UNILAB NETWORK

HANDOUT OF

PUBLIC FINANCE

1st PARTIAL

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This handout has been written by students with no intention to substitute the University official materials. Its purpose is to be an instrument useful to the exam preparation, but it does not give a total knowledge about the program of the course it is related to, as the materials of the university website or professors.

GENERAL CONCEPTS

The 4 questions of public finance

1. **When should the government intervene in the economy?**

1st fundamental theorem of welfare economics: competitive equilibrium is the most efficient outcome for society → only two reasons for intervention: market failures impede efficiency; redistribution of resources for equity principle. Problem: equity – efficiency trade-off. A Pareto efficient (perfect competition) market would require no intervention.

2. **How might the government intervene?**

Government can tax or subsidize private sale or purchase, restrict or mandate private sale or purchase, act on public provision or finance publicly private provisions, and lastly it can exploit its regulatory role.

3. **What is the effect of interventions on economic outcomes?**

Direct effects can be predicted if individuals don't change their behavior in response to interventions, while indirect effects arise from change in behavior of individuals in response to interventions.

4. **Why do governments choose to intervene the way they do?**

Governments do not always efficiently and face enormous challenges in figuring out what citizens want. Political economy: theory of how political process produces decisions that affect individuals and the economy.

Facts on government:

Government spending is financed through taxes or debt.

Trends in public spending: it grew from the end of 19th century; it is lower in low-income countries both as a share of GDP and in per capita terms and it is less focused on social protection; public financing of private provisions is widespread.

Trends in taxes: with development, states have increased their level of taxation; developed countries collect larger shares of national output relying on income and corporate taxation, while developing countries rely on taxes on consumption; political institutions affect fiscal capacity for compliance and efficiency of tax collection mechanisms; income tax rates have declined as a response to globalization; the importance of consumption taxes has increased in developed countries.

Government spending and Tax revenues: when revenues exceed spending, there is a budget surplus, if the contrary happens, we are in a budget deficit. Deficit adds itself to the stock of government debt, financed by borrowing from citizens.

Distribution of spending: public goods and social insurance programs.

Distribution of revenue sources: individual tax income, corporate tax revenues, payroll taxes, taxes con consumption (indirect taxes= sales taxes, VAT and exercise taxes).

MICRO REVIEW

Theoretical tools: set of tools designed to understand the mechanics behind economic decision making.

Utility function: mathematical function representing an individual's set of preferences on different bundles. Constrained utility maximization: process of maximizing the utility of an individual subject to budget constraint.

Models: Mathematical or graphical simplified representations of reality.

Indifference curves: graphical representation of bundles that make an individual equally well-off, they are always downward sloping, consumers prefer higher indifference curves.
Marginal utility: additional increment to utility obtained by consuming an additional unit of a good, follows the non-satiation principle and principle of diminishing marginal utility of consumption.
Marginal rate of substitution: rate at which a consumer is willing to trade a good for another while keeping overall utility constant, it corresponds to the slope of an indifference curve in absolute value.
Budget constraint: mathematical representation of the bundles an individual can afford to buy if the entire income is spent, given the unitary prices of each good.
Optimal choice: maximizes utility given budget constraint, corresponding to higher indifference curve.
Demand curve: the quantity of a good demanded by consumers changing according to price, it can be interpreted as the maximum price consumers are willing to pay to buy an additional unit of good.
Elasticity of demand wrt price: ratio between the % change in quantity and in price
Aggregate demand for private goods: sum of quantities demanded at various prices by all consumers (horizontal sum of individual demands).
Supply curve: quantity that each firm is willing to supply at each price to maximize profits. It reflects marginal costs of production for one additional unit. Profit maximizing quantity equates marginal revenue and marginal costs.
Market equilibrium: perfectly competitive market satisfies both demand and supply, maximizing social surplus (sum of consumer and producer surplus).
Equity: social welfare concerned with distribution.
Rawlsial social welfare function (Maxmin): maximizing the utility of the individual with the lowest utility in society.
Bentham Social Welfare Function: neutral from an equity perspective, government can maximize welfare by increasing the endowment of any individual.

EMPIRICAL TOOLS

Empirical tools: set of tools designed to analyze data and answer questions raised by theoretical analysis.
Difference between correlation and causation:
Correlated: two economic variables that move together
Causal: the movement of one economic variable causes the movement of the other.
Randomized trials
The ideal type of experiment to test causality as random assignment rules out reverse causation.
Treatment group: set of individuals subject to an intervention being studied.
Control group: set of individuals comparable to the treatment group who is not subject to treatment being studied.
Treatment and control group differ only by treatment, with no selection.
Bias: any source of difference between the groups is correlated with the treatment buy not caused by it.
Randomize trials eliminate bias.
Problems: results are valid for the sample, not population as a whole. Individuals may suffer from attrition (reduction in the size of sample over time, if not random leads to bias); there Is also a moral issue on the random assignment of benefits, and the problem of the Hawthorne effect (behaviors change when individuals know they are part of an experiment).
Randomized data are not usually available, so researchers rely on observational data, being generated by observation of individual behavior in the real world (with pervasive bias).
Time series analysis: used to identify and measure correlation, it does not exclude causation, it is the analysis of comovement of two series over time.
Cross-sectional regression analysis: measures the relationship between two or more variables exhibited by many individuals at one point of time.
Panel analysis: takes the same group at the same point in time several times.

Control variables: included in cross-sectional regression models to account for differences between treatment and control groups that can lead to bias.
Quasi-experiments: economic changes that create nearly identical treatment and control groups for the effect of such changes, creating randomization. Experiments give the reduced impact of some policies but do not explain why the policy works; structural estimates are built on features that drive individual decisions; it implies reduced form estimates, meaning measuring the total impact of an independent variable on a dependent one, without decomposing the source of that behavior in terms underlying utility functions.
Difference in Difference Estimators: quasi-experimental designs, it is the difference between the changes in outcomes for the treatment group and the control group, if there is a difference in the differences, we cannot be certain that we have purged all biases.
Intuitive approach: given the experiment, most of the bias has been removed.
Statistical approach: use alternative or additional control groups to confirm that bias has been removed.
Limitations of randomized trials and quasi-experimental approaches: they both provide an estimate of the causal impact, such that we can't extrapolate from a particular change in the environment to model all possible changes in the environment. They can tell us how outcomes change but can't tell us why.

EXTERNALITIES

Assumptions behind Market Efficiency

1. The welfare of each consumer depends solely on his consumption decision.
2. The production of each firm depends only on its own input and output choices.

In reality, the market is affected by external effects from the action of other agents.
Externality: it arises whenever the actions one party make another party worse (negative externality) or better off (positive externality), yet the first party is not affected by such impact.
Externalities are an example of market failure.
Externalities matrix: positive-negative/ consumption-production
Negative production: SMC> PMC where SMC= PMC+MEC → overproduction (shift in supply) → tax (Pigouvian tax)
Positive production: SMC < PMC where SMC= OMC -MB → underproduction (shift in supply)
Negative consumption: SMB< PMB where SMB= PMB -MD → overconsumption (shift in demand)
Positive consumption: SMB > PMB where SMB= PMB+EMB (external marginal benefits) → underconsumption (shift in demand)
SMC= social marginal cost SMB= social marginal benefit
PMC= private marginal cost PMB= private marginal benefit→ direct effect to consumers consuming extra unit of a good by the consumer
MD= marginal damage MB= marginal benefit MEC= marginal external cost
Solutions to externalities:

- Internalizing the externality: leading price to the party who generates the externality.
- Private solutions: market solves the issue via private transactions →Coase theorem.
- Public solutions: price-based government intervention→Pigouvian taxes and subsidies.

Coase theorem: either the party creating the externality has the right to do so, or the party affected has the right to ask for compensation; parties can bargain between them without bearing additional costs, therefore agreements between parties can lead to social optimum.
Problems: assigning the blame and the amount of damage, holdout due to shared ownership, free-riding, transactional costs.
Pigouvian tax (or subsidy): taxes can be applied onto agents creating negative externalities, and they are calculated so that at the primum, PMC includes MD→ PMC=SMC, tax= MD, the same works for subsidies and MB, government can give the producer a subsidy for each unit that is not produced. E.g., tax credit as an incentive for private donation to museums and cultural institutions (Italian art bonus), tax credit = min (65%D; 15%Y) Y= taxable income D= donation

PUBLIC GOODS

Pure public goods: non-rival in consumption and non-excludable, they are rare.
Impure public goods: satisfy the conditions to some extent.

- Excludable and rival= private goods
- Excludable and non-rival = club goods (cable tv)
- Non-excludable and rival= common resources (public parks, roads)
- Non-excludable and non-rivals= public goods

Market efficiency: producer marginal cost = consumer marginal benefit → pure public goods are produced at the PC sub-optimal market equilibrium.

Optimal provision of private goods

From individuals to aggregate demand with no market failures:
Aggregate demand= SMB (from consumption)
Market supply curve= SMC
At private market equilibrium: D=S → SMB=SMC → consumers demand different q at same p
Mathematical representation:

- Demand side: individuals' optimal choice: tangency between indifference curve and budget constraint
- Supply side: goods are produced until MC= MR (in PC market = price)

Optimal provision of public goods

Quantity consumed for public goods is by definition the same, therefore, the aggregate demand is equal to the sum of prices that every consumer is willing to pay for that quantity.
Mathematical representation:

- Demand side: MRS of the public good (x) wrt the private good (y) → SMB= MRSx + MRSy
- Supply side: SMC

Problems with private supply of public goods

Private suppliers will encounter free-riding problems in presence of non-rival and non-excludable goods → private entities are incentivized to free ride on each other to pay costs of services. Private provision of a public good leads to underconsumption of the good with respect to the optimally social quantity (market failure).

Public provision of public goods

Government provision potentially solves the problem of noncontributors.
Crowd-out: as the government provides more of a public good, private sector will provide less.
It can be reduced f government forces non contributors to pay.
Warm glow: interest in contributing will lead to continuous contributions even when the government contributes.
Evidences on crowd-out are mixed and might be biased by the correlation of high government contribution and high income.

The right mix

Contracting out: government retains responsibility of provision but hires private-sector firms to actually provide the public good, or competitive bidding.
Problems: private sector's incentives may not align with public goals → lower public costs and worse outcomes. Also, biffing in contracting out is often far from competitive.

Lindahl pricing

Individuals honestly reveal their WTP and the government charges that amount to finance public goods. Steps:

1. Derivation of individual WTP: government announces sets of tax prices and individuals declare the amount of public good desired for that price.
2. Adding up individual WTP at each quantity (vertical sum) → overall demand curve
3. Government relates the demand curve to the MC curve to solve for optimal public good quantity.
4. Individuals are charged their WTP for that quantity of public good.

It works because the government produces the efficient amount of the public good as MC= total marginal WTP → equilibrium. It also exemplifies benefit taxation, where individuals are taxed according to their valuation of the benefit received.
Problems:

- Preference revelation problem: incentive to free ride by understating true WTP → quantity and taxes both decrease.
- Preference knowledge problem: individuals may not know their valuation of public good
- Inequity: individuals with lower income but greater need of a good will pay more than individuals with higher income but low need, in relative and absolute terms.

Lindahl pricing required unanimous consent to implement the public good, if unanimity cannot be reached → voting → majority voting.

POLITICAL ECONOMY

It is the field of economics that applies economic principles to the analysis of political decision-making.

Majority voting

Requirements:

- Dominance: if one choice is preferred by all voters, the aggregation mechanism must be such that this choice is made by society
- Transitivity: if a> b and b>c → a>c
- independence of irrelevant alternatives: if one choice is preferred to another , the introduction of a third independent choice will not change the ranking.

Condorcet voting

We have 3 alternatives (A, B, C) and 4 types of voters (alfa, beta, gamma, delta), voters will vote sequentially each pair to reach a Condorcet winner.
Cycling: when majority voting does not deliver a consistent aggregation of individual preferences.

Arrow's Impossibility Theorem

There is no social decision rule that converts individual preferences into a consistent aggregate decision without either restricting preferences (only certain rankings are considered acceptable) or imposing dictatorship.

- single-peaked preferences: single local maximum and utility falls as choices move away from it, so the utility of individuals is increasing when approaching the preferred option.
- double peaked (bimodal): transitivity falls, B>A>C>B (voting cycle)

The median voter theorem

If there is an odd number of voters and the preferences of all voters are single picked, there will always exist a Condorcet winner and it corresponds to the median voter.
In the real-world citizens vote their representatives that will vote upon public policies. The theorem explains why democratic systems converge to moderate positions.

Agenda manipulations explain the importance to have representatives being presidents for parties. If the key assumption is that politicians only care about maximizing their votes, they will end up enacting the median voters' preferences.
Potential inefficiency: majority voting does not recognize intensity of preferences.
Median voter model relies on six assumptions:

1. single-dimensional voting: votes based on one single issue, representatives are elected on a bundle of issues → different electors are at different points of the voting spectrum on different issues, so appealing to one end of it may be vote-maximizing.
2. only two candidates: there is always an incentive to move in response to your opponent.
3. no ideology: if the goal is maximizing votes, ideology could move politicians from the center of the specter.
4. no selective voting: all people are affected by public goods vote.
5. no money: it is a tool of influence, as it may serve to long-run interest.
6. full information: voter knowledge of the issues, politician knowledge of the issues, politician knowledge of voter preferences.

Lobbying

The expending of resources by certain individuals or groups to influence a politician. It helps convey intensity of preferences and can help inform politicians ant the electorate about issues. It is linked to the problems with the median voter model.
Lobbying suffers from free riding as many bills benefit small numbers of people, harming the rest, but these small groups are more able to organize to lobby, favoring the passing of inefficient bills.

OPTIMAL FISCAL FEDERALISM

Federal systems divide activities between national and local governments.
Optimal fiscal federalism: which activities should take place at which level of government.
In the US, state and local spending have declined considerably, being now supported by intergovernmental grants, i.e., payments from one level of government to another.
Primary factors behind the changes in government spending in the US (larger total government spending, decline in local and state spending):

1. 10th amendment → limiting federal power.
2. 16th amendment → income taxes on citizens
3. New Deal programs of the 30s in response to Great Depression
4. Social insurance and welfare programs

State and local governments spend on education, healthcare and public safety. State governments use sales and income taxes, while local governments use property taxes, comprising half od local government revenue
Federal government spends on healthcare, social security and national defense.

The Tiebout Model

The private market provides the optimal amount of private goods.
Tiebout's insight: shopping and competition are missing in the market for public goods; when public goods are provided at the local level, competition arises: individuals can vote with their feet (threat of exit) which can induce efficiency.

The Formal Model

Competition across towns can lead to the optimal provision of public goods.

Towns determine public good levels and tax rates, while people move freely across towns, so people with similar tastes end up together paying the same amounts of taxes for the same public goods. There is no problem of preference revelation and no free riding as everyone pays the same amount in each town (lump-sum tax). Preference aggregation is solves as everybody in each town wants the same amount of public good. Lindahl pricing works within each town.

Problems with Tiebout Competition

The Tiebout model lies on assumptions:

- People are perfectly mobile.
- People have full information on taxes and benefits.
- People must be able to choose among towns matching their taste.
- Provision of some public goods requires sufficient scaling or size.
- There are enough towns for individuals to sort themselves according to similar preferences.
- Equal financing for public goods among residents: lump-sum tax (fixed tax independent of the person) which is often unfair or infeasible.

→ the model assumes that public goods have effects only in a given town, without spill overs, but many local public goods have externality or spillover features (police, public works, education). With spillovers, low-tax and low-benefit towns can free ride.
→ house price capitalization: the price of a house incorporates the costs and benefits of living in it, so areas with generous public goods have higher prices.
The model implies that three factors should determine local public good provision:

- Tax-benefit linkages: goods with strong tax-benefit should be provided locally.
- Cross-municipality spillovers: if spillover effects arise, the goods will be unprovided by any locality.
- Economies of scale: these do not provide efficiently public goods for competing local jurisdiction.

Tiebout model predicts that local spending should focus on programs benefitting most individuals with few externalities and relatively low economies of scale.
Local communities should play a limited role in providing public goods that are redistributive, have large spillovers, and large economies of scale.
If tax and benefits are linked, and there are no spillovers or economies of scale, then local public good provision is close to be optimal.

Grants

Main are intergovernmental grants: cash transfers from one level of government to another.
Matching grant: amount tied to the amount of spending that the local community allocates to public good. → income and substitution effect. It acts like a subsidy, rotating out budget constraints, it targets externalities.
Block grant: fixed amount with no mandate on how to spend it. → only income effect. It shifts out entirely the budget constraint, raising spending on all goods → redistribution.
Conditional block grant: fixed amount with mandate to spend it in a particular way. → effect depends on the initial spending (if lower, both effects). It differs from block grant only if the amount is greater than the initial spending.

Conclusions

Central governments collect part of total taxes and spend part of total public spending.
Higher levels of government won't believe in the Tiebout model, as they will redistribute across lower levels of government, through grants picked according to the goal of financing.

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