer from existing policy
- Inverse elasticity for commodity taxation:

$$\frac{\eta_1}{\eta_2} = \frac{\tau_2}{\tau_1}$$

- Optimal income taxation and sufficient statistics approach

$$\frac{t}{1-t} = -\frac{\text{cov}\left(\lambda, \frac{I}{I^M}\right)}{\frac{1}{N}\sum_{i=1}^{N} \varepsilon^i \cdot \frac{I_i}{I^M}}$$

- **Key takeaway**: elasticity measures responsiveness taxation and matters
- **Key takeaway**: optimal income tax models yield sufficient statistics to calculate tax rates

Other facts on taxation

- Non-linear income tax policy more complicated; focus on the top bracket
- Optimal top marginal tax rate would be 0% if applying to a single person
- **Intuition:** Encourages highest earner to work more, increasing revenue
- **Caveat:** This doesn't work if too many people are in the top bracket and increase their labor supply a ton

- Many models of optimal capital taxation – all starting from the same point that savings shifts the tax burden to future consumption

$$C_1 + \frac{C_2}{1 + r(1-t)} = Y_1 + \frac{Y_2}{1 + r(1-t)}$$

Responsiveness to taxation

- Empirical elasticities of taxable income are sufficient for most optimal income taxation models
- All behavioral changes to taxation affect the elasticity of taxable income, and thus optimal tax rates
  - Hard to do: taxes rarely vary exogenously
- Notch/kink designs most popular way to estimating tax elasticities though they have some extrapolation issues
- Avoidance (legal) and evasion (illegal) of taxes also important
- Tax evasion increases social cost of taxation, but at least somewhat inevitable (especially without third-party reporting)
- **Key takeaway**: taxable income response important for optimal taxation

Summary: Market Failures in Focus

- Second half of course emphasizes **market failures** and government's role in addressing them.
- Main types of market failures:
  - **Externalities:** When private actions have side effects (costs or benefits) on others not captured in market prices.
    - Negative externalities (e.g., pollution) and positive externalities (e.g., education)
    - Solutions: taxes/subsidies (Pigovian), regulation, or cap-and-trade systems
  - **Public Goods:** Goods that are non-rival and non-excludable (e.g., national defense)
    - Markets underprovide due to free rider problem
    - Government provision can correct this, but may crowd out private provision
  - **Information Asymmetry:**
    - **Moral Hazard:** Insured parties may change behavior in riskier ways, raising costs for insurers
    - **Adverse Selection:** Those most likely to need insurance are most likely to buy it, raising average costs and potentially destabilizing the insurance market
- **Key takeaway:** These failures justify a policy role for government intervention, but each comes with design tradeoffs and implementation

Market failures: externalities and public goods

- Externalities: private costs/benefits differ from social costs/benefits
  - Thus, market equilibrium is not efficient (private MRS $\neq$ social MRS)
  - Government can solve this through taxation, cap and trade, or regulation – each has different pros and cons
- Public goods: non-rival and non-excludable
  - Thus, market equilibrium underprovides public goods due to free riders
  - Government can solve this by providing public goods, but crowds out private provision
- **Key takeaway**: strong case to be made for government involvement in these markets

Market failures: insurance

- Risk averse/neutral people buy insurance to smooth consumption against adverse shocks
- **Actuarially fair insurance**: insurer earns zero profit; consumers fully insured and pay premia equal to expected payout
- Moral hazard: once insured, people change their behavior to be riskier
  - Thus, insurers charge higher premia and fewer people buy insurance
  - Gvernment has tricky role: tries to balance incentives with social insurance
  - Hassle mechanisms and in-kind support are imperfect policy fixes
- Adverse selection: people with higher risk more likely to buy insurance
  - Premia based on average risk; low-risk people priced out
  - Marginal cost below average cost, so $MC = p$ leads to firms exiting market; supply curve is AC and downward sloping
  - Government can (ideally) solve this by mandating insurance
- **Key takeaway**: government role in insurance markets depends on type of information asymmetry
- **Policy puzzle:** Hard to balance adverse selection fixes (expanded enrollment) with moral hazard concerns (insured take more risks)

Einav-Finkelstein and Rothschild-Stiglitz

- **Adverse selection:** People with higher expected health costs are more likely to buy insurance, which can destabilize insurance markets.
- **Rothschild-Stiglitz (1976):** Classic model showing adverse selection can lead to **separating equilibrium**:
  - Insurers offer contracts that attract different risk types (extensive margin: who buys insurance)
  - Only highest-risk people fully insure, lower-risk people underinsure; some may be left uninsured
  - The market "sorts" people by willingness to pay for coverage
- **Einav-Finkelstein:** Emphasize the **extensive margin** (who buys coverage):
  - Even with everyone insured (mandate), people who expect greater health costs buy more generous plans
  - Adverse selection shows up as higher demand for more coverage among higher-cost people, shifting the "intensive" rather than "extensive" margin
- **Key difference:**
  - Rothschild-Stiglitz: focus is on *how much* coverage is chosen (intensive margin)
  - Einav-Finkelstein: focus is on *who* buys coverage (extensive margin)

Final exam fast facts

- The exam will be 80 minutes and cumulative
- You will have a calculator, but that math will be simple
  - Some of you have submitted some extremely tricky arithmetic (e.g. why in the world would you suggest that a question wih a 27% income tax rate?)
- You can use front and back of one 8.5x11" sheet of paper with notes, equations, etc.
- When questions have multiple parts, check to see if I am giving you bread crumbs to the next part (don't redo work!)
- You need to memorize relatively little for this exam
- Instead, you will need to understand and apply the tools we've learned
- When studying, think about how content links back to big themes:
  - Excess burden of taxation: measured as a deviation from Pareto efficiency
  - Market failures and government's role in solving them
  - Equity vs. efficiency: tradeoffs in taxation

Questions?