Summary

-Economic Policy and Public Finance-

Table of contents

Book summary

Chapter 1. Introduction

Public finance = the field of economics that analyses government taxation and spending. Also, it analyses what these government activities ought to be, influences by ideological views:

a) **Organic view of the government**: society is a natural organism. Each individual is part of this organism and the government can be seen as its heart. Individuals are valued only by their contribution to the realization of social goals that are determined by the government. The group is at the center stage.

b) **Mechanistic view of the government**: government is a contrivance (apparaat) created by individuals to better achieve their individual goals. The individual is at the center stage.

- **Libertarians**: very limited government, against a further economic role for the government.
- **Social democrats**: substantial government intervention is required for the good of individuals. Individual freedom is more than the absence of physical coercion. They are pro paternalism: behaviour by a state which limits some person or group's liberty or autonomy

A common approach is to measure the size of government by annual expenditures. Types:

1. Purchases of goods and services.
2. Transfers of income to people, business or other governments.
3. Interest payments to its creditors.

When the government is a debtor and prices increase, inflation, changes in the real value of the debt may be an important source of revenue.

Question: during 2011, inflation is 3.6%, national debt UK is £940 billion. What are the implications of these facts for measuring government revenues in the UK during 2011?

Answer: At the beginning of the fiscal year, the government's outstanding debt is £940 billion. The inflation rate in the UK of 3.6 reduced the real value of the government's debt by £33.84 (£940 billion * 0.036). This is a revenue for the government of the UK.

- But with Dutch pension funds, it is troublesome when interest rates are low. Low interest rates mean that benefits will not be increased/indexed, contributions have to increase etc.
- Inflation is either a burden or a benefit, depending on the actor in the economy.

Chapter 4. Public goods

Pure public good = a commodity that is nonrival and nonexcludable in consumption, like defence.

Private good = a commodity that is rival and excludable in consumption, like pizza.

Impure public good = a good that is rival and/or excludable to some extent, like lighthouse that only works for ships that have a special receiver, or a scenic view: quality decreases with more people.

Aspects of the definition of public good:

• Even though everyone consumes the same quantity of the good, it need not be valued equally by all.
• Classification as a public good is not an absolute. It depends on market conditions and the state of technology (impure public goods).
• A commodity can satisfy one part of the definition of a public good and not the other.
• Some things that are not conventionally thought of as commodities have public good characteristics, like honesty, fairness of income distribution or some types of information.
• Private goods are not necessarily provided exclusively by the private sector.

- Government provision of a good does not necessarily mean that it also must be produced by the government. E.g. garbage collection that is done by a private firm.

Horizontal summation = creating market D curve by summing QD's by each individual at every P.

Vertical summation = creating an aggregate demand curve for public goods by adding the P each individual is willing to pay for a given Q of the good.

Pareto efficiency equilibrium in a competitive market with private goods: $MRS^A_{fa} = MRS^B_{fa} = MRT_{fa}$

- Each individual has the same MRS but people (A and B) can consume different quantities (of the goods f and a) (horizontal sum,). Everyone sees the same P and decides Q they want.

Equilibrium of public goods: $MRS^A_{ra} + MRS^B_{ra} = MRT_{ra}$

- Everyone consumes the same Q but people can have different MSs (vertical summation). Everyone sees the same Q and people decide what P they are willing to pay.
- **Free riders:** problem in achieving efficiency. Therefore, the private market is unlikely to provide nonrival goods efficiently. Solution could be **perfect price discrimination**.

Public versus private provision (e.g. protection, education, libraries, etc.)

- The less expensive sector (regarding wage and material costs) is preferred for efficiency.
- Administrative costs can be spread with public provision and not with private provision.
- Diversity of tastes implies that private provision is more efficient.
- **Commodity egalitarianism**, the idea that some commodities ought to be made available to everybody, help explain the wide appeal of things as public education and medical care.

Public versus private production

- Private producers have profit incentives, thus aim at lower costs: more efficient.
- Central argument against private: private contractors produce inferior products and contracts can never be complete.
- Argument against this argument: competition and reputation reduce inefficient costs.

Chapter 5. Externalities

Externality = a cost or benefit that occurs when the activity of one entity directly affects the welfare of another in a way that is outside the market mechanism. Externalities can be produced by consumers as well as firms, they are reciprocal in nature, they can be positive and public goods can be viewed as a special kind of externality.

See graph p. 76. When externalities exist, private markets do not necessarily produce the socially efficient output level.

- When a good generates a negative externality, a free market produces more than the efficient output. Because the marginal social cost are higher than the marginal private cost, the optimal market point MPC=MB is higher than the optimal societal point MSC=MB.
- In graph 5.2, if output is reduced to the efficient output level for society, the polluter loses a smaller area than the gain to society. So this is a net gain.
- This implies that in general, zero pollution is not socially desirable.

Coase theorem: under the important assumptions:

1. The costs to the parties of bargaining are low.
2. The owners of resources can identify the source of damages to their property and legally prevent damages.

The efficient solution will be achieved *independently* of who is assigned the property rights, as long as *someone* is assigned those rights. This implies that once property rights are established, government intervention is not required to deal with externalities.

One way to deal with an externality is to *internalize* it by combining the involved parties.

- For instance, if the polluter and pollute firms went to merge, the externality is taken into account by the party that generates the externality = the externality is internalized.
- If they were to coordinate their activities, the profit of the joint enterprise would be higher than the sum of their individual profits when they didn't coordinate.
- Unlike firms, individuals cannot merge to internalize externalities. However, social conventions/moral principles induce people to empathize with others, and hence internalize the externalities their behaviour may create, to correct for the absence of missing markets.

Pigouvian tax = a tax levied on each unit of a polluter's output, equal to the amount of marginal damage it inflicts *at the efficient level of output*.

- P. 85. The tax raises the effective marginal cost of the polluter so that MPC are shifted up by the tax distance. The new MC=MB point lies therefore at the efficient social output.
- Compensation to the victim of the externality is not necessary to achieve efficiency and will likely lead to inefficiency (victims will then consume more than is efficient).
- However, in practice, it will be difficult to find the correct tax rate.

Subsidy for the polluter not to pollute.

- A Pigouvian subsidy for each unit the polluter does not produce, shifts up his private marginal cost curve by the amount of the per-unit subsidy (p.86).
- Therefore, at the original point: (MPC + subsidy) > MB, so that the polluter decreases its production to the efficient level of output.
- Problem: the subsidy leads to higher profits, which attracts new firms. The subsidy may cause so many new firms to relocate that total pollution could increase.

With the tax, the polluter pays a tax equal to Q* * tax rate.

With a subsidy, the polluter receives a payment equal to $(Q_1 - Q^*)$ * subsidy per unit.
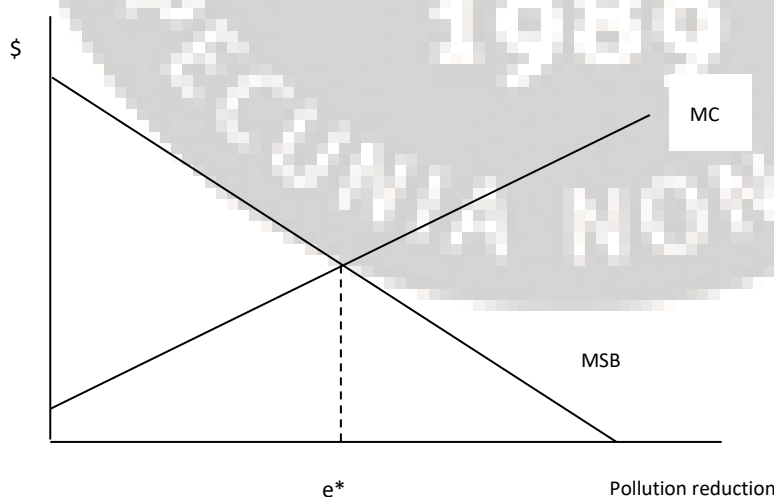
This figure on the previous page shows the annual pollution reduction on the horizontal axis.

MSB: the MSB of victim(s) for each unit of pollution that is reduced. The curve is downward sloping because the victim becomes worse off at an increasing rate for each additional unit of pollution.

MC: MC to the polluter of reducing pollution. It's upward sloping because the cost of reducing pollution (e.g. new technology, reducing output, cleaner inputs) increases at an increasing rate.

The polluter has no incentive to reduce pollution and will be at point 0.

Efficient outcome is e*: MC = MSB. The government has three approaches to attain e*: emissions fee, cap-and-trade, and command-and-control regulation.

Incentive-based regulations = emissions fees and cap-and-trade systems, because they provide polluters with market incentives to reduce pollution by increasing opportunity costs of polluting. Polluters are flexible in how to reduce their emissions, and in who reduce pollution.

Emissions fee = a tax levied on each unit of pollution (instead on each unit of output).

- Suppose the government levies an emissions fee that charges f* for each unit of pollution, where f* (horizontal line, p.88) is the MSB of pollution reduction at the efficient level e*.
- The polluter's tax bill goes down by f* for each unit of pollution he cuts. If f*>MC, he reduces pollution, so the polluter cuts pollution until e*.

With more number of polluters, *the total cost of emissions reduction is minimized only when the marginal costs are equal across all polluters*.

Cost effective = a policy that achieves a given outcome at the lowest cost possible.

- P. 90. With a tax of f', each polluter sets its pollution reduction where f'=MC.
- The polluter with the higher MC sets its pollution reduction at a lower point than the polluter with the lower MC. Therefore, the polluter with the lowest pollution reduction has to pay more taxes. This makes the outcome still equitable.

The key advantage of an emissions fee is that it achieves pollution reduction at the lowest possible cost. For *any* emissions free, the MC of reduction is the same for each polluter = cost-effective.

- Whatever the reduction, the fee achieves it at the lowest cost possible.

Cap-and-trade = a policy of granting permits to pollute. The number of permits is set at the desired pollution level, and polluters may trade the permits.

- Polluters sell permits to each other until MC's are equal = cost-effective outcome (p.92).
- The same pollution reduction would occur no matter how the government initially allocated the permits between the polluters. It does affect the income distribution, as each of them would like to be sellers of permits rather than buyers (this is an example of Coase Theorem).

Practical differences between an emissions fee and a cap-and-trade system:

- Inflation lowers the real emissions fee, leading to less pollution reduction. The advantage of cap-and-trade is that no legislative or regulatory action is needed; the adjustment takes place automatically, whilst the fee must be adjusted each year for inflation.
- With the emissions fee, pollution reduction decreases as MC increase. With cap-and-trade, pollution reduction is constant as MC increase, but this could impose higher costs on the polluters. Neither system automatically leads to an efficient outcome when MC change. Solution: **safety valve price**: a price set by the government at which polluters can purchase additional permits (very high price) beyond the cap within a cap-and-trade system.

A cap-and-trade system is preferable to an emissions fee when MSB are inelastic and costs are uncertain. This is because the too much pollution reduction with a cap-and-trade system is lower in absolute terms than the too little pollution reduction with an emissions fee (p.95).

If marginal costs are uncertain, an emissions fee is preferable to a cap-and-trade system when MSB are elastic. This is because the too much pollution reduction with a cap-and-trade system is higher in absolute terms than the too little pollution reduction with an emissions fee (p.96).

Command-and-control regulations = policies that require a given amount of pollution reduction with limited or no flexibility w.r.t. how it may be achieved. Variety of forms:

a) **Technology standard** = requires firms to use a particular technology to reduce their pollution. Generally they are not cost effective.
b) **Performance standard** = sets an emissions goal for each individual polluter and allows some flexibility in meeting the goal. However, the burden of reducing pollution cannot be shifted across firms. It is more cost effective than a tech. standard but it's not very cost effective.
- A command-and-control approach is preferable to an incentive-based system only when emissions cannot/are too expensive be monitored.
- Another potential problem with incentive-based regulation is that they can lead to **hot spots** = areas with relatively high concentrations of emissions.

Spillover effects can also be positive: positive externalities (p.103).

- An individual firms will set its quantity where MC=MPB.
- However, MSB = MPB + MEB (marginal external benefit).
- Efficiency: MC = MSB. But this is less than the individual firm's quantity, so the market underprovides the activity or good.

A positive externality can be corrected by a Pigouvian subsidy, equal to the MEB at the optimum.

Chapter 6. Political Economy

Voting procedures

- Unanimity
- Majority (direct/rank-ordered)
- Median Voter Theorem
- Logrolling
- **Arrow's Impossibility Theorem**

Unanimity Rules – Lindahl Model

- Society demand a public good (r).
- Demand depends on the share of costs borne by member. The rockets must be paid by taxes.
- → Vote on the distribution of tax shares.
- → Provision of public good determined by unanimity.

Lindahl prices = the tax shares an individual must pay per unit of public good. At equilibrium is a set of Lindahl prices such that at those prices each person votes for the same quantity of public goods. –

- p.110: both parties agree that r* rockets should be provided.

Through a bargaining process, similar to perfectly competitive markets, society will agree on a quantity of public goods provision.

1. Outcome is efficient. Because the marginal benefit from each rocket is the same as the costs they incur per rocket.
2. Each member of society pays a personalized price (Lindahl price).

We have Eve and Adam.

Demand curve: the more you have to pay off the rockets, the less you demand. And vice versa.

They vote on the distribution of the tax share and they vote on the provision of the public good. And this must be unanimity: they both have to agree on it.

If Adam prefers more rockets than Eve, than it is intuitive that Adam pays a higher share of the taxes → each member pays a personalized price.
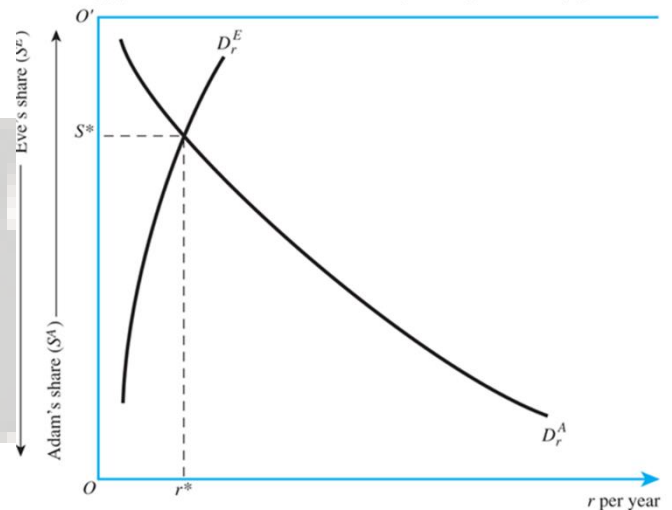
This implies that if you have unanimity vote, then any outcome of the voting procedure should be optimal. This is basically the Coase Theorem. But we know this doesn't hold always, because of transaction costs. When we do this in the whole society, we have to find unanimity in the whole society, and this is not feasible.

This model is not useful in actual elections. We mostly use majority voting rules in real life.

Majority Voting Rules = One more than half of the voters must favor a measure for approval.

Direct = person having most votes will win the election.
For example: -Dutch Parliamentary Elections.
-U.S. Presidential elections (incl. primaries).

Rank-ordered/Preferential Voting = you list your candidates in terms of preferences. You list multiple people, e.g. you prefer Sanders and then Trump. If nobody wins the first round, then the person with the least votes is eliminated. When this was your first person, your second vote counts. This process continues until one person has the majority of the votes.
For example: -Australian Parliamentary Elections (single transferable vote).

Table 6.1 – Direct

- People have first, second and third preference.
- A single round majority vote will yield no result. Brad votes A, Jen C and Angelina B, so we have a three-way tie.
- Multiple rounds of pairs yield B. Rank-ordered/preferential voting results in B, because A is no once second preference. If we corporate the second preference, B wins.

Table 6.1 Voter Preferences That Lead to an Equilibrium

Choice	Voter		
	Brad	**Jen**	**Angelina**
First	A	C	B
Second	B	B	C
Third	C	A	A

Table 6.2 (change in preferences) – Direct

- No winner from direct three-way election. Because there is A, B, C in first choice.
- No winner in multiple rounds – **Voting Paradox.**

    If we pair up A and B, B and C, A and C, you see that preferences are in a vicious cycle. The individual preferences are clear. But the community preferences are not ordered.

    Voting paradox = with majority voting, community preferences can be inconsistent even though each individual's preferences are consistent. P. 111 table 6.2.

    Problems arise when a voter has double-peaked instead of single-peaked preferences: when a voter moves away from his most preferred outcome, utility goes down but then rises again, instead of that "utility consistently falls.

- A Voting paradox may give rise to **Agenda Manipulation** = the process of organizing the order in which votes are taken to ensure a favorable outcome. Or **Cycling** = when paired majority voting on more than two possibilities goes on indefinitely without a conclusion ever being reached.

    When Brad wants A to win, he wants to pair up B and C so that B wins, and then when A and B are paired up, A wins. And Jen and Angeline would do this so that resp. C and B win. You can manipulate the elections so that your preferred one will win the election.

Table 6.2 Voter Preferences That Lead to Cycling

Choice	Voter		
	Brad	**Jen**	**Angelina**
First	A	C	B
Second	B	A	C
Third	C	B	A

Why did the second election fail and the first succeed?

➔ **Peaks**

Graphical representation of preferences (6.2):

- **Peak** = preference at a point where neighboring points are lower.
- **Single-Peaked** is the case for Brad / **Double-Peaked** is the case for Jen.
- ➔ When all preferences are single-peaked, no voting paradox occurs.
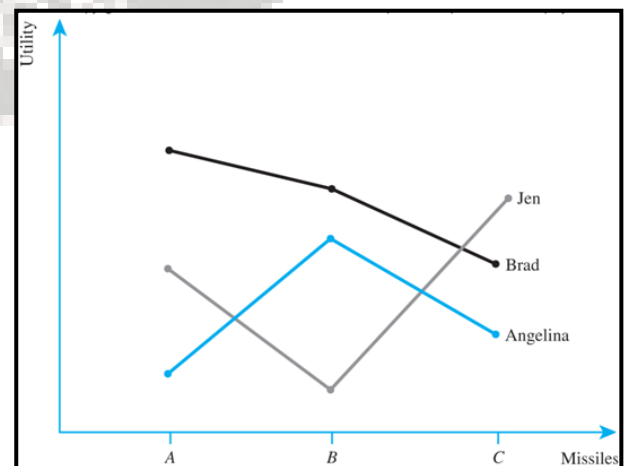
→ *What could be reasons for double-peaked preferences?*

Multipeak

1. Medium option is least attractive.
   - Missiles are only effective in bulk, so we need either a lot or none. You can only win the war with a lot, and it just costs you money when you have a couple of them so then you can just make non to have no costs.
   - Alcohol is expensive here, so I'll either get completely wasted or I'll drink nothing at all.
2. Presence of costly substitute.
   - Public transport should be either completely free or expensive. Free: use car (low taxes); expensive: use public transport (high taxes, great comfort).
3. Multidimensional issues.
   - How to use former room 'Het Gerecht' – (A) silent-study, (B) relaxation/spa, (C) conference-room. There are options that are not substitutable. These are different purposes, but it is not the same as having more or less missiles.

Median voter = the voter whose preferences lie in the middle of the set of all voters' preferences.

Median voter theorem: as long as all preferences are **single peaked**, the outcome of majority voting reflects the preferences of the median voter.
- Applicable to majority voting.
- Draws some empirical evidence. It does hold to some extent, but not every election is characterized by single peaked preference and one-dimensional issue.

Voter	Expenditure
Splinter	$0
Donatello	$50
Raphael	$65
Michelangelo	$120
Leonardo	$175

The person in the center dictates the outcome in the election. In this example, all people want to expend something else on people. The median voter theorem states that the expenditure will be $65. If Splinter expend $0, the rest will all oppose. Then Donatello proposes $50, he gets 2 votes. When Raphael proposed $65, Splinter, Donatello and Raphael know that when they don't accept, they will move more away from their peak. So, the median voter's preference is the outcome. This will also hold when you argue it from Leonardo's point of $175.

Logrolling = trading votes. The trading of votes to obtain passage of a package of legislative proposals. With logrolling, a majority of voters can form a coalition to vote for projects that serve their interests, but whose costs are borne mainly by the minority. Although the benefits of the projects to the majority exceed the costs, this is not true for society as a whole.

- We vote for having a break or not. Student 1 has a utility of 4 when there is a break, whilst student 2 then has a disutility of 2, etc. You see that in total, no break gives a disutility of -9 and a break gives total utility of 1. Having a break is the optimal outcome.
- Majority vote results in no break. Because 3 people vote for that. Majority vote results not necessarily in an efficient outcome.
- Student 3 can *buy* student 4's vote → efficiency enhanced. He can compensate him buy say 5 utilities, he will still be better off. It must be less than 12. Student 4 then has positive utility,

so he is better off and student 3 as well. We have a break and still have a positive total utility of 1, we just have a redistribution of the utility.

Voter	Break	No break
Student 1	4	0
Student 2	-2	1
Student 3	7	-5
Student 4	-1	1
Student 5	-7	-6
Total Utility (in €)	1	-9

- Standard practice in real politics (PvdA & VVD).
- Coase theorem.

Appeal:

- Minorities are able to pass legislation that they feel strongly about, but the general public does not.
- Cost-effective procedure to pass legislation.
- For example: Culture.

Danger:

- Legislation leading to great losses for the many, reaped by the few.
- (Tabaco, Oil, Agriculture, *Waffelijzerpolitiek*). Tabaco industries lobby and make companies very rich at the expense of the taxpayer. A very small majority buys up votes to get an outcome that is at the expense of the society.
- Waffelijzerpolitiek: in Belgium, when Wallonia has an expenditure, Vlaanderen demands the same expenditure as well and vice versa. Even if e.g. Vlaanderen obtains a new university, Wallonia wants it too whilst it doesn't need it at all.

Arrow's Impossibility Theorem: it is impossible to find a voting rule that aggregates individual preferences to collective preferences in an *ethically* acceptable way.

Any possible procedure goes into ethical ways.

- Arrow's impossibility theorem includes six criteria for a collective decision-making rule in a democratic society (p.116), does not state that it is necessarily impossible to find a consistent decision-making rule, but that one cannot guarantee that society will be able to do so (in general, it is impossible to find a rule that satisfies all six criteria).

We think these are the ethical things:

1. It can produce a complete ranking deterministically (**universality**).

   If we have the election and have it again, the outcome should be the same.

2. All theoretical configurations must be possible **(non-imposition)**.

   Regardless of preferences, all possible outcomes must be included as options.

3. It must be responsive to individual preferences (**monotonicity**).

It cannot be that if one prefers a candidate more, he must be more preferred if that person votes, or at least at the same preference, but not drop in the ranking.

4. Results must be **transitive**.

    If A>B and B>C, A>C.

5. Ranks must be **independent of irrelevant alternatives.**

    If we have a certain preference order, and we insert an irrelative preference it must not change the preferences. It you had the option of coffee and tea and you choose coffee, when water is added to the options, it must not be that you prefer tea over coffee.

6. No **dictatorship**

    There must not be a person that dictates the outcome of the election.

- A voting rule *may* produce a decision in accord with the principles, but it does not *necessarily* do so. If you have a system, it doesn't always result in an outcome that inhere to the six principles.
- Democracies are institutionally flawed by definition, not by design. There is some way that the principles will be breached. This is the case of definition not of design.
  - *Could have sub-optimal outcomes as result of multi-equilibria.*

I. Political Economy – Summary

Understand the following:

- Unanimity (Lindahl).
- Majority (direct/rank-ordered).
- Median Voter Theorem.
- **Logrolling** (important for exam).
- Arrow's Impossibility Theorem (know what it means and know the principles).

II. Public Choice

Governing is done by people – politicians, judges, bureaucrats and others.

Like any other agent, these people will maximize their self-interest.

1. Elected Politician.
2. Market for Legislation (Tollison, 1988).
3. Prominent Models.

Median voter theorem

It is economic rationale for the two ice cream cars to move to the middle. You expect that this will result in the ice cream cars standing next to each other.
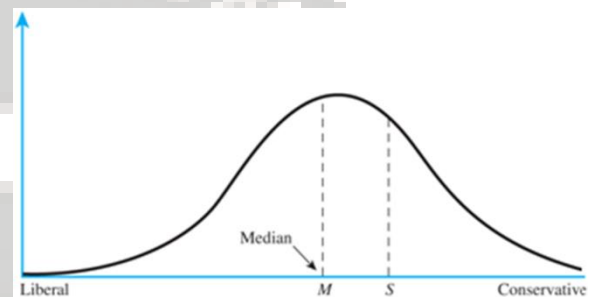
They want to attract most of the people from the beach.
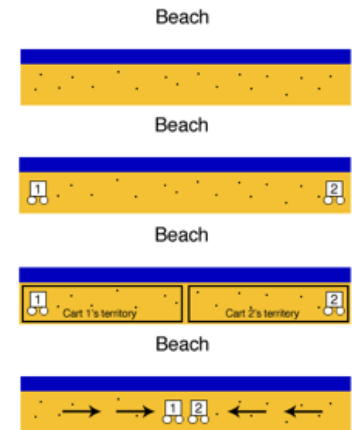
Elected politician

"Candidates in an election adopt vote-maximizing behavior"

- Preferences are one-dimensional.
- Preferences are single-peaked (liberal ←→ conservative).
- Preferences are normally distributed.
- Apply Median Voter Theorem.

A two-party system results in candidates moving towards the "center".

Everyone to the left of M vote for M, to the right of S on S, so M wins. You see this often that when the presidential election approaches, that a candidate that has a clear opinion moves more to the center, like Trump.

Elected Politician: Criticism

- Elections are hardly one-dimensional.
- Multi-peaked preferences. Then even if you have single dimension, you can be in favor
- Personal traits (leadership, personality, stunning looks).
- Information Asymmetry.
- Ideology – deviations from maximization.

Tollison (1988): "Goal of the paper is to understand the legislative process from an economic (e.g. public choice) point of view."

- You don't have to read this paper.
- There is a "Market for legislation", there is Supply and Demand of/for legislation.

Actors in the market for legislation:

a) Interest groups (demand): people who organize themselves to get some legislation or to remove it.
b) Individuals (supply): they pay for it, they supply it, taxpayers.
c) Bureaucrats/politicians/political actors… (broker/monitor): anyone in the government who acts as a mediator between demand interest groups and the individuals, more or less the price mechanism you could say.

Tollison – Demand & Supply

- **Interest group**: An organization of individual citizens that demand the production (or removal) of a certain public good. Special interest groups are groups of people with common interest that can exercise disproportionate power by acting together.
- **Interest group theory** → groups who can organize for less than one dollar of benefits from legislation will be the effective demanders of law.
    - Marginal benefit of organization > marginal cost of organization.
- How to solve for free-rider problem? This hasn't been solved in the literature yet.

Supply: Those who do not find it cost effective to resist wealth transfers.

Broker: the bureaucrat/politician that acts as the market mechanism between the supply and demand of legislation through voting.

Broker ≠ market mechanism.

- Maximizing votes.
- Maximizing profit.
- Brokers are affected by farm companies because he received rents for it.

He behaves rationally, but he is susceptible to Logrolling.

Outcome according to this mechanism: politician will vote for whatever increases his profit, either indirectly (through logrolling or re-election) or directly (rents).

- This actually happened.

Rent Seeking – Special Interest

- **Rents**:
    – Returns to a factor in excess of its productivity.
- **Rents-seeking**:
    – Using the government as a tool to obtain economic rents.
- **Passive**:
   – Exogenous creation of rents (fishing licenses, parking in Amsterdam).

- **Active**:
  - Endogenous creation of rents (peanut example, piece of the moon).
- **Welfare?**
  - With passive rents, there is a redistribution from individuals to government.

If there were no government intervention, Qc would be the equilibrium outcome.

Government gives monopoly rights/cartel rights on the peanut market. The amount will be Qcartel.

There is a deadweight loss of the grey triangle.

With the government, we have producer's surplus. Rent-seeking is that companies demand cartel/monopoly rights and then give some of the rents to the bureaucrats. Government can extract rents into his own pocket. And the companies are then better off as well because they have profits. But the society as a whole loses.
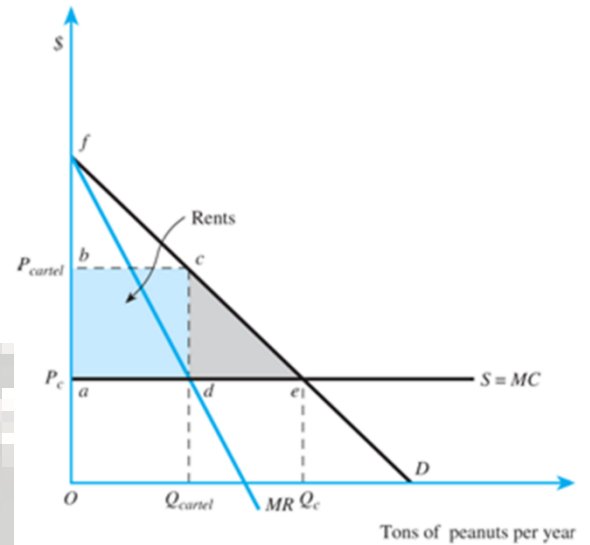
Public Employees/Bureaucrats (Niskanen)

Assumptions:

- **Bureaucrats** seek to maximize self-interest (wages / prestige) by ever-increasing their budget.
- **Public good** has a diminishing marginal benefit (V) – increasing marginal cost.
- **Information asymmetry** between sponsor (politician) and bureaucrat.
  - Bureaucrat can perceive costs & benefits associated with Q.
  - Politicians only perceive Q → public benefit. He doesn't know MC and MB that are associated with the public goods.
- **Division of power** between sponsor (politician) and bureaucrat.
  - Politicians hold procedural power (agenda setting). He chooses the amount of provided public goods.
  - Bureaucrats hold power of knowledge (exploit ignorance). He is trying to exploit the sponsor, the politicians.
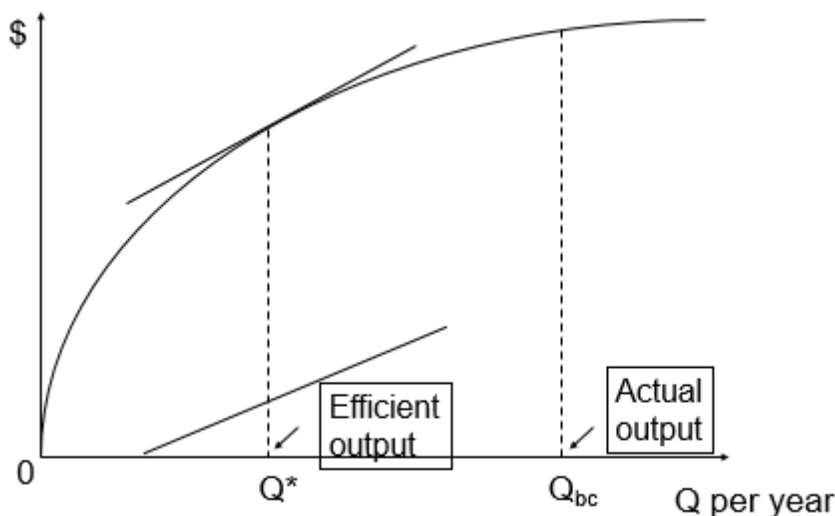
Q^* = optimal provision

Q^{bc} = actual provision (overprovision) (C = B)

Marginal benefits are the curved line, marginal costs are the straight line.

Note: NOT DRAWN ACCURATELY

UPWARD SLOPING COST LINE SHOULD INTERSECT AT ACTUAL OUTPUT

Optimal provision will be where MC=MB, where they are tangent, Q*.

Due to information asymmetry and power of knowledge, the bureaucrat can make the politicians choose where costs are equal to the benefits. That is at Qbc.

The bureaucrat is using his power of knowledge to choose an output that is larger than efficient but maximized his own welfare.

Why do governments grow?

- <u>Niskanen</u>. Bureaucrats try to increase the sizes of their department. In a couple of years, politicians are removed whereas the bureaucrat is still in office. The bureaucrat will have more power of knowledge, so that there is more information asymmetry. Then governments grow because their budgets grow.
- <u>Citizen Preferences</u> (Adolph Wagner's law). As we become richer over time, we demand more public goods like infrastructure, education, better health systems, etc. These become more expensive as well. Government budget increases is a reflection of the preferences of the citizens. Then it is not necessarily a bad thing.
- <u>Baumol's disease</u>. You have a private and public sector. The private sector becomes more innovative, economies of scale etc. It becomes more productive and wages increase in the private sector. But because there is substitutable between workers in public and private sector, wages in public sector increase as well. That means that the government is becoming more cost ineffective and budgets have to increase.
- <u>Chance Events</u> (Peacock/Wiseman). If something happens like an economic crisis, or refugee crisis, we have to make costs that were unseen. Then we start getting used to having this amount of expenditure, so that we do not adjust expenditures to the old level after the war/crisis is over. Budgets increase, no tendency to decrease.
- <u>Economic openness/globalisation</u>. The more globalized, the more open economies, the more we demand from the government. As countries become more open, they tend to have higher government expenditures. Couple of reasons. E.g. losers want to be compensated by the government such as social security, or training. This is controversial because it assumes a causality but the causality could also be the other way round.

Chapter 7. Education

Education is primarily a private good, because it is rival and excludable. It improves students' welfare by enhancing their ability to earn a living and, more generally, to deal with life.

- Possible positive externality: education serves as a powerful force for socialization.
- However, research has shown that increase in education does not have to make a country more democratic. But this is also questionable.

The external benefits of education likely vary by education level. Some argue that college education should be subsidized because it increases productivity. But as long as the earnings of college graduates reflect their higher productivity, there is no externality.

- The commodity egalitarianism view suggests that education should be made available to all citizens regardless of the benefits and costs.

You could draw a budget constraint of a family and their IC, for the trade-off between the quantity of education and the quantity of all other goods (p.137). Suppose a public school opens on a take-it-or-leave-it basis so that families can sent their children either to a public school for a fixed amount of hours per week at no cost for the family, or sent their children to private education. Situations:

- When public education is introduced, it is a fixed amount x. When choosing for this, the family can consume 100% of all other goods. When this point lies on a higher indifference curve, the family chooses for public education = public education crowds out private education. Depending on the place of the IC, the family switches to more or less education than before.
- When it is not the case that a higher IC can be achieved by choosing for public education, the amount of education is unchanged.

The evidence on whether increasing expenditures on public education improves average test scores is mixed. The evidence suggests that marginal increases in education expenditures have very little impact on future earnings. The estimated effect is relatively large for additional spending on younger, disadvantaged children.

Chapter 9. Health care

Social insurance = government programs that provide insurance to protect against adverse events.

- **Insurance premium** is paid by buyers to get insurance when illness occurs.

Expected value (EV) = (probability outcome 1 * pay-out outcome 1) + (prob. Outcome 2 * pay-out 2)

Actuarially fair insurance premium = an insurance premium for a given time period set equal to the expected pay-out for the same time period.

U is the curve of the function between the income and the utility of a person, say Emily.

It has a concave curvature because of diminishing marginal utility.

Emily has an income of $50,000

Insurance is $3000

Health costs are $30,000
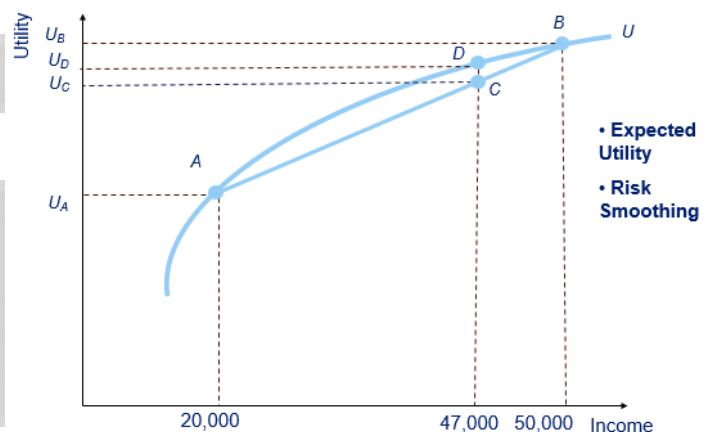
With insurance: EV = 47,000 with certainty

When no insurance:

EV = 9/10 * 50,000 + 1/10 * 30,000 = 47,000 on average

Emily prefers insurance because of the assumption that people prefer more income to less. And diminishing marginal utility means that the pain of losing an extra $ > pleasure of an extra $.

A: Emily is sick, income is 20,000, utility is U_A.

B: Emily is healthy, income is 50,000, utility is U_B.

Expected utility = (9/10) U(50,000) + (1/10) U(20,000)

C: Emily's expected utility when she buys no insurance.

D: Emily buys insurance so that she receives $47,000 for sure.

- Both options give the same EV, but the option with certainty gives higher expected utility.

Risk smoothing = taking action to obtain a certain level of consumption should an adverse event occur. Reducing income in high-earning years in order for protection in C drops in low-earning years.

Whether a person will buy insurance depends on the shape of the utility function U.

The demand for insurance depends on the curvature of U: the more **risk aversion** a person has, the more he/she is willing to pay above the actuarially fair return premium, the greater the curvature.

- E.g. the more curvature: an income of 40,000 will generate the same utility as an income of 47,000 on the straight line. That means the person is willing to pay 10,000 for insurance.
- When the person is not so risk averse, an income of 46,500 on U will generate the same utility as an income of 47,000 on the straight line. This means the person is willing to pay only 3,500 for insurance.

Risk premium = the amount above the actuarially fair premium that a risk-averse person is willing to pay to guarantee compensation if an adverse event occurs.

Loading fee = the difference between the premium an insurance company charges and the actuarially fair premium level.

- By *pooling* the risk across individuals (more people in insurance pool), outcome are more predictable, so the insurance company actually lowers risk from a social point of view.

Asymmetric information → Adverse selection → if an insturance company has less information on the health risks faced by its customers than do the customers, any premium set to cover the average risk level may induce the lower-risks people to leave the market. People who could have benefited from insurance at an actuarially fair rate go without insurance, and indeed, the market may stop functioning altogether as more and more participants opt out as the insurer raises the premium.

- This phenomenon is called **death spiral**.
- Given that most people are risk averse, the low-risk people might still want to buy the insurance coverage, so that the market for insurance would not collapse.

Experience rating = the practice of charging different insurance premiums based on the existing risk of the insurance buyers.

Community rating = the practise of charging uniform insurance premiums for people in different risk categories within a community, thus resulting in low-risk people subsidizing high-risk people.

- Inefficient: some people pay more for insurance than is worth to them, whereas others would prefer to pay more money in order to buy more insurance.
- But it eliminates inequities associated with sorting by health risk.

Moral hazard = when obtaining insurance against an adverse outcome leads to changes in behaviour that increase the likelihood of the outcome.

Deductible = (eigen risico) the fixed amount of expenditures that must be incurred within a year before the insured is eligible to receive insurance benefits.

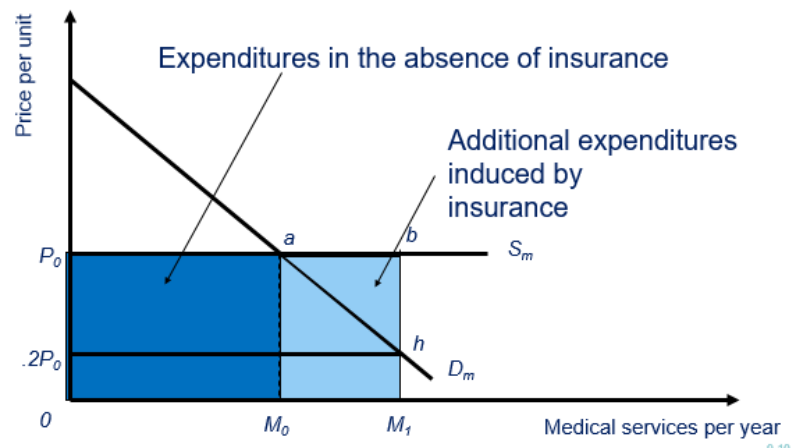**Co-payment** = a fixed amount paid by the insured for a medical service.

Coinsurance = a percentage of the cost of a medical service that the insured must pay.

S_M is horizontal at P_0, the marginal cost of producing medical services.

D_M is the market demand curve for medical services.

Equilibrium where S=D

Total expenditure: $P_0 O M_0 a$.

Introduction of insurance:

Assume 20% coinsurance

Patient confronts no longer P_0 but $0.2P_0$.

Quantity demanded rises to M_1.

Patient spends $O 0.2 P_0 h M_1$ on medical services.

Total expenditures are $P_0 O M_1 b$ with the insurance company paying $P_0 b h 0.2 P_0$.

- Because of the insurance, health care expenditures increase.
- People consume medical services past the point where MB=MC → inefficient.
- → **deadweight loss**: triangle abh = the size of the inefficiency.

Paternalism states that people should be forced into health insurance, and more generally, that health care decisions are too complicated to be left in people's own hands.

- Because people have 'wrong' tastes and/or expectations.

Much anxiety over the state of US health care is due to concern for the uninsured (16%).

The US has much higher health expenditures per GDP than Australia, Canada, France, Germany, Japan and the UK. Over the long terms US's rate of growth in these expenditures has not been much out of line with others. Care costs have been growing rapidly in every country. Possible explanations:

- Market failures such as moral hazard due to the prevalence of third-party payments.
- The aging of the population.
- Income growth.
- Improvements in quality of technology.

Chapter 10. Government and the market for health care (mostly background info)

US: income of wages is taxed, but income in the form of premiums paid by employers for health insurance is not → the federal tax system provides a subsidy to employer-provided health insurance.

The advantages of employer-provided health insurance:

a. Reduce risk by pooling it across individuals.
b. Reduce adverse selection (but it does not eliminate it amongst employees that choose the employer according to its package of insurance benefits and their risk).
c. Lower administrative costs.

Medicare and Medicaid are major government's programs that directly provide health insurance.

Medicare = federally funded government program that provides health insurance to people aged 65 and over and to the disabled. It's a system of government finance of health care, not production of it.

- In US, health care is primarily provided by the private sector.
- Participation in part A, hospital insurance (HI), is compulsory. Participation in part B, supplementary medical insurance (SMI), is voluntary.
- HI is financed by a payroll tax on the earnings of current workers. SMI relies primarily on general revenues for financing, so that there is no issue of its trust fund becoming insolvent.
- Part D is the coverage of drugs (added to medicare in 2006).

Retrospective payment system = payment system, previously used by the Medicare Hospital Insurance program, in which compensation is paid after the care is completed and thus provides little incentive to economize on costs.

Prospective payment system = payment system, currently used by the Medicare Hospital Insurance program, in which the compensation level is set prior to the time that care is given.

Medicaid = federal- and state-financed health insurance program for the poor.

- The federal government provides the state governments with a certain percentage of matching funds to cover the costs, based on percentage of low incomes in the state.
- The federal government's contribution comes from general revenues, not from payroll taxes.
- Public insurance **crowds out** (reduces) private insurance. This happens when people who place a low value on private insurance would obtain free public insurance when available, because the free public insurance gives higher health insurance than their optimal point op private insurance (were IC and budget constraint are tangent).

Goal of US: expanding access to health insurance and controlling the costs of health care.

- Afforable Care Act (ACA) of Obama sought to address these challenges by expanding existing programs as well as by mandating that everyone purchase health insurance.

Alternative paths to health care reform

a. Single-player approach: replace the current health insurance market with a single provider of health insurance. It is funded by taxes and provide all citizens, regardless of income or health status, with a specified set of health care services at no (or low) direct cost to the insured.
    - Pro: lower health expenditures, administrative costs and infant mortality rates.
    - Con: lower access to innovate technologies and higher waiting time for surgery.
b. Market-oriented approach: lower costs and increase access by harnessing the power of competition.
    - Pro: increased competition would lead to lower costs and more innovation.
    - Con: consumers lack the information to make sensible choices. And seriously ill persons might be prices out of the market.

Chapter 11. Social security

Social security provides insurance for disabled and retired workers.

Justifications of social security: adverse selection, lack of foresight and paternalism, moral hazard, economize on decision making and administrative costs, income redistribution and improve the economic status of the aged.

Fully funded = a pension system in which an individual's benefits are paid out of deposits that have been made during his or her working life, plus accumulated interest.

Pay-as-you-go financing = a pension system in which benefits paid to current retirees come from payments made by current workers.

Actuarially fair return = an insurance plan that on average pays out the same amount that it receives in contributions.

N_b: number of beneficiaries, B: average benefit per retiree

t: tax rate, N_w: number of covered workers, w: average covered wage per worker.

Total benefits = total taxes → **$N_b * B = t * N_w * w$**

Average benefit per retiree: **$B = t * (N_w/N_b) * w$**

The implicit rate of return in a pay-as-you-go system is strictly determined by wage and population growth. Assuming t constant, retirees receive a positive return on the taxes they contributed when wages and population increase. Return = wage growth + population growth.

- A rise in t does not lead to a permanent increase in the implicit rate of return.

Social security wealth = present value expected future B payments – PV expected payroll tax paym.

- It is the expected lifetime net benefits from social security.

Life-cycle model = the theory that individuals' consumption and savings decisions during a given year are based on a planning process that considers lifetime circumstances.

- The introduction of a Social Security system can substantially alter the amount of lifetime savings due to the wealth substitution effect, the retirement effect and the bequest effect.

Wealth substitution effect = the crowding out of private savings due to the existence of Social Security, since people view SS taxes as means of saving for future benefits.

- Pay-as-you-go: no increase in public saving → reduction amount of capital accumulation.
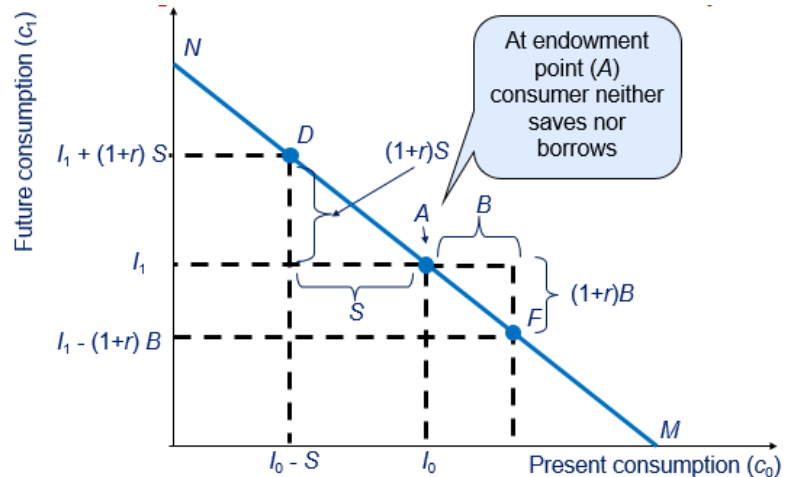
Period 0 (now) and 1 (future).

With income I_0 and I_1

(working and retirement income).

Endowment point is A = the consumption bundle that is available if an individual neither borrows nor saves.

I_0 now and I_1 in future.

When S is saved this period with return r:

$C_o = I_0 - S$

$C_1 = I_1 + (1+r)S$

When B is borrowed this period with interest r:

$C_o = I_0 + B$

$C_1 = I_1 - (1+r)B$

MN shows the trade-off between consumption across time. It is the **intertemporal budget constraint** = the set of feasible consumption levels across time.

- Slope: $(1 + r)$: the cost of \$1 consumption now is $1+r$ \$ of forgone consumption in the future.

Left graph: lines I, ii, and iii, are indifference curves of an individual.

For this individual, point E_1 maximized utility.

C_0* now and c_1* in the present.

Saves $I_0 - c_0*$ now (could be different for different persons)

Right graph: including Social Security.

Assumption implicit return from SS equals the market rate of interest r.

SS tax T moves the endowment point T to the left: tax reduces present consumption.

The program moves the person up by $(1+r)T$: increase in future consumption.

R has replaced A as the endowment point.

Optimal bundle is still E_1: savings is decreased to $I_o^T - c_0^*$.

Persons save less on their own → Social Security crowds out some private savings.

Because a pay-as-you-go system does not channel the taxes into capital accumulation, public saving does not compensate for this reduction in private saving.
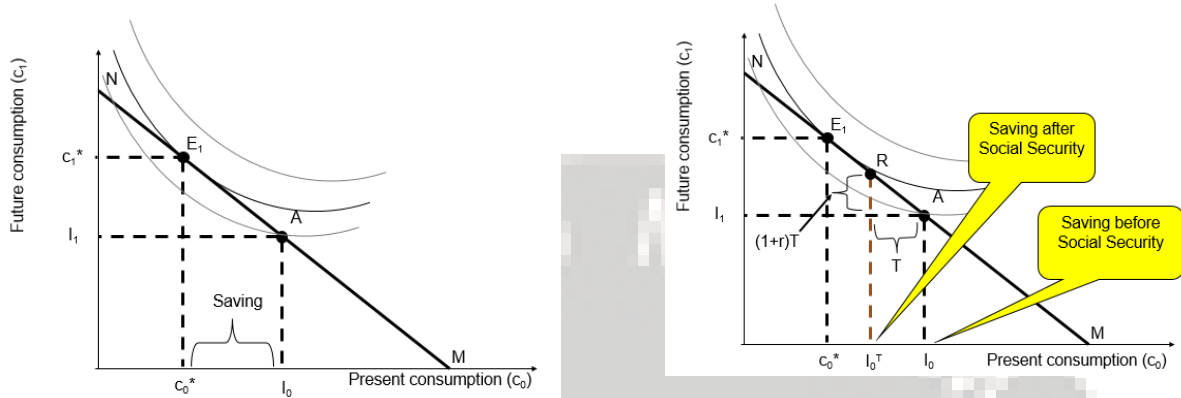
Retirement effect = to the extent that Social Security induces people to retire earlier, people may save more in order to finance a longer retirement.

Bequest effect = theory that people may save more in order to finance a larger bequest to children in order to offset the intergenerational redistribution of income caused by Social Security.

Rearranging of $N_b * B = t * N_w * w$ → $t = \frac{N_b}{N_w} * \frac{B}{w} = dependency\ ratio * replacement\ ratio$

Long-run problems arise because of aging of the population: increasing dependency ratio over time.

- The higher the dep.ratio, the less of workers to support a retiree.

Options:

- Increase covered wages. But wages increase due to productivity growth, due to increases in the capital stock. In US, the saving rate is not enough to cover the increasing dep.ratio.
- Unpleasant options of either increasing the tax rate or decreasing benefits.

Approaches to maintain the Social Security system (the sustainable solvency of it):

a. Raise the payroll tax.
b. Raise the maximum taxable earnings level, so that revenues and benefits would increase.
c. Raise the retirement age.
d. Reducing the cost-of-living adjustment to reduce benefits (adjustments less that CPI).
e. Change the benefit formula to change how B is determined and to reduce B.
f. Privatize the system: allow individuals to invest some or all of their Social Security

    contributions into a personal account. The impact of this depends on how much future benefits are reduces for each dollar redirected into a personal account. Whether privatization would increase saving depends on the structure of the specific plan.

Chapter 12. Income redistribution: conceptual issues

Poverty line = a fixed level of real income considered enough to provide a minimally adequate standard of living.

Standard measures of income distribution and poverty levels provide some useful information, but they should be interpreted cautiously. Because a person's income during a given period consists only of the family's cash receipts and not in-kind transfers, it ignores taxes, it is measured annually, consumption data may provide a better assessment of well-being, and it is unclear how to define the unit of observation/it ignores changes in the household composition.

Utilitarian social welfare function: welfare depends on individuals' utilities: $W = F(U_1, U_2, \ldots, U_n)$

- **Additive social welfare function**: $W = U_1 + U_2 + \ldots + U_n$

With the – questionable – assumptions:

1. Individuals have identical utility functions that depend only on their incomes.
2. These utility functions exhibit diminishing marginal utility of income.
3. The total amount of income available is fixed.

The government should redistribute income so as to obtain complete equality. See graph p.257.

Maximin criterion = social welfare depends on the utility of the individual who has the minimum utility in the society. $W = \text{Minimum}(U_1, U_2, \ldots, U_n)$

Commodity egalitarianism = idea that some commodities ought to be made available to everybody.

In-kind transfer = payments from the government to individuals in the form of commodities or services rather than cash.

- P. 265. An in-kind transfer moves the budget constraint to the right with the amount of commodities. The budget constraint is horizontal in the first part because the person must consume the commodities that are given to him/her. But when it is allowed to sell the goods, the budget constraint shifts in total.
- It depends on the positions of the utility curves whether a person reaches a lower, or the same utility level with an in-kind transfer instead of a cash transfer.

Chapter 13. Expenditure programs for the poor

Basic trade-off: **B = G – tE** $\rightarrow$ **B=0 when E = G/t**

B = benefit received.

G = the basic grant an individual receives when he is not working.

t = benefit reduction rate = the rate at which G is reduced when t recipient earns money.

E = level of earnings.

See p. 273 for the budget constraint for leisure-income choice.

- Income is zero when the person doesn't work (optimal leisure hours possible, T).
- Slope = w (wage of working one hour).
- Option one: If now the person is eligible to participate in a welfare program, the budget constraint is changes so that is becomes kinked. The first part has a slope of w, the second part has a slope of (1 – t)*w and begins where the person's income it high enough so that he receives no welfare benefits.
- The ultimate work decision depends on the shapes of the individual's IC.
- Option two: when the tax rate on the earnings of welfare recipients is 100%, the budget constraint becomes horizontal from the point of G. This implies that utility could be maximized where no labor is supplied, but this depends as well on the shape of the IC.

Workfare = able-bodied individuals who qualify for income support receive it only if they agree to participate in a work-related activity.

Earned income tax credit (EITC) = a reduction in tax liability for low-income individuals, p. 281.

- E.g. must pay $1,000 in income taxed but you have a tax credit of $600, you pay $400.
- Phase-in range: between $0 and say $13,090. The maximum credit is 0.40*$13,090 where t is the tax credit. Between $13,090 and $17,090 the tax credit remains the same.
- Phase-out range: the credit is reduced by x cents for each dollar of earnings above $17,090 until $41,952.
- One justification is to improve work incentives for the poor. In the phase-in range, the government adds 40 cents to each dollar of earnings.

Supplemental security income is a federal program that provides a basic monthly benefit for the aged, blind or disabled.

Medicaid is by far the largest spending program for low-income individuals. The possible loss of Medicaid benefits can create work disincentives, so that people keep their earnings below the cut-off level, see p.284.

Insurance against the possibility of unemployment should be provided by the government, because private markets can fail to provide adequate amounts of insurance in situations where adverse selection and moral hazard are important. Government provision can only eliminate adverse selection. Moral hazard can be mitigated by deductibles and a coinsurance rate.

- Deductible = a requirement that an individual not receives any benefits for the first few weeks he or she is unemployed.
- Coinsurance rate = a provision that the benefits cover only a portion of lost earnings.

Chapter 14. Taxation and income distribution

Statutory incidence = indicates who is legally responsible for a tax. It tells essentially nothing about who really pays the tax, because prices may change in response to the tax.

Economic incidence = the change in the distribution of real income induced by a tax.

Tax shifting = the difference between statutory incidence and economic incidence.

General remarks:

- From an economist's point of view, people bear taxes, a corporation cannot.
- **Functional distribution of income** classifies supplies to the production process, ANKO.
- **Size distribution of income** classifies income across income classes.

Balanced-budget incidence computes the combined effects of levying taxes *and* government spending financed by those taxes.

Differential tax incidence examines how incidence differs when one tax is replaced with another, holding the government budget constant.

- The hypothetical other tax used for comparison is often a **lump sum tax** – a tax whose value is independent of the individual's behaviour, e.g. a $100 tax independent of income.

Absolute tax incidence examines the effects of a tax when there is no change in either other taxes or government expenditure.

Proportional = an individual's average tax rate is the same at each level of income.

Progressive = an individual's average tax rate increases with income.

Regressive = an individual's average tax rate decreases with income.

- Average tax rate = ratio of taxes paid to income. Must not be confused with marginal tax rate = the proportion of the last dollar of income taxed by the government.

We consider two simple measures of *how* progressive a tax system is:

(1) The greater the increase in average tax rates as income increases, the more progressive it is:

$$v_1 = \frac{\frac{T_1}{I_1} - \frac{T_0}{I_0}}{I_1 - I_0}$$

(2) One tax system is more progressive than another if its elasticity of tax revenues with respect to income is higher (i.e., % change in tax revenues divided by % change in income).

$$v_1 = \frac{T_1 - T_0}{T_0} / \frac{I_1 - I_0}{I_0}$$

Partial equilibrium models of how taxes affect the income distribution

Partial equilibrium models study only one market and ignore possible spillover effects in others.

Unit tax is levied as a fixed amount per unit of commodity purchased, p. 301.

- The incidence of a unit tax is independent of whether it is levied on consumers or producers.
- Levied on consumers: the demand curve shifts down with the unit tax, because producers receive (P – tax) for every Q sold.
- Levied on producers: the supply curve shifts up with the unit tax, because consumers must pay (P + tax) for producers to supply the same amount of units.
- **Tax wedge** = the tax-induced difference between the price paid by consumers and the price received by producers.

The incidence of a unit tax depends on the elasticities of supply and demand.

- The more elastic the demand curve, the less the tax borne by consumers, o.t.e.
- The more elastic the supply curve, the less the tax borne by producers, e.t.e.

- When S is perfect inelastic, producers bear the entire burden of the tax.
- When S is perfect elastic, consumers bear the entire burden of the tax.
- An important assumption behind this analysis is that consumers correctly understand the tax rate they are facing. There is, however, some evidence that consumers' perception of a tax might depend on the **salience** of the sax rate = the extent to which a tax rate is made prominent to a taxpayer.

Ad valorem tax is computed as a percentage of the purchase value, p. 306.

- Instead of moving a curve down by the same absolute amount for each Q, the ad valorem tax lowers it by the same proportion.
- The new curve has another slope. The analysis is the same as by a unit tax.

Taxes can also be applied to factors of production.

- The payroll tax is paid by employers and employees. However, the statutory distinction between workers and bosses is irrelevant. The incidence of a labour tax is determined only by the wedge the tax puts between what employees receive and employers pay. And the behavioural elasticities matter.
- Capital can also be taxed. In an open economy where capital is perfectly mobile across countries, the supply of capital to a particular country is perfectly elastic at the going rate of return.
- When a taxed is imposed, capital simply moves abroad if it has to bear any of the tax; hence, the before-tax rate has to rise.

Suppose that a unit tax or an ad valorem tax is levied on each unit of output sold, where the units are produced by a monopolist. This tax lowers D and MR curves. The new profit-maximizing point arises at a lower output than the before-tax point. The price paid by consumers goes up and the price received by the monopolist goes down. The monopolist's profits fall.

Firms can also be taxed on their economic profits. For profit-maximizing firms, a tax on economic profits cannot be shifted – it is borne only by the owners of the firm, because a proportional tax on economic profits changes neither MC not MR, so neither output or the price paid by consumers.

Suppose land is taxed and suppose land is fixed in supply and it is durable.

R_0: annual rental rate on land, r: interest rate, P_R: price of land, T: last year the land yields its service.

Price of land:
$$P_R = \$R_0 + \frac{\$R_1}{1+r} + \frac{\$R_2}{(1+r)^2} + \cdots + \frac{\$R_T}{(1+r)^T}$$

P with a tax of u on land:
$$P_R{}' = \$(R_0 - u_0) + \frac{\$(R_1-u_1)}{1+r} + \frac{\$(R_2-u_2)}{(1+r)^2} + \cdots + \frac{\$(R_T-u_t)}{(1+r)^T}$$

As a consequence of the tax,

the price of land falls by:
$$u_0 + \frac{u_1}{1+r} + \frac{u_2}{(1+r)^2} + \cdots + \frac{u_T}{(1+r)^T}$$

thus, at the time the tax is imposed, the price of the land falls by the present value of all future tax payments. This is **capitalization**, the process by which a stream of tax liabilities becomes incorporated into the price of an asset.

General equilibrium analysis is the study of how various markets are interrelated.

Partial factor tax = tax levied on an input in only some of its uses, like a tax on capital used in the production of food, or a tax on labor used in the production of manufactures.

Chapter 15. Taxation and efficiency

Because a tax distorts economic decisions, it creates an **excess burden** = welfare cost = deadweight loss = a loss of welfare above and beyond taxed collected. An excess burden arises from distorted decisions.

P_b is price per pound of barley and p_c is price per pound of corn, I is Ruth's fixed income.

If there are no taxes or distortions such as externalities, prices of the goods reflect their social MC.

Figure 15.1:

- Ruth's consumptions of barley on horizontal axis, consumption of corn on vertical axis.
- Budget constraint slope is $-P_b/P_c$ and horizontal intercept I/P_b.
- Utility is maximized where the IC is tangent to budget constraint.

Suppose government levies a tax at a % rate of t_b on barley.

- Price Ruth faces becomes: $(1+t_b)P_b$, so slope budget constraint is $[(1+t_b)P_b/P_c]$
  and horizontal intercept $I/[(1+t_b)P_b]$.
- The vertical distance between AD and AF shows Ruth's tax payments measured in corn. We can convert tax receipts to dollars by multiplying distance C_aC_b by P_c.
- The new optimal point E_2 is on a lower IC, so Ruth is worse off.

Equivalent variation = a change in income that has the same effect on utility as a change in the price of a commodity. It measures the loss inflicted by the tax as the size of the reduction in income that would cause the same decrease in utility as the tax.

- Shift budget line inward until it's tangent to the lower IC. The amount by which it's shifted is the equivalent variation. Ruth is indifferent between losing ME_3 dollars and facing the b tax.
- Equivalent variation ME_3 > barley tax revenues GE_2 → excess burden of E_2N.

Lump sum tax = a tax whose value is independent of the individual's behaviour.

- When we want to analyse a lump sum tax that leaves Ruth as well off as the b tax, we have to make the new budget line parallel to AD and tangent to IC2.
- The tax revenue is then ME_3, the same as the equivalent variation from before, so:
- A lump sum tax has no excess burden. A lump sum tax that leaves Ruth on the same IC as the b tax generates more revenue for the government.

If lump sum taxes are so efficient, why don't governments use them?

- Because of policy implications. Most people would consider it unfair because the same tax hurts a poor family more than a rich family. So politicians make themselves not popular.

Are there any results from welfare economics that would help us understand why excess burdens arise?

Pareto efficient allocation of resources: $MRS_{bc} = MRT_{bc}$

Consumers set $MRS_{bc} = \frac{(1+t_b)P_b}{P_c}$

Producers set $MRT_{bc} = \frac{P_b}{P_c}$

As long as t_b is not zero, $MRS_{bc} > MRT_{bc}$ so this is not Pareto efficient. The utility loss arises because the barley tax creates a wedge between what the consumer pays and what the producer receives.

In contrast, under a lump sum tax, the price ratios faced by consumers and producers are equal. There is no wedge, so the necessary conditions for Pareto efficiency are satisfied.

Does an income tax entails an excess burden?

- An income reduction moves the intercepts of the budget constraints closer to the origin but leaves its slope unchanged. If income were fixed, an income tax *would* be a lump sum tax.
- However, when people's choices affect their incomes, an income tax is *not* generally equivalent to a lump sum tax. Income tax affects the after-tax wage, but the employer still pays the before-tax wage, so that MRS and MRT are not equal.

If the demand for a commodity does not change when it is taxed, does this mean that there is no excess burden?

- Figure 15.4. When a person does not change b consumption after the b tax, he is at E2. The b tax revenues E1E2 > equivalent variation RE3, thus, excess burden is E2S.
- **Uncompensated response** = the movement from E1 to E2. It shows how consumption changes because of the tax and incorporates effects due to both losing income and the tax-induced change in relative prices.
- **Income effect** = the effect of a price change on the quantity demanded due exclusively to the facts that the consumer's income has changes. In this case, from E1 to E3.
- **Substitution effect** = compensated response = the tendency of an individual to consume more of one god and less on another because of a decrease in the price of the former relative to the latter. In this case, from E3 to E2.

Ordinary demand curve: depicts the uncompensated change in the quantity of a commodity demanded when price changes.

Compensated demand curve: shows how quantity demanded varies with price, holding utility constant.

Excess burden of a commodity tax. See figure 15.5.

- Db is the compensated demand curve for barley.
- S is horizontal because we suppose that the social marginal costs of b are constant at pb.
- When a tax is levied on b, the new price is (1+tb)Pb, associated with S'b.
- Tax revenue: gfdh. Change in CS: gfih. Excess burden: fdi.
- **Excess burden = ½ ∩ P_b q_1 t_b^2**
- ∩ = the absolute value of the compensated price elasticity of demand for barley.

Theory of second best = in the presence of existing distortions, policies that in isolation would increase efficiency can decrease it and vice versa.

- E.g. rum and gin are substitutes. Rum is taxes, creating an excess burden. When gin is taxed, demand for rum increases again, so that rum consumption is moved back to its efficient level. The efficiency gain in the rum market can offset the excess burden in the gin market.

Double-dividend effect = using the proceeds from a Pigouvian tax to reduce inefficient tax rates.

A subsidy is also associated with an excess burden.

- Consider the subsidy for housing. See figure 15.6. initial equilibrium in h1.

- After the subsidy of s percent to housing producers, the new price for housing services is (1 – s)P_h and the supply curve becomes S'$_h$. Q increases to h2.
- CS increases by nouq. Subsidy costs are nvuq. Excess burden of ovu.
- The subsidy induces people to consume housing services that are valued at less than their cost. Hence, it is inefficient.

We could apply the theory of excess burden as well to inputs, see 15.7.

- Excess burden is hid, because welfare loss fdhg excess the tax collected hid.
- **Excess burden = ½ ε ω L₁ t²**
- ε is the compensated elasticity of hours of work with respect to the wage.

Sometimes the tax on an input depends on where it is employed. E.g. corporate vs noncorporate business taxes. Or differential taxation of labor in the household and market sectors.

- This distorts people's choices between them. See 15.8.
- The value of marginal product (VMP$_{home}$) of hours worked in the household sector is the dollar value of the additional output produced for each hour worked. VMP$_{mkt}$ for market.
- Equilibrium at H* where VMP are equal to each other and equal to w1.
- When tax t is levied on income from market work, and household work is untaxed, there is a wedge between the VMP and the associated wage rate.
- Tax on market wages at rate t lowers the wage rate to $(1 – t)$VMP$_{mkt}$.
- People work less in the market and more at home. After-tax VMPs in the two sectors are equal to $(1 – t)$w2. Tax is inefficient in the sense that it distorts incentives to employ inputs in their most productive uses. The resulting decrease in real income is the excess burden of t.
- Excess burden is abcd minus aecd, so abe. This is **½ (ΔH) t w₂**
- The greater the change in the allocation of labour (ΔH) and the greater the tax wedge (tw₂), the greater the excess burden. In general, whenever a factor is taxes differently in different uses, it leads to a misallocation of factors between sectors and hence an excess burden.

Chapter 16. Optimal Commodity Taxation

$$w(T – l) = P_X X + P_Y Y$$

$$wT = P_X X + P_Y Y + wl$$

$$wT = (1 + t)PX_X + (1 + t)PY_Y + (1 + t)wl$$

$$\frac{1}{1 + t} wT = PX_X + PY_Y + wl$$

You can use your total earnings to buy X and Y. the budget constraint.

The second line is the value of total **time endowment** = the maximum number of hours available for a person to work. We could reduce leisure time to zero.

Suppose we introduce ad valorem tax, a percentage tax, on X, Y and leisure time. Tax rate of t. Tax on all commodities including leisure. This is a **lump sum tax** because you cannot change behaviour to avoid this taxation.

The tax reduces the budget constraint. This is in the third line.

We can rewrite this to the final equation. This equation states that the value of time endowment is reduced because of taxation.

Time endowment = the maximum number of hours an individual can work during a given period.

- Commodities X and Y, and leisure l. Wage rate w, time endowment T (fixed amount).
- Budget constraint: $w(T - l) = P_xX + P_yY$ → $wT = P_xX + P_yY + wl$
- After tax budget constraint: $wT = (1+t)P_xX + (1+t)P_yY + (1+t)wl$ → $(1/[1+t]) wT = P_xX + P_yY + wl$
- A tax on all comonities including leisure at the same percentage rate t, is equivalent to reducing the value of the time endowment from wT to $(1/[1+t]) wT$. however, putting a tax on leisure is impossible. Only X and Y can be taxed so some excess burden is inevitable, even with **neutral taxation** = taxing each good (X and Y) at the same rate.

When we have two products and a tax on leisure, we have a lump sum tax. It reduces the value of time endowment, no change in behaviour, optimal taxation.

But in reality, leisure taxation is not possible. You can tax X and Y. some excess burden is inevitable.

The optimal commodity taxation is where we tax X and Y at the same rate t = **neutral taxation**. This is optimal but not efficient, since we are not able to tax leisure time.

Rule for indirect taxation: Only tax final goods and they should be taxed uniformly.

The optimal taxation on intermediate goods should be zero. Because you distort the allocation when you introduce them and that is inefficient.

When you tax final goods, individual consumers can make choices that are not distorted. Saying it nicely, when consumer choices are not distorted, it leaves the economy on its production frontier, so it's efficient.

So a rule for indirect taxation follows from the equations above. The value added tax, VAT, in NL is an optimal taxation. In the US, there is no value added tax. VAT is levied on final goods, not on intermediate goods. The idea is to shift taxes towards consumers. However, with income tax, shifting is not requested nor desirable.

Does a VAT on goods have distributional consequences?

You get equity issues when you introduce a uniform rate. It's the opposite of progression of taxation.

Ramsey rule

To minimize total excess burden, tax rates should be set so that the tax-induced percentage reduction in the quantity demanded of each commodity is the same.

$$\frac{\Delta X}{X_1} = \frac{\Delta Y}{Y_1}$$ see 16.1 and p. 350 for derivation

If you want to minimize the excess burden, you should look at the marginal excess burden of the last dollar of revenues. For each commodity, that should be equal. In this graph, the marginal excess burden is shown. It starts from unrelated goods X and Y: not complements nor substitutes. Dx is the demand curve and S is considered to run horizontally.

Imagine we introduce a tax of Ux. We move from X0 to X1.

When we introduce Ux with 1 dollar, we go from X1 to X2. The area of the marginal excess burden ibea is the excess burden of the result of increasing taxes by one dollar.

The marginal excess burden of X should be equal to that of Y. that is optimal taxation.

Marginal excess burden

= area fbae
= $1/2\Delta x[u_X + (u_X + 1)]$
= ΔX

Change in tax revenues

 = area gfih – area ibae
$$= X2 - (X1 - X2)u_X$$
Marginal tax revenue   = X1 - ΔX

Marginal tax revenue per additional dollar of tax revenue
$$= \Delta X/(X1 - \Delta X)$$

Marginal tax revenue per additional dollar of tax revenue for good Y
$$= \Delta Y/(Y1 - \Delta Y)$$

To minimize overall excess burden
$$= \Delta X/(X1 - \Delta X) = \Delta Y/(Y1 - \Delta Y)$$

therefore

$$\frac{\Delta X}{X_1} = \frac{\Delta Y}{Y_1}$$

Reinterpretation of the Ramsey Rule → **Inverse elasticity rule**

For goods that are unrelated in consumption, efficiency requires tax rates to be inversely proportional to elasticities. The higher ∩$_y$ (compensated elasticity of demand for y) is relative to ∩$_x$, the lower should be t$_y$ relative to t$_x$.

$$t_X \eta_X = t_Y \eta_Y$$

Tax rates should be set so that the quantities demanded on X and Y should be the same.

High rates on inelastic goods. Because high changes in prices results hardly in changes in quantity demanded.

This is the opposite of saying we should tax X and Y uniformly. Now it says we should tax dependent on demand. So, efficiency does not require that we set all rates uniformly when we talk about taxation on goods.

$$\frac{t_X}{t_Y} = \frac{\eta_Y}{\eta_X}$$ **inverse elasticity rule**
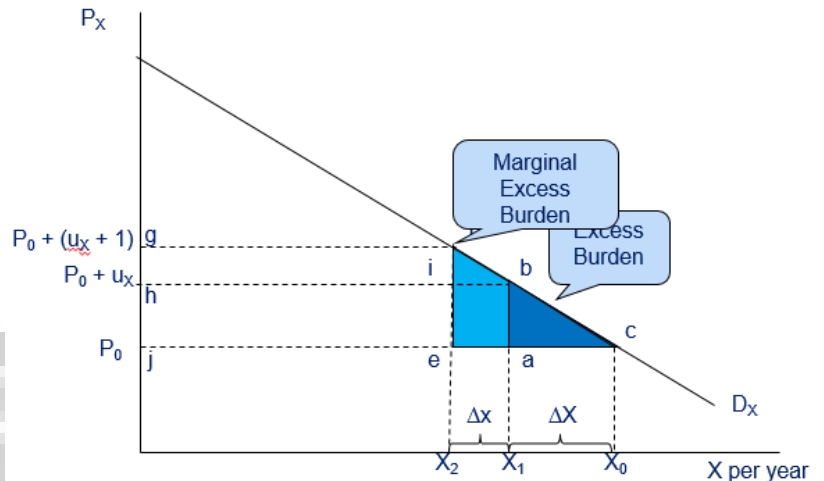
What does the Ramsey rule apply for equity?

- When you tax bread, it should be highly taxes according to the Ramsey rule. But this is not fair regarding equity. For equity reasons, you do the opposite: tax bread less.
- In Dutch case, 6% instead of 21%.

The Corlett-Hague Rule

- In the case of two commodities, efficient taxation requires taxing commodity complementary to leisure at a relatively high rate.
- A step closer to a "first best" result (no excess burden of taxation).
- E.g. tickets for the cinema or a play.

Equity Considerations

- Equity implications of inverse elasticity rule.
- **Vertical equity** = people in the same position should be taxed equally. Or: distributing tax burdens fairly across people with different abilities to pay. E.g. people with the same income
- In a democracy, we look for an optimal departure from Ramsey Rule. You can look at to what extent does a democratic society cares about equality. When there is a strong preference for equality, you may step away from the Ramsey rule.
- But when you don't apply the Ramsey rule, it creates excess burden. So, you have to balance preferences to costs/excess burden to efficiency.
- That is why taxes between countries and cultures differ.
- You can also look at when consumer patterns differ between rich and poor people, we could take that into account as well.

Application: Taxation of the Family

- Under US federal income tax law, fundamental unit of income taxation is family.
- Is excess burden minimized by taxing each spouse's income at same rate?
- Should husbands face higher marginal tax rates than wives?

Public choice analysis of tax policy. Trying to be elected again by maximizing budget and voters.
Time inconsistency of optimal policy = when the government cannot implement an optimal tax policy because the policy is inconsistent with the government's incentives over time, and taxpayers realize this fact.
When you want to put into place an effective policy, you should have to start from a credible government. So, don't change the rules while playing. A yoyo policy is not credible.

To summarize, in the context of optimal tax theory, a fair tax is one that guarantees a socially desirable distribution of the tax burden. An efficient tax is one with a small excess burden. In public discussion however, a fair tax is often one that imposes equal liabilities on people who have the same ability to pay, and an efficient tax system is one that keeps down administrative and compliance expenses. We will discuss these alternative notions of fairness and efficiency next.

Other Criteria for Tax Design.

- **Horizontal equity**. People in equal positions should be treated equally.
  - What is equal? We mostly take income or wealth or wage.

- **Utility definition of horizontal equity** (Feldstein) = a method of classifying people of 'equal positions' in terms of their utility levels. Feldstein suggest looking at utility. Because education and effort to get that money is also important. People with the same utility before taxation should have the same utility after taxation.

- **Transitional equity** = fairness in changing tax regimes. When you change your scheme, take some time for people to adapt.
  - **Rule definition of horizontal equity** = the rules that govern the selection of taxes are more important for judging fairness than the outcomes themselves.

Economic consequences of taxation.

- **Tax avoidance** (intended-unintended) = altering behavior in such a way as to reduce your legal tax liability.
- Labor supply (income and substitution effect).
- Shifting (intended-unintended). Costs are shared between workers and employers.

- **Tax evasion** (underground economy) = not paying taxes legally due, fraud. This is illegal. In the informal economy, you don't pay taxes. When there is tax avoidance and evasion, taxes in the formal economy must be raised.

Tackling Tax Avoidance: why it matters?

Revenue lost to corporate avoidance at around €50-70 billion a year in the EU.

Coordinated EU approach against tax avoidance: The Anti-Tax Avoidance Package (EC, 2016) ensure fair and efficient taxation, is built **on three pillars**:

a) **Effective taxation** whereby all companies pay taxes where they make their profits.
b) **Tax transparency** so that Member States have the information needed to ensure fair taxation.
c) **Addressing the risk of double taxation** so that companies which pay their fair share of taxes are not penalized for making use of the EU's internal market.

Key elements in the Anti-Tax Avoidance Package.

- An **Anti-Tax Avoidance Directive** proposes a set of legally binding anti-avoidance measures, which all Member States should implement to shut off major areas of aggressive tax planning.
- A **Recommendation on Tax Treaties** advises Member States how to reinforce their tax treaties against abuse by aggressive tax planners, in an EU-law compliant way.
- A revision of the **Administrative Cooperation Directive** introduces country-by-country reporting between tax authorities on key tax-related information on multinationals.
- A Communication on an **External Strategy for Effective Taxation** sets out a coordinated EU approach against external risks of tax avoidance and to promote international tax good governance.
- A **Chapeau Communication** and **Staff Working Document**, which explain the political and economic rationale behind the individual measures.

Positive Analysis of Tax Evasion
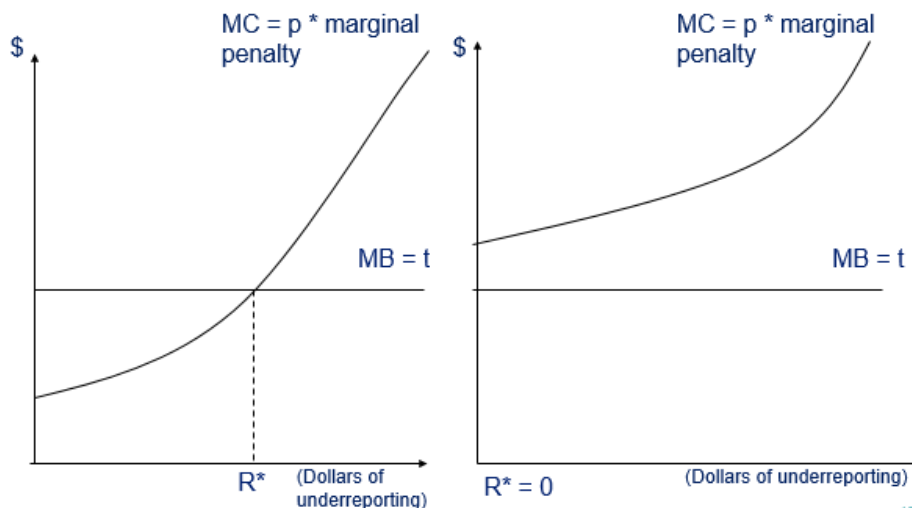
We could look at tax evasion being rational, it's a cost-benefit analysis.

MB is equal to the tax that you don't have to pay.

MC is the chance p of being caught times the penalty you have to pay.

In the left graph, the optimal situation of tax evasion in R*.

In the right graph, there is no evasion.

Normative Analysis of Tax Evasion

Tax evaders given weight in the social welfare function. That may be a reason for not to reduce it to zero. The black market can contribute to making redistribution more equal. We have arguments to tolerate tax evasion.

Tax evaders given no weight in the social welfare function.

- Expected marginal cost of cheating = penalty rate * probability of detection.
- Probability of detection = f (resources devoted to tax administration).
- Draconian vs. just retribution penalties.

Chapter 20. Government Debt
- Debt & Deficit
    - Operationalization
    - Acquisition
- Effects of Debt
    - Financial Markets
    - Real Economy
    - Government
- To tax or to borrow?

Deficit: the excess of expenditures over revenues during a period of time.

(Surplus: negative deficit)

Debt: the total amount owed at a specific point in time (sum of all deficits).

On-budget deficit: the deficit resulting from on-budget activities.

Off-budget deficit: the deficit resulting from off-budget activities.

- "Off-budget expenditures" = expenditures that the law prohibits to be put on budget: parts of Social Security & U.S. Postal Office. They are rare in practice.
- Why won't it end up on the budget? → To prevent policy makers from cutting SS for budgetary reasons.

Book: **Debt** is a stock variable (measured at a point in time), while deficits and surpluses are flow variables (measured during a period of time). Deficit/surplus = expenditures – revenues.
- Central bank's holdings of government securities are counted as debt held by the public.
- Federal, state and local government can all borrow.
- When the government is a debtor and the price level changes, the real value of the debt may be an important source of revenue e.g. $9 trillion debt and 3.2% inflation: real value of the debt is reduced by 9 trillion * 0.032 = $288 billion. However, the government's accounting procedures do not allow the inclusion of gains due to inflationary erosion of the debt.
- The federal government does not distinguish and the business and state local government do distinguish between current spending (expenditures for services that are consumed within the year) and capital expenditures (expenditures for durable items that yield services over a long time) although distinguishing can sometimes be difficult.
- Some argue that the omission of tangibles leads to a highly misleading picture of the government's financial position.
- A number of economists have argued that the present value of promised social security, Medicare and other entitlement benefits should be included in the national debt.

Acquisition: How can the government obtain debt?

- Government Bonds (bonds given out by government agencies). (vs private bonds that are given out by private companies like Phillips).
- **U.S. government bonds ranked by maturity:**
    - **Treasury bills, or T-bills:** Up to one year.
    - **Treasury notes:** One to ten years.
    - **Treasury bonds:** Ten years or more (long-term).

Dutch bonds: negative yield on bonds between 3 months and 3 years, and a positive yield on bonds with longer terms than that. This is because the demand for Dutch bonds is high. This is because the risk on other countries' bonds like Greece is so high that you only know your money is safe if you invest in NL. Moreover, people think that in 10/20/30 years, the financial crisis is over, so they do want to receive some interest on their loans.

- This is very uncommon though.

Who holds government debt?

Internal debt: The amount that a government owes to its own citizens.

External debt: The amount that a government owes to agents outside of country borders.

- The debt of the US is distributed around the world. The largest holder is the Chinese government. They can screw the US if they supply all demands at once. Then no one wants to buy all those bonds and the US could go bankrupt. This is a very risky situation. The government budget is more or less in the hands of China.

Common / Large holders of debt:

a) **Central Bank** of the own country.
- Inflation, Independence, Seigniorage = If there is inflation, the real debt goes down, so it's easier for the government to repay its debt.
- When there isn't central bank independence, it could create inflation to do this, but this is than instable. Powers of central bank are then abused.
b) **Foreign Governments**
c) **Financial Market Participants**
- Private Agents, Hedge/Mutual Funds, Pension Funds, etc.

How to obtain a government bond:

Secondary Market (market price): we can calculate the bond by present value calculation.

$$PV = \frac{C}{(1+i)^n}$$

This is when the bond is already sold and when the bond is resold in the secondary market.

Primary Market (initial price): depends.

Ex. U.S. Department of Treasury can give the bonds by:

- Directly.
- Auction.
- Reopening of auctions.
- Sell bonds to Bank/Broker.

Participants: Anyone.

[United States] Primary Bond Market – Auction are usually used.

- 30-yr bond is issued on 15-8-2005 and has a face value of $100 (the price of the bond).
- Coupon rate of 4,25% (you receive $4,25 each year).
- At maturity you get $100 back, the face value.
- YTM = the interest rate you get → discount value for given coupon, price and face value. The YTM is the i in the equation. PV = 4.25 / (1+i) + 4.25 / (1+i)^2 +…. Etc. until n=30.

Auction Process:

First: Auction is announced (days before the auction, details will be provided).

Second: Auction takes place at designated time.

Participants place bids

- <u>Competitive Bid:</u> specified bid (yield). I want to obtain this bond, but I want to have at least X yield on it.
- <u>Non-competitive Bid</u>: agree to accept the set yield that comes out of the auction.

Third:

(1) All non-competitive bids are accepted.
(2) Competitive bids are accepted (low to high yield) until the offered amount (that the government wants to gather) is reached.

→ All *winners* receive the same yield as the accepted highest bid.

Even though people have the same willingness in terms of yields, they receive the same yield.

Debt & Deficit – Summary

1. Government deficit is the excess of expenditures over revenue during a period of time.
   - This can be on- or off budget (depending on legal rules).
2. Government debt is the amount a government owes at a specific point in time.
   - An accumulation of all previous deficits.
3. Governments can borrow from its citizens (internal) or abroad (external).
   - Using T-bills, Notes and Bonds; held by various institutions.
4. Primary offering of such instruments differs per country.
   - Some auction through an intermediary is most common.

<u>Effects on Debt on the real economy</u>

Three effects of debt on "the economy":
a) <u>Financial Markets</u>
   - Crowding out hypothesis (Neoclassical Model).
     – and beyond!
b) <u>Real Economy</u> (Burden of debt).
   - Automatic Stabalizer.
   - Ricardian Equivalence.
     – Representative Agent Model (tomorrow).
   - Generational Accounting.
     – Overlapping Generations Model (tomorrow).
c) <u>Government</u>
   - Financial and Political Constraints.
     – Credibility.

<u>Financial markets – crowding out</u>

Crowding out hypothesis: "Government borrowing decreases private investment by raising the market interest rate." (<u>Rosen & Gayer</u>).

- We think this is bad because decreasing investments is decreasing growth in the long term.

Neoclassical Economics: Competing over a limited or fixed pool of resources.

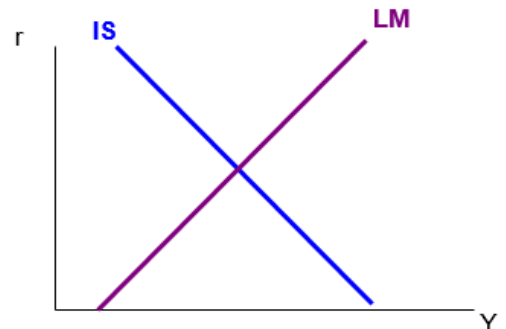Increases in debt →↑ Money Demand →↑ Price of money (e.g. interest rate) → more unattractive for private investors to invest → ↓ private investments.

(1) Deficit → expansionary fiscal policy → rise in output.
(2) Investment → reduction output.

Net effect depends on investment sensitivity to interest.

We could show this graphically.

r = interest rate

Y = output

IS = combinations of output and interest rate where the goods market is in equilibrium.

Y=C+I+G+(E-M)

LM = combination of output and interest rate where the money market is in equilibrium.
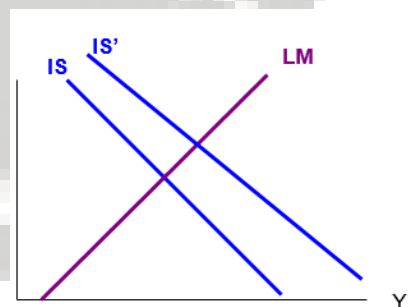
L(Y,i) = Ms

Where the two intersects, we have a perfect equilibrium.

When the governments borrow → increase in real money demand → IS shifts to the right.

$G\uparrow \rightarrow Y\uparrow$

$Y\uparrow \rightarrow r\uparrow$

$r\uparrow \rightarrow I\downarrow$ (crowding out)

Interest sensitivity = slope LM
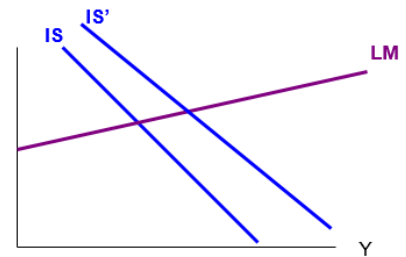
But now suppose that the slope in LM is small.

Then the change in the interest rate is very small. The more horizontal/elastic the LM, the lower the effect.

Government borrowing → increase in real money demand

G↑ →Y↑

Y↑ → r ↑

r ↑ → I ↓ (crowding out)

ΔY = approx. equal

Δr = much less

- Crowding out uncertain within Neoclassical framework.

Beyond crowding out. It is not only related to private investments, but to other channels as well.

➢ However: *"Crowding out refers to every mechanism in which expansionary fiscal policy will have a negative impact on an indicator"*

1. Deficit   → expansionary fiscal policy   → rise output

2. Investment   → reduction output

3. Bonds Market* → Increase in Bonds supply
   → decrease short-term interest rate
   → increase investment   → rise output

4. Currency   → demand for money
   → appreciation currency
   → crowding out exports (↑M)   → reduction output

*Effect is likely to be very small, perhaps insignificant compared to the other channels.

Investment Synergies (public+private investments) are not a recognized channel in the neoclassical framework, yet significant in reality (think Mazzucato, 2011, Topic 2 Lecture 1/2).

You could also say that if we have a deficit because of government investments, you should see more private investments even more because government investments support private investments so as a government you don't have to bury the whole burden of the investment. This is financed by government deficit whilst private investments increase. Output increases.

So, it's not that clear cut, there are a lot of channels.

Crowding out – the empirical evidence

- Difficult to isolate effect of deficits on "the interest rate".
    - There is no single interest rate.
    - Any interest rate has many determinants.
- Crowding out refers to many different mechanisms.
    - For instance: 'crowding out' internal motivation by giving external motivation.
    - Refer to previous slide.
- No theoretical explanation for time scope in which the crowding out will occur. How long a government deficit takes to result in crowding out. We don't know when the causality takes place.
    - When should the interest rate change when government debt is incurred from a theoretical perspective?

No conclusive evidence.

Crowding Out – Summary

1. Crowding out hypothesis originally implied competition over resources.
    - Between private and public sector.
2. Crowding out hypothesis is now a catch-all term.
    - Referencing adverse effects of budget deficits.
3. Crowding out in a national setting (IS-LM) works through increase in r.
    - When considering deficit as supply of bonds, it works the other way around.
4. Crowding out in an international setting works through exchange rate.
    - And decreases output.
5. (Empirical) evidence for the crowding out hypothesis is limited.
    - Which has yet to settle the theoretical debate.

Real economy: are budget deficits bad?

Automatic stabilization

Recession → High level of transfers → High → Deficit
→ Low tax income

High Transfers → Expansionary Fiscal Policy → Output increasing

Allowing government deficits acts as an automatic stabilizer.

Accept deficits during recession, run surpluses during a boom.

- Medium run budget balance.
    -full-employment deficit, structural deficit, cyclically adjusted deficit.

Ricardian Equivalence (Ricardo-Barro proposition)

How to finance fiscal expansion?

1. Taxes up now.

2. Or borrow money, Deficit up now and taxes up in future (to pay back debt).

- Ricardian Equivalence says: how we finance does not matter. It doesn't matter whether we tax now or raise taxes later because government borrows now.

Argument:

- Deficit (and debt) has no effect on economic activity.
- Consumers do not change their consumption in response to a tax cut if the present value of current and future after-tax labor income is unaffected.

Assumptions:

- Perfect foresight. Consumers know the income you are going to receive in your lifetime, and you are able to discount them to incorporate this in your current consumption pattern.
- No credit & liquidity constraints.

Generational Accounting: tax burden can be shifted among generations.

How to finance fiscal expansion?

1. Taxes up now.
2. Deficit up now and taxes up in future (to pay back debt).

Table 20.1 Overlapping Generations Model

		The Period 2010–2030	
	Young	Middle-Aged	Old
(1) Income	$ 12,000	$ 12,000	$12,000
(2) Government borrowing	−6,000	−6,000	
(3) Government-provided consumption	4,000	4,000	4,000
		The Year 2030	
	Young	Middle-Aged	Old
(4) Government raises taxes to pay back the debt	$−4,000	$−4,000	$−4,000
(5) Government pays back the debt		+6,000	+6,000

Three periods with age groups young, middle-aged and old that live in the period now.

In the next period, old people die, middle-aged become old, young become middle-ages and a new young generation is born.

The government borrow 6,000 from young and middle-aged and each generation receives 4,000 of it in consumption.

The next period, the debt has to be repaid. Old people don't can pay it back. Young and middle-aged received the debt and payed the debt. But young people of now must pay debt whereas they didn't receive something.

When at any given time several generations coexist simultaneously: **overlapping generations model.** The burden of a debt can then be transferred across generations.
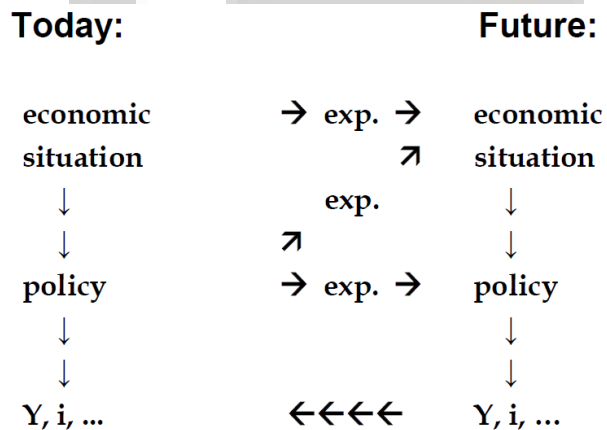- The debt repayment in 2030 involves a transfer between people who are alive at the time, but the young are at the short end of the transfer because they have to contribute to repaying a debt from which they never benefited.
- Current generations benefit at the expense of future generations.

Are budget deficits debt?
- Automatic Stabilizer: No, they're actually good (no structural deficit).
- Ricardian Equivalence: No, they're irrelevant.
- Generational Accounting: Yes, they shift burden of debt.

The effect on the real economy depends on the perspective you have. So it is hard to give a clear answer.

Policy analysis (dynamic):

Today: **Future:**

economic   → exp. →   economic
situation   ↗   situation
↓   exp.   ↓
↓   ↗   ↓
policy   → exp. →   policy
↓   ↓
↓   ↓
Y, i, …   ←←←←   Y, i, …

We have an economic situation, we imply a certain policy that results in a higher income and interest rate. But in the real world, things are differently.

Because we have a certain economic situation, e.g. crisis, we expect a future economic situation. Everything today has an impact on what we expect in the future. Our expectations affect today.

Expectations are formed by private markets and government. They determine economic situation today. E.g. how much a government can borrow and at which rate.

This explains differences in debt and interest rates of countries. We have negative expectations about Greece so it's has to pay large interest and it has low growth rates.

Because the economic situation is rather bad in US but that we think it will be good in the future, their interest rate is relatively low.

Expectations are crucial in determining the effect of government deficit on the government itself.

Adaptive Expectations: (…-1970's)

- Animal Spirits. They are something very unexpectedly.
- Stochastic, backward-looking, static models. Expectations are based on history.
- But these models predicted economic changes poorly.

We went to **Rational Expectations**: (1970's-…)

- Forward looking.
- Assessing the likely course of the future (expectations) and working out the implications (rational).
- No systematic errors, shocks are unanticipated.
- This comes close to Ricardian Equivalence principle.

Bounded Rationality

- Catch-all term for deviations from full rationality.
- We make Systematic errors in our estimations & expectation, not irrational. We are bounded rational.

The fundamental idea behind expectations is Credibility.

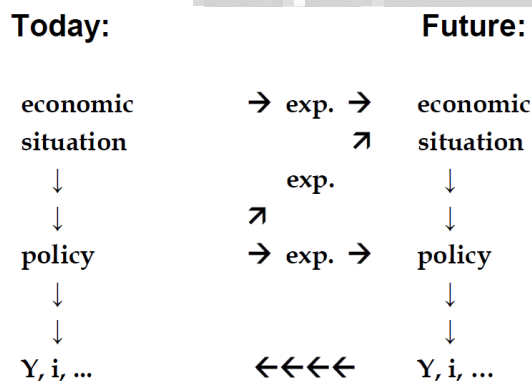Suppose that the country has a large structural deficit.

Government announces to reduce the budget deficit, but in the future will maintain a smaller structural deficit.

Is his announcement credible?

Expectations:

- Fiscal contraction → output reducing in the short-term.
- Lower structural deficit → output increasing in the medium-run. Because the government is better able to structure the economy and less interest payments.
- Is the Government willing to exacerbate / create economic downturn?
- Depends on ….

Expectations: Short-term (Y↓) and Future (Y↑).

Today:		**Future:**
economic	→ exp. →	**economic**
situation	↗	**situation**
↓	exp.	↓
↓	↗	↓
policy	→ exp. →	**policy**
↓		↓
↓		↓
Y, i, …	←←←	**Y, i, …**

Result:

- Credible deficit reduction may increase output now.
- Small cuts now, large later (Backloading).

What if announcement is not credible?

In the future, they will not have the same policy. Markets will have other expectations about the policy in the future. This means that output will be lower in the future. Interest rates will be higher; government has more trouble to incur more deficit. Government is then unable to borrow and the economy will turn into a recession. Deficit will stay a lot larger in the future, hence private investors won't lend to the government anymore.

Why wouldn't it be credible?

Government and debt

1. The government's credibility depends on the kind of rationality.
   - Rationality ultimately determines how expectations are formed.
   - But also depends on the governents ability and willingsness to uphold (Public Choice)
2. The government's credibility determines effectiveness of deficit reduction.
   - If the government is not credible, private agents will have pessimistic expectation of the future which will hamper economic activity today.
3. Large government debt can only be sustained if the government can convince markets it will cut spending/raise taxes later.
   - If this is not the case, access to funds will be denied and the government will go bankrupt.

To tax or to borrow?

Benefit-Received Principle: those who benefit from a government expenditure should bear its cost.

- To the extent that the program creates benefits for future generations, it is appropriate to shift the burden to future generations via debt finance.
- If future generations are expected to be richer (e.g. technological process), it does make sense to transfer income from future generations to now. And vice versa.
- Benefits now: defence, public transport, etc. (tax). You would say that if you have benefit now, you must pay taxes now.
- Benefits later: education, climate control (debt). Then you can pay this using debt.

Intergenerational Equity: wealth should be equalized intertemporally.

- If future generations are expected to be richer (e.g. technological process), it does make sense to transfer income from future generations to now. And vice versa.
- Technological progress → high wealth later/future generations will be wealthier → debt financing.
- Depletion of natural resources → low wealth later because we don't have fossil fuels in the future → tax financing.
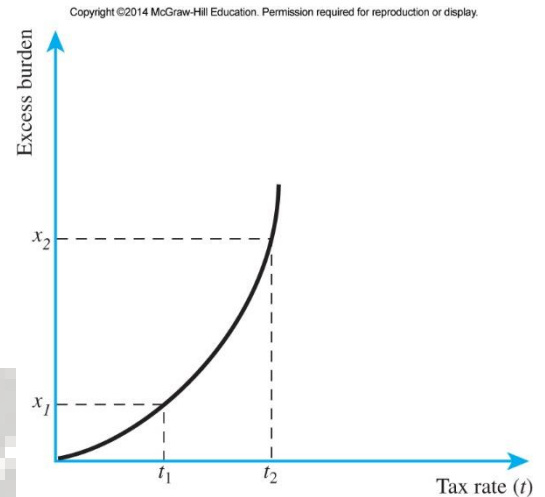- Equalize wealth across different generations.

Efficiency Considerations

Tax is increasingly distortionary. The more you tax, the more excess burden you create.

Tax can best be spread out of multiple payments. Then it would be good to have government debt such that taxes are equal across time.

However, this ignores the excess burden of crowding out.

Efficiency considerations. When taxes are levied on labour income, there is an excess burden of $\frac{1}{2}\varepsilon wLt^2$ so two small taxes are preferred to one big tax. Debt financing is more efficient. However, when taxes are levied on capital, debt finance is less efficient because it distorts capital allocation decisions. Tax finance is more attractive when we assume that crowding out occurs.

Deficits and functional finance	Func.fin = using fiscal policy to keep aggregate demand at the desired level, regardless of the impact on deficits. Deficit finance can be desirable when the economy is not operating at its full potential because of the low opportunity cost of the resources diverted from the private sector.
Federal debt and the risk of a fiscal crisis	When the debt becomes 'too high', growth may slow down. Or interest rates may rise to compensate investors for the increased risk, which can lead to a fiscal crisis, and less investment and slower growth in output and wages.
Moral and political considerations	The normative view that deficits are immoral rest on the unproven positive hypothesis that the burden of the debt is shifted to future generations.

Paper summary

Mazzucato (2013) – ch. 2 & 3, the dynamic approach

The idea is that to make the economy more competitive, entrepreneurial and innovative, the public sector needs to cut back on spending so that the private sector can 'step in' and allow the economy to take off. This is because government spending 'crowds out' private spending, but also because private sector investment is deemed more efficient. The rhetorical assumption behind all of this is that the role of the state is negative rather than positive.

There are four stages regarding innovation -

1. Basic and applied research
2. Idea vetting and pre-commercial testing
3. Establishing commercial viability
4. Large-scale deployment

Investments are extremely volatile because they are (1) subject to uncertainty, (2) prone to recessions and (3) based on expectations. Mazzucato argues that this leads to ''market failure'', particularly in the first stages of innovation. There is little and uncertain return on basic research which eliminates the incentive for private investment. That's why the government should not step out, but step in. Public investments do not crowd out private investments, but they complement them and go beyond market failure.

Radical innovations – innovations that change the way we live – are particularly vulnerable for ''market failure'' because they are uncertain, but we benefit the most of them as a society. That's also reason for the government to step in. Most of the radical innovations so far have been financed by the government.

Gupta & Chu (2018) – Inclusive Development and Climate Change: The Geopolitics of Fossil Fuel Risks in Developing Countries

This Paper sets out to evaluate theories of stranded resources, stranded assets and inclusive development to inform how developing countries 'should' develop in the post-Paris Agreement world. The old paradigm of developing countries catching up with industrialized countries is outdated: both developing and industrialized countries have unique pathways to sustainable future.

In this context, U.N. has adopted the Paris Agreement on Climate Change (2015), where they commit to: (1) reduce the growth of greenhouse gas emissions and (2) eventually phase out all emissions

Development theory: positive look, what needs to be done, opportunities

Stranded asset theory: negative look, learning form economic losses resulting from development and choices

Fossil fuels are (1) particularly important for development (2) instigator of climate change and ecological degradation. There is a **trade-off** between (1) and (2). The paper argues for a forward based on three cases: China, Nigeria and Kenya.

Old paradigm: policy should be aimed at making developing countries follow in the footsteps of the industrialized world. However, aid, assistance and regulations felt to have prevented development (as perceived by developing countries). They argue that they need to pollute first to be able to afford systematic ecosystem services in the future ('development first'). In contrast, China has adopted a philosophy of the green and circular economy as a way to emphasize growth.

Inclusive development questions the continuous linear quest for growth as reflected in increasing income for all. Inclusive development focuses on enhancing human wellbeing and ecosystem, thus creating a sustainable society rather than economy. There is a physical (ecological) limit to the conversion of (natural) resources into consumable commodities (climate change). As income (GDP) is a reflection of the value of commodities, growth is limited by physical constraints.

China

- Recent emissions have been higher because of the sheer size of Chinese economy
- China has two broad policies: 1. Prioritize renewable energy 2. Invest in fossiel fuels abroad and at home
- Large Chinese corporations invest in other countries (mostly Africa)
- They facilitate by providing capital, infrastructure and institutions to successfully extract fossil fuels, which they then import for home consumption
- Such investments may never fully result in benefits for China on the long term and exacerbate climate change

Nigeria (worst case scenario)

- Large oil-producing country
- Resource curse: the abundance of natural resources hampers economic growth
- Beyond the resource curse: corruption, predatory states, reduced demand for public accountability
- Nigeria says it will build the institutional framework to sustainably use natural resource rents, but historically this has never been true and seems unlikely to hold in the future

Kenya

- Recently discovered huge oil and gas reserves
- New-found wealth can: boost Kenya to become a stable MIC or plunge Kenya into a resource trap (i.e. Nigeria all over again)
- Policymakers in Kenya argue 'development first'
- Future is uncertain, but indications are bad

Stranded asset theory = financial and physical assets that may lose their economic value because they become obsolete before the end of their expected life

Happens because of changes in innovation, social values, environmental problems, war or politics

Link to inclusive development

- Climate change destroys value of natural assets
- Politics binds the use of assets

Tension: invest in oil-gas because of development first or mitigate risk of creating a stranded asset?

Even if there is investment in fossil fuel, then: resource curse might show up, benefits accrue only to large multinationals, deteriorate institutional framework, creates ecological degradation

China has already experienced a lot of stranded assets in Africa – china reaps benefits, thus development first argument doesn't hold

Solution: inclusive development can only take place when

- The decisions of individual nations are weighted by the global community in terms of limiting GHG's
- Trade-off between development and damage to resource base kept within ecological limits

Conclusion: global coordination of resource management is required, global registration of emission required, global negotiation of 'development first' legitimacy required, otherwise: damage beyond repair and suffering beyond despair. But also… China plays a key role in cutting emissions.

Kahn, J. A. (2011). Can We Determine the Optimal Size of Government?

The massive spending programs and new regulations adopted by many countries around the world in response to the economic crisis of 2008 have drawn renewed attention to the role of government in the economy.

This paper argues that the recent research conclusion, that the growth-maximizing size of government is between 15-30% of GDP, is not warranted by the evidence.

Government: to protect individuals and property, provide public goods and enforce private contracts.

However, tendency to become overgrown and corrupt → negative impact on productive ec. activity.

Two important messages from the literature on economic growth:

1. Government policies leave their long-run impact primarily on the level of economic activity, not the growth rate.
2. The sources of this impact are multi-dimensional and not necessarily well measured by conventional measures of 'size', such as the share of government spending in GDP.

Main conclusions: governments are generally too large.

- Greater economic freedom results in a higher average standard of living.
- If the bias of the government is always toward more spending, perhaps there is too much spending on core functions as well.
- This evidence cannot plausibly say what the ideal size of government is, only that virtually all governments are larger than optimal from the standpoint of maximizing GDPc.
- The data can realistically only say that smaller governments are better, and suggest that the optimal size of government is smaller than what we observe today.

Mankiw, Weinzierl, and Yagan (2009). Optimal taxation in theory and practice.

This paper explores the interplay between tax theory and tax policy.

Standard theory treats the social planner as a **utilitarian**: the social welfare function is based on the utilities of individuals in the society, and it a nonlinear function of individual utilities. However, drawing policy conclusion from a model with a representative consumer (that could have the same preferences as other consumers e.g.), can in some cases lead to trouble.

Ramsey: taxes on commodities should be imposed in inverse proportion to the representative consumer's elasticity of demand for the good, so that commodities which experience inelastic demand are taxed more heavily.

If the social planner is allowed to be unconstrained in choosing a tax system, the optimal tax is a **lump-sum tax** because absent market imperfection, it is best not to distort consumer choices.

- This tax places a greater relative burden on the latter, so that it is unpopular.

Mirrlees: By recognizing unobserved heterogeneity (the social planner cannot observe ability nor effort to earn income), diminishing marginal utility of consumption, and incentive effects, the Mirrlees approach formalizes the classic trade-off between equality and efficiency that real governments face, and it has become the dominant approach for tax theorists.

- Revelation principle: any optimal allocation of resources can be achieved through a policy under which individuals voluntarily reveal their types in response to the incentives provided.
- The strength of the Mirrlees framework is that it allows the social planner to consider all feasible tax systems. The weakness of the Mirrlees approach is its high level of complexity.

General lessons suggested by optimal tax theory as it has developed in recent decades:

1. Optimal marginal tax rate schedules depend on the distribution of ability.
2. The optimal marginal tax schedule could decline at high incomes.
3. A flat tax, with a universal lump-sum transfer, could be close to optimal.
4. The optimal extent of redistribution rises with wage inequality.
5. Taxes should depend on personal characteristics as well as income.
6. Only final goods ought to be taxed, and typically they ought to be taxed uniformly.
7. Capital income ought to be untaxed, at least in expectation.
8. In stochastic, dynamic economies, optimal tax policy requires increased sophistication.

Overall, tax policy has moved in the directions suggested by theory along a few dimensions.

- In particular, among OECD countries, top marginal rates have declined, marginal income tax schedules have flattened, and commodity taxes are more uniform and are typically assessed on final goods.
- However, there remain large gaps between theory and policy.

Conclusions

- Some trends in tax policy look like at least partial victories for optimal tax theory. Like the reduced taxation of capital income, or the worldwide trend towards flatter tax rates.
- Some results from optimal tax theory cannot be easily identified in actual policy and seem unlikely to be found there anytime soon. This could be because (a) policymakers and the public are slow to appreciate valuable but counterintuitive insights, or (b) the broader tradition in public finance includes other ideas that are often ignored in modern optimal tax theory, such as the benefits principle and the horizontal equity principle.

Dorfman & Palacios (2012) – Social security: Global Issues

Social security has two objectives: 1. Prevent sharp decline in income 2. Protection against poverty at old age

Three main issues regarding social security

1. **Coverage gap** - % of elderly who receive social security

2. **Adequacy** – the size of benefits relative to poverty threshold

3. **Sustainability** - whether the system and level of benefits can be maintained in the face of aging populations

Performance criteria

- **Environment** = Indicators such as demographic conditions, laborforce participation, macroeconomic conditions, fiscal space and financial development reflect the degree to which a country is capable of providing social security

- **System design** = Indicators of the current architecture of the existing pension system, eligibility rules, etc. indicates the need for reform

- **Performance** = Indicators such as coverage, adequacy, sustainability, and administrative efficiency

Pension schemes financed on **pay-as-you-go** basis face increasingly unsustainable financial burdens

- Periodically adjust key parameters such as the contribution rate, interest rate and retirement age to maintain financial balance in the future

Funded defined contribution schemes also rely on greater contributions and years of contributions in order to support populations that are living longer

Global issues: adequecy gap

In practice, **adequacy** is often determined not by the benefit formula so much as the period spent by workers outside the formal labor market

- **Informal sectors** do not contribute to pension scheme thus lowering their effective benefit levels

One of the major challenges for pension systems is the low <u>coverage</u> that characterizes social insurance schemes in low and middle income countries

Global issues: coverage gap

- Low income countries = contributors to pension program stagnated at 10% workers, transfers themselves expanded, but range remains limited to roughly 25% of elderly
- Middle income countries = Contributions have either stalled or went down (former socialist countries), increased dependency ratio leaves many prospective elderly unprotected

World bank recommendations = incentive based approach to informal sector (instead of voluntary), delink pension provision from labor force (payroll)

- Couple to universal schemes in addition to 'social pensions'

Global issues: sustainability

Challenge of **ensuring long-run financial sustainability of pension schemes** applies to countries with a rapidly aging population

Policy **decisions today create long-term liabiliti**es in some countries that are already unsustainable

Sustainability is not an **objective**, but rather a **constraint** on the capacity to finance future obligations

Advanced economies have generous pension programs that **cannot be sustained under the projected demographic change** (pay-as-you-go)

Low- and middle-income countries face **unfavorable demographic changes before they become rich** (sub-saharan Africa exception)

Following policy choices will particularly matter:

- To what degree should pensions be prefunded?
- What investments can be made that expect reasonable returns and hedge risk?

A general solution is to **link the retirement age to life expectancy**

What you should know

- Rivality and excludability
- Positive and negative externalities
- Coase theorem
- Pigouvian taks
- Emsissions fee system and cap and trade system
- Lindahl model
- Majority voting, rank-ordered/preferential voting and direct voting
- Voting paradox
- Median voter theorem
- Logrolling
- Arrow's Impossiblity theorem
- Interest group theory
- Insurance premium
- Asymmetric information and moral hazard
- Fully funded pension system and pay-as-you-go financing
- Retirement effect and bequest effect
- Utilitarian social welfare function, additive social welfare function and maximin criterion
- Earned income tax credit (EITC)
- Statutory incidence and economic incidence
- Proportional, progressive and regressive tax systems
- Unit tax, ad valorem tax and lump sum tax
- Income effect and substitution effect
- Optimal commodity taxation
- Ramsey rule
- The Corlett-Hague rule
- Horizontal equity and vertical equity
- Ricardian equivalence
- Generational accounting
- Adaptive expectations, rational expectations and bounded rationality
- Benefit-received principle
- Intergenerational equity

What you should be able to do

- Explain the differences between certain public goods and private goods
- Explain the free riders' problem with public goods and possible solution
- Explain what externalities are and how to deal with them
- Explain the Coasem Theorem
- Explain and draw the Pigouvian tax, and describe the solutions
- Explain and draw the differences between the emission fee and cap and trade system
- Explain the Lindahl model
- Explain the different voting systems (direct, rank-ordered, majority) and their consequences
- Explain the median voter theorem and logrolling
- Explain Arrow's impossibility Theorem and its six criteria
- Explain the paper by Tollison and its theory about interest groups
- Explain Niskanen's theory regarding bureaucrats
- Explain the different theories about why governments grow
- Explain whether education is a private or public good and whether public education crowds out private education
- Be able to calculate an insurance premium and its utility, and link it to risk aversion
- Explain asymmetric information and moral hazard regarding healthcare and how to solve it
- Explain the different pension schemes, solutions to keep them sustainable, and be able to calculate the dependency ratio and replacement ratio
- Explain whether public savings crowds out private savings regarding pension schemes
- Explain the different welfare functions
- Explain how the earned income tax credit (EITC) works
- Explain the difference between statutory incidence and economic incidence and how tax shifting is possible
- Explain the difference between a progressive, regressive and proportional tax system and how to calculate how progressive a tax system is
- Explain what a unit tax, ad valorem tax and lump sum tax is, how taxes are determined and how excess burden is created
- Explain and calculate what optimal commodity taxation is and how it is possible, and how equity plays a role
- Explain the Ramsey's rule
- Explain the Corlett-Hague rule
- Explain how governments refinance themselves, the effects of debt on the real economy and the crowding out hypothesis
- Explain the Ricardian equivalence and generational accounting
- Explain how expectations have changed over the years
- Learn all the papers, they are very important

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