BLAB
HANDOUTS

PUBLIC FINANCE
-FIRST PARTIAL-

WRITTEN BY

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CHAPTER 1 – EXTERNALITIES AND PUBLIC GOODS
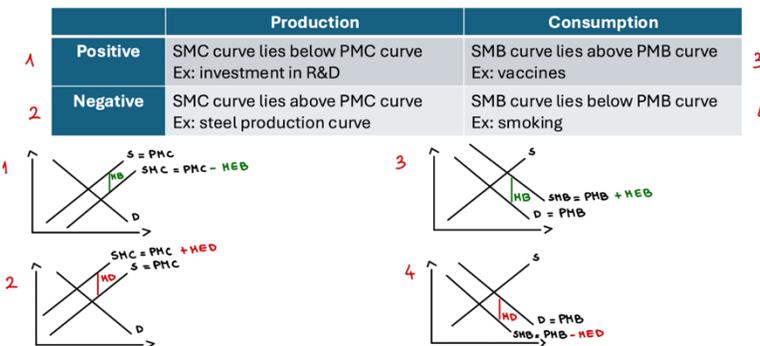
1. EXTERNALITIES

1.1 Introduction And Types of Externalities

→ Global warming is a classic example of an externality, which is a kind of market failure.

Externality Definition: Externalities arise whenever the actions of one party make another party worse or better off, yet the first party neither bears the costs nor receives the benefits of doing so.

Market failure Definition: A problem that causes the market economy to deliver an outcome that does not maximize efficiency, since we do NOT produce the SOCIAL EFFICIENT level of output.

There are 4 different types of externalities. They can be either positive/negative and on the consumption/production side.

	Production	Consumption
Positive	SMC curve lies below PMC curve Ex: investment in R&D	SMB curve lies above PMB curve Ex: vaccines
Negative	SMC curve lies above PMC curve Ex: steel production curve	SMB curve lies below PMB curve Ex: smoking

Example - Negative Production Externality: : When a firm's production reduces the well-being of others who are not compensated by the firm, for example pollution from steel production.
→ They create a wedge called marginal damage, MD, between private and social marginal cost.

1. **Private marginal cost, PMC Definition:** The direct cost to producers of producing an additional unit of a good.
2. **Social marginal cost, SMC Definition:** The private marginal cost to producers plus any costs associated with the production of the good that are imposed on others.

→ When there is an externality, the PRIVATE costs are not equal to the SOCIAL costs. Therefore the equilibrium reached privately (we assume the private equilibrium emerges without the parties negotiating to internalize the externality) is NOT socially efficient.

- In the graph, social marginal cost is SMC equals PMC plus MD. The supply curve S represents private marginal cost. Demand equals private marginal benefit and social marginal benefit. There is overproduction equal to Q1 minus Q2, with an associated deadweight loss equal to area BCA.
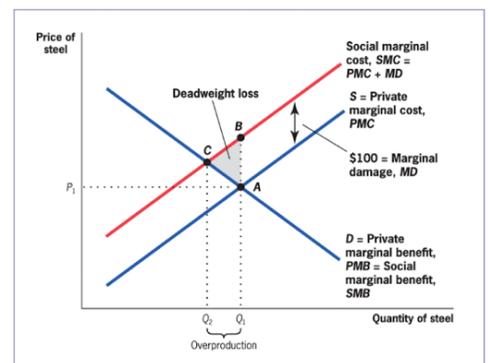
In this course marginal external cost, MD, and marginal external benefit, MB, are always fixed amounts per unit. Therefore SMC and PMC, and SMB and PMB curves, are always parallel.

1.2 A Private Solution: The Coase Theorem

The solution to this is to <u>internalize the externality</u>. → Internalizing the externality means that either private negotiations or government action lead the party to fully reflect the external costs or benefits of that party's actions.
→ For example, a steel producer could pay the fishers for each unit of steel produced so that they are compensated for the damage to their fishing grounds.

Quantity produced will converge to the efficient level only if the payment by the steel maker is per unit extra produced. If the payment is a lump sum unrelated to how much he produces, this will not change production Q. So the steel maker <u>must pay</u> an amount equal to the <u>marginal damage</u> per unit produced, so that PMC becomes SMC and Q decreases.

The <u>Coase theorem</u> says that private parties will be able to solve the problem of externalities by internalizing them by agreeing privately with each other, if property rights are clearly defined and transaction costs are zero or very low, regardless of who initially owns the property rights.

Coase theorem Part I: When there are <u>well defined property rights</u> and <u>costless bargaining</u>, negotiations between the party creating the externality and the party affected by the externality can bring about the socially optimal market quantity.
→ A property right can be, for example, the right to have a clean river for the fisherman, or the right to pollute for the steelmaker.

Coase theorem Part II: The efficient solution to an externality do<u>es not depend on which party is assigned the property rights</u> as long as someone is assigned those rights.
→ Who holds the right does not affect whether the externality is internalized. What changes is who pays. Depending on who holds the rights, we decide who pays. For example, if the fisher has the right to clean water, then the steelmaker must pay. If the steelmaker has the right to pollute, then the fisherman must pay. If property rights are clearly assigned, somebody always pays.

Example – Negative Production Externality: The charge internalizes the externality and removes the inefficiency of the negative externality. In this case, the externality is internalized but we do not know who paid for it.

Regardless, the payment was equal to the marginal damage, MD = 100 dollars. The payment shifts private marginal cost upward to equal social marginal cost, reducing quantity from Q1 to Q2 and increasing price from P1 to P2.

The MD is 100 per unit so now the total payment equals 100 × Q2
→ The vertical shift of the cost curve is 100, not the total payment
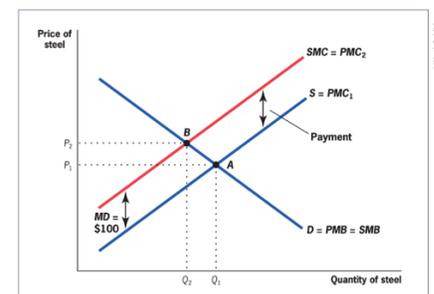
1.3 Problems With The Coase Theorem

There are 4 problems with the Coasian solution, which makes it hard to achieve.

1. **The Assignment Problem:** The first problem is assigning blame. <u>Deciding who pays/benefits for it</u>. Does the fisher pay the steel plant for not polluting? Or does the steel plant pay for polluting?

→ <u>Depends on who HOLDS the PROPERTY RIGHTS</u>. For example, if the steel plant has the property rights on the river then the fisherman has to pay for this cost.

2. **The Holdout Problem:** <u>Shared ownership</u> of property rights gives each owner power over all the others. <u>Each person has veto power</u> and so may <u>demand enormous payments</u>.

→ Suppose 100 fishers are harmed. The steel producer wants to pay them to allow pollution at the efficient level. If 99 agree but 1 refuses and demands a huge payment, the deal can collapse. That one person is the holdout, since he has veto power and can request a very expensive payment, making the deal collapse.

3. **The Free Rider Problem:** If there are <u>many people involved with a negative externality</u>, individuals will underinvest and <u>not pay their fair share of the negative externality</u>. Individuals may not want to pay enough to reduce pollution.

→ Since many people have to pay, <u>each hopes others will pay</u> to fix the problem. So no one wants to contribute enough to internalize the externality by all paying for it together

4. **Transaction Costs And Negotiating Problems:** It is <u>hard to negotiate</u> when there are <u>large numbers of individuals</u> on one or both sides of the negotiation.

→ This problem is amplified for an externality <u>such as global warming</u>, where the potentially divergent interests of billions of parties on one side must be somehow aggregated for a negotiation.
Negotiating is costly and complicated, and sometimes impossible when there are too many people involved, for example global warming.

1.4 Conclusions

Ronald <u>Coase</u>'s insight that <u>externalities can sometimes be internalized</u> was a brilliant one. It provides the competitive market model with a defense against the onslaught of market failures. It is also an excellent reason to suspect that the market may be able to internalize some small scale, localized externalities.

→ Many criticize the competitive market because market failures such as externalities show it is not always efficient, but Coase argues that under certain conditions private bargaining can still lead to efficient outcomes without government intervention.

<u>It will not help with</u> large scale, <u>global externalities</u>. → In the Coase Theorem we assume the government is not involved and private parties agree with each other without its intervention. <u>Government intervenes</u> when the Coase Theorem fails because of one of the four problems.

2. PUBLIC GOODS

2.1 Introduction
Pure Public Goods Definition: Goods that are perfectly <u>non-rival</u> in consumption and are <u>non-excludable</u>.

→ Non rival in consumption: One individual's consumption of a good does not affect another's opportunity to consume the good.
→ Non excludable: Individuals cannot deny each other the opportunity to consume a good.

		Is the Good Rival in Consumption?: (Yes)	Is the Good Rival in Consumption?: (No)
Is the Good Excludable?	(Yes)	Private good (ice cream)	Impure public good (TV streaming)
Is the Good Excludable?	(No)	Impure public good (crowded city sidewalk)	Pure public good (national defense)

Impure public goods: <u>Only one of the two conditions is fully satisfied</u>, either non excludability or non-rivalry.

Horizontal vs Vertical Summation:

- For private goods, horizontal summation is used because each individual consumes their own separate units of the good. At any given price, different individuals demand different quantities, and total market demand is simply the sum of all those individual quantities.
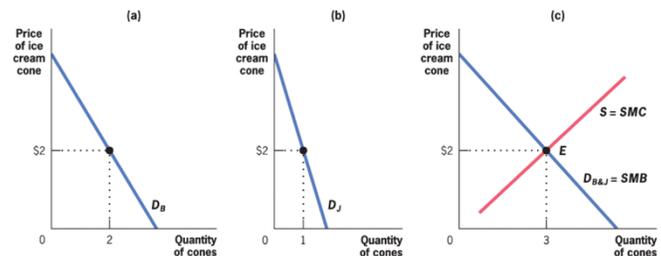
→ For example, if at a price of 2 euros Ben demands 2 cones and Jerry demands 1 cone, the total quantity demanded in the market is 3 cones. Since the <u>price is the same for everyone</u> and <u>consumption is separate</u>, we <u>add quantities across individuals at each price level</u>. This is why we sum horizontally.

- For public goods, we use vertical summation because <u>everyone consumes the same quantity</u>, so what differs across individuals is <u>how much each is willing</u> to pay for that quantity.

In the graph, Ben and Jerry each have their own demand curve for missiles. If the government provides, for example, 5 missiles, both consume those same 5 missiles. Since quantity is shared, we cannot add quantities. Instead, at quantity 5, <u>we add Ben's and Jerry's willingness to pay vertically</u>. This gives the total marginal social benefit, which we compare with marginal cost to find the efficient quantity.
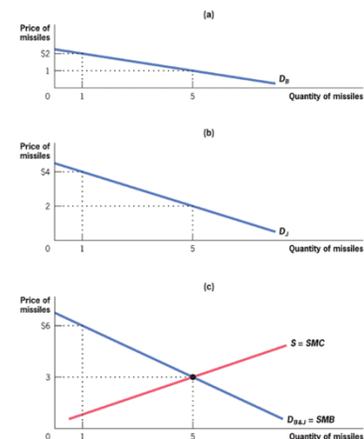
→ The problem is that even if total willingness to pay is 3, individuals do not have an incentive to reveal or actually pay that amount. Each person knows the good is non excludable and non-rival, so they can benefit even if they do not contribute. So they understate their willingness to pay or refuse to pay.

2.2 Private Provision Of Public Goods: Problem And Solutions
This is the case in which <u>production</u> of the public good is <u>left to private producers</u> and not to the government. The <u>market does not produce the efficient amount of public goods because of the free rider problem</u>.

Free Rider Problem: When an investment has a personal cost but a common benefit, individuals will underinvest.
Since Ben's consumption of missiles also benefits Jerry, Jerry may not want to pay, or vice versa.
→ The free rider problem does not arise for private goods because private goods are excludable and rival. If you do not pay for your ice cream, you do not get it. And if you eat one cone, I cannot eat that same cone.

→ This results in the private market <u>producing an inefficiently low quantity of the good</u>.

There are **3 solutions** to the Free Rider Problem which happens in the private markets.

1. **Private Provision of Public Goods Despite Free Riding:** The free rider problem does not lead to a complete absence of private provision of public goods. This means that even though free riding exists, <u>private markets do not necessarily provide zero</u> public goods because of Altruism, Social Capital and Warm Glow effects.

Altruism: Altruism means <u>individuals care about others'</u> benefits and costs, so they may <u>contribute voluntarily</u>. Individuals value the benefits and costs to others in making their consumption choices. If the public good is provided by someone else, you are still happy, because what matters is the total level of the public good (not your own → so different from warm glow) and others' well-being. You do not care who paid. You care about the outcome. Many laboratory experiments provide evidence for altruism and show that people contribute to public goods.

Social Capital: Social capital means <u>trust and community norms encourage people to contribute even without formal enforcement</u>, for example by the government. The quantity of social capital depends on how much people of the same community affected by the public good can trust each other and are therefore willing to chance their personal investment of time and effort into paying for the public good without any formal guarantee of reciprocity from other community members.

Warm Glow: Warm glow means indiv<u>iduals care about both the total amount of the public good and their particular contributions as well</u>. People might simply <u>feel good about contributing</u> to public goods or charity. Different from altruism because people do not care about just the amount of the public good. So even if the good is public and there is a free rider problem, people may still voluntarily contribute because they feel good about doing so.

Warm glow effect can add onto the motivations of altruism and social capital, they are not mutually exclusive.

2. **Overcoming Non-Excludability Through Exclusion Mechanisms:** When private suppliers are given the <u>ability to overcome</u> the problem of <u>non-excludability</u>, they can produce the efficient quantity of the good.

This means that if firms find a way to <u>exclude nonpayers</u>, the problem weakens. For example, they may create a club good such as Netflix, use subscriptions, or restrict access. If people can be excluded, then firms can charge them, and provision can approach efficiency.

3. **Lindahl Pricing and Personalized User Fees:** The private sector can in some cases combat the free rider problem to provide public goods by <u>charging user fees</u> that are <u>proportional to their valuation of the public good</u> → <u>BUT IT NEEDS THE GOVERNMENT HERE</u>

2.3 Lindahl Pricing: How It Works And Problems

Lindahl pricing is an approach to financing public goods in which individuals honestly reveal their willingness to pay and the government charges them that amount to finance the public good. Each person pays a personalized price equal to their marginal willingness to pay.

The procedure works in six steps.

1. The government announces tax prices for the public good.
2. Each individual states how much of the public good they want at those tax prices. The announced tax price is a price per unit of the public good.
3. This process is repeated to construct a marginal willingness to pay schedule for each individual.
4. The government adds up individual willingness to pay at each quantity of the public good.
5. It finds the quantity Q such that total marginal willingness to pay equals marginal cost. Efficient provision requires that total marginal willingness to pay equals marginal cost.
6. The public good is financed by charging each individual their own willingness to pay for that quantity.
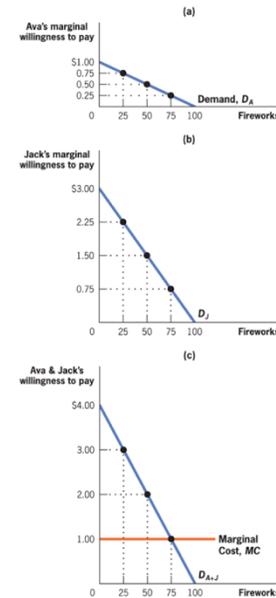
By aggregating individual marginal willingness to pay and setting total marginal willingness to pay equal to marginal cost, the government ensures that social benefits exceed or equal total cost. Each person's price equals their own marginal willingness to pay, so the outcome is an equilibrium and reflects benefit taxation, since individuals are taxed according to how much they value the benefit they receive.

→ In theory, if everyone truthfully reveals their willingness to pay, the efficient quantity of the public good is provided. In practice, Lindahl pricing faces several important problems.

1. **Preference Revelation Problem:** Individuals have an incentive to understate their true willingness to pay in order to reduce the price they personally have to pay. Since the good is public and non-excludable, they hope others will pay more while they pay less.
2. **Preference Knowledge Problem:** Individuals may not know their exact marginal willingness to pay, especially for complex or large-scale public goods. It can be difficult for people to evaluate how much they truly value something like national defense or climate policy.
3. **Preference Aggregation Problem:** Even if individuals truthfully reveal and know their willingness to pay, it is difficult for the government to collect, verify, and accurately aggregate all individual preference schedules into a single social decision. There is no simple and uncontroversial way to combine all valuations into a social welfare outcome, and doing so is administratively complex and costly.
4. **Political And Fairness Problem:** Personalized prices mean different individuals pay different amounts for the same public good based on their willingness to pay. This may be perceived as unfair and can be politically infeasible, since voters may reject a system where some are charged much more than others.

2.4 Public Provision Of Public Goods: Problem And Solutions

Even with private provision, there is a role for government provision of public goods. Under private provision, not everyone contributes to the good, even though everyone benefits from it.

→ Because of this, <u>government provision potentially solves the problem of noncontributors/freeriders</u>. Nonetheless, there is a big <u>problem to government provision.</u>

Crowd Out: As the <u>government provides more</u> of a public good, the <u>private sector will provide less</u>.

Why does crowd out happen? Because people care about the total amount of the public good. If the government increases provision, <u>individuals feel there is less need for their own contributions</u>, so they <u>reduce them.</u>

Full Crowd Out: <u>government intervention accomplishes nothing</u> because an increase of 5 units provided by the government results in a decrease of 5 units provided privately, leaving <u>total provision unchanged</u>.

Partial Crowd Out: when the government increases provision, <u>private contributions fall</u>, but <u>by less than the government increase</u>. As a result, <u>total provision</u>, public plus private, <u>still rises</u>.

→ Full crowd out is rare. <u>Partial crowd out</u> is much more common and <u>can occur in two different cases</u>.

1. **When Noncontributors To The Public Good Are Taxed To Finance Provision Of The Good:**
In the first case of partial crowd out, some individuals were voluntarily contributing to the public good while others were free riding and paying nothing. When the government intervenes and taxes everyone to finance the public good, those <u>noncontributors are now forced to pay</u>, which <u>increases total funding</u>

The <u>original contributors</u> may reduce their voluntary giving because the government is now providing part of the good, but they usually <u>do not reduce it one for one</u>. The <u>reason</u> is that <u>they experience an increase in effective wealth</u>. Since the public good is now partly financed by others through taxation, contributors can enjoy the same or a higher level of the public good while personally paying less than before.

<u>Example:</u> Before government: Total public good = 100. You contribute 100. Others contribute 0.
After government: Government taxes everyone and raises 60. You pay 20 of that. Others pay 40.
So public good is already 60 without your voluntary gift. If you still want 100 total, you now add 40.
Your total payment: 20 tax + 40 voluntary = 60. Before you paid 100. Now you pay 60.
You are better off because others are now sharing the cost and you have an increase in effective wealth of 40.

2. **When Individuals Derive Utility From Their Own Contribution As Well As From The Total Amount Of The Public Good:**
This is the <u>warm glow effect</u>. Even if the government increases provision, people still get satisfaction from giving, so they do not completely stop contributing. As a result, private contributions fall, but not one for one with government provision, so crowd out is only partial.

If they only care about how much they personally give, government contributions have no effect on their giving. This is pure warm glow, which is rare in reality and implies zero crowd out.

Existing evidence on crowd out is mixed. Some studies that assess how individual contributions respond to government spending suggest a very small crowd out, although these studies suffer from many bias problems. Laboratory experiments, on the other hand, suggest that crowd out is large. Overall, there is no consensus on the size of crowd out.

Evidence: Measuring Crowd Out: The evidence on crowd out is mixed. Kingma 1989 studied how private contributions changed as local governments contributed different amounts to public radio. He found that for every 1 dollar increase in government funding for public radio, private contributions fell by 13.5 cents. This suggests only partial crowd out, since private giving decreases, but by much less than the increase in public funding.

However, there is a potential bias problem. Areas with high government contributions might also be high income areas or places where people have a stronger preference for radio. In that case, these areas would both receive more public funding and give more privately.

→ So when we observe that private giving does not fall much as government funding increases, we cannot be sure whether this is due to warm glow or income effects, or simply because richer, radio loving areas both give more and receive more funding. That uncertainty is the bias problem.

2.5 Public Goods: Who should Provide Them And How Much?

The question is who should provide public goods, since both full public provision and private involvement have advantages and drawbacks, so the optimal solution is often a mix of the two.
One extreme is provision entirely by the public sector, where the government both finances and produces the good. The other extreme is subsidized or mandated private provision, where private firms provide the good and the government supports or requires this through incentives.

→Contracting out is a mixed solution. The government retains responsibility for the public good and ensures it is provided, but it hires private sector firms to actually produce or deliver the good or service.

Two **problems** with contracting out:

1. **The private sector's incentives may not align with public goals:** When the government contracts out a public service to a private firm, the firm's goal is profit, while the government's goal is social welfare. The firm may cut costs in ways that reduce quality, safety, or access, even if those dimensions matter to policymakers. This can lower public costs but worsen outcomes along other dimensions.
2. **Bidding in contracting out is often far from competitive:** In practice, there may be only a few firms bidding, they may collude, or one firm may dominate the market. If competition is weak, the government does not obtain low prices, and the expected efficiency gains from contracting out disappear.

After having decided who should provide the public goods, we need to think of how much to provide.

→ When deciding how much of a public good to provide, the government must compare total social benefits with total social costs, but measuring both sides is often very difficult.

1. **Costs of Public Goods:** Optimal provision requires measuring the true social cost of a project. For example, consider building a highway. The direct costs include wages and materials. However, suppose that without the highway project, half of the workers would be unemployed. In that case, paying wages is not just a cost but also creates job opportunities. This makes it difficult to determine the real opportunity cost of the resources used.

2. **Benefits of Public Goods:** Measuring benefits is also challenging. In the case of a highway, what is the value of time saved for commuters due to reduced traffic jams? And what is the value to society of fewer deaths if the highway is safer? These benefits do not have clear market prices, so they are hard to quantify.

    These <u>issues are addressed by cost benefit analysis</u>, which provides a framework for estimating and comparing the social costs and social benefits of public projects.

CHAPTER 2 - EDUCATION

1. TRENDS IN OECD COUNTRIES

Education is the largest long-term investment governments make to increase productivity and social mobility. Education spending varies a lot. OECD average is 5/6% of GDP or 10% of total public spending.
- In Italy, the share is slightly lower than OECD, especially because of low investment in preschool and tertiary funding.

So what matters is only HOW MUCH countries spend on education? NO → what matters is HOW we spend it. For example Finland and Estonia have better outcomes in education despite lower spending. Italy on the contrary has a medium level spending but below average education outcomes → there is a problem of efficiency in HOW resources are used.

2. WHY SHOULD THE GOVERNMENT BE INVOLVED IN EDUCATION?

There are two reasons to be involved in education:
1. **Efficiency:** the market is inefficient. So if we leave education only to the private sector, the market underprovides education.
2. **Equality:** even if the market was efficient, the government must intervene to promote equality of opportunities. Education is a key driver of intergenerational mobility → more education means less inequality.
3.

Therefore governments in OECD invest heavily in education: the average is 80% of education publicly financed.

2.1 What if Education Was Left Entirely to the Private Market?

Education is not a pure public good, but if it were provided only by private institutions, many students would be excluded because of credit constraints. Poor families may not afford tuition even when returns are high.

Private decisions consider only individual returns, not social benefits such as higher productivity, innovation, civic engagement, and lower crime. For this reason, markets tend to underinvest, especially in early education where long-term returns are high but not immediately visible.

2.2 The Benefits of Government Intervention in Education

There are **market failures** and **redistribution reasons** that justify intervention:

- **Educational Credit Market Failure:** Education is a large upfront investment, and many families cannot borrow enough to finance it. Credit markets do not work well for human capital because there is no physical collateral and future income is uncertain. Without public provision, many capable students would be excluded even if education is socially productive.

- **Failure To Maximize Family Utility:** <u>Parents may underinvest in their children's education</u>. They may focus on short term consumption, face liquidity problems, or not fully internalize long term returns for the family. This leads to underinvestment relative to the social optimum.
- **Redistribution:** Education is <u>a normal good</u>, so higher income families would purchase more education in a purely private system, creating a <u>gap between rich and poor families</u>. Public education reduces inequality in access and promotes intergenerational mobility, which is a key goal in democratic societies.

When the government intervenes in education, several **social benefits** arise for both individuals and society.

- **Productivity Increases:** A more educated workforce raises overall output, innovation, and long run economic growth. The benefits extend beyond individuals to society as a whole.
- **Democratic Quality Improves:** Education creates more informed and active citizens, increasing voter participation and strengthening democratic institutions.
- **Crime Decreases And Civic Participation Rises:** Higher education levels are associated with lower crime rates and greater social stability. Empirical evidence such as Lochner and Moretti 2004 finds lower crime among more educated individuals, while Milligan, Moretti and Oreopoulos 2004 show higher voter turnout.
- **Access Expands Despite Credit Constraints:** Public funding ensures that talented students from low-income families are not excluded simply because they cannot borrow.
- **Children's Welfare Is Protected:** Government intervention reduces the risk that parents underinvest in their children's education due to short term pressures or myopia.
- **Inequality Is Reduced:** Public education limits the gap in educational attainment between rich and poor families and supports intergenerational mobility.

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3. HOW SHOULD THE GOVERNMENT BE INVOLVED IN EDUCATION?

The government can intervene on providing education in two main ways: free public school and vouchers.

3.1 Free Public School

Most public education is provided through free public schools. In this framework, the government chooses and provides a <u>specific level of education for free</u>. It does not give families cash. It sets the price of that publicly provided education equal to zero.

- <u>Initially</u>, assume education is <u>entirely private</u>. Families choose their preferred level of education based on income and prices. When the government introduces free public education at a given level, the <u>budget constraint changes</u> because families can consume that specific amount of education at zero price. The budget constraint is the same for every family, so we assume same income and prices. But families have different preferences (indifference curves).
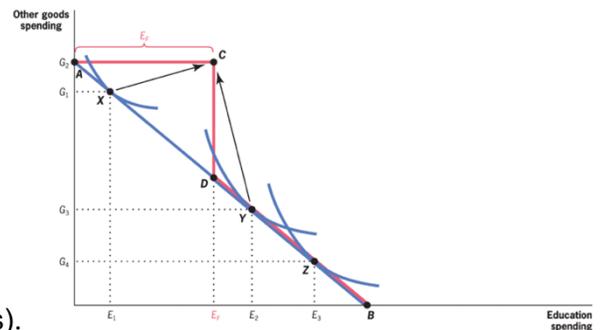
<u>Crowding out</u> means that <u>public provision replaces private</u> spending rather than increasing total education.

Without free public schools, some families would pay for private, higher quality education. With free public schools at the level chosen by the government, some families switch from private to public schools to save money. Private education spending therefore falls.

Low-income families (X) typically increase their education consumption because they could not afford that level before. Middle(Y) - and high-income (Z) families may simply substitute public for private schooling without increasing total education. → This is the crowding out effect.

If crowding out is large, public spending mainly replaces private spending and total education rises only slightly. If crowding out is limited, public provision increases total education and improves outcomes.
The final effect depends on how different income groups adjust to the specific level of education provided for free.

3.2 Educational Vouchers

Instead of providing a fixed level of education for free, the government can give families a voucher. A voucher is a credit of a certain value that can be used to pay for tuition at any school, public or private.
Unlike free public provision at a fixed level, vouchers expand the household budget set more flexibly. Families are not forced to consume a specific level chosen by the government. They can choose their preferred level and type of school, using the voucher as partial payment.

- Vouchers effectively lower the price of education for everyone by the value of the voucher. This shifts the budget constraint outward for all families.
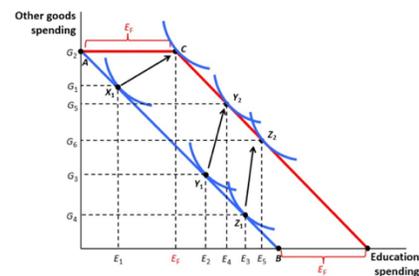
Low-income families typically use the full subsidy and increase their education consumption. Middle income families may switch from public to private schools if they prefer higher quality options. High income families often increase education spending further, adding private resources on top of the voucher.

Because vouchers reduce the price of all education rather than providing only a fixed free level, they generate less crowding out than free public schooling. Total education consumption is more likely to increase.

The **PROS** of vouchers are:

1. **Consumer sovereignty:** Families are free to choose the school and education level that best match their preferences. They are not forced to consume the specific level chosen by the government, as in free public provision.
2. **Competition:** Schools compete to attract students who bring vouchers with them. This competitive pressure can improve efficiency, raise quality, and reduce costs, similar to how private markets operate.

The **CONS** of vouchers are:

1. **Excessive School Specialization:** Schools may focus on narrow market segments such as sports or arts to attract students, potentially neglecting core subjects and essential educational standards.
2. **Segregation:** Vouchers may reintroduce segregation by income, race, or ability, as families sort into different schools based on resources and background.
3. **Inefficient And Inequitable Use Of Public Resources:** Public spending may increase because the government subsidizes students who would have attended private schools, anyway, leading to higher total costs without large gains in access.
4. **Limited Competition Or Natural Monopoly:** The education market may not function as a fully competitive market. In some areas, having a single provider may be more efficient due to scale economies.
5. **High Costs Of Special Education:** Students with disabilities require more resources. Private schools may avoid enrolling them, or vouchers may not fully cover their higher costs, creating inequities.

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4. MEASURING THE EFFECTS OF EDUCATION

Education can have many effects on different things: economic return, productivity ecc..

4.1 Measuring the Returns to Education

Measuring the returns to education is important but empirically difficult. Individuals with more education earn more on average, but this positive correlation can be interpreted in different ways.
Returns to education refer to the benefits obtained when people acquire more schooling or higher quality education.

As an example, assume individuals with a high school education earn Y_{HS} and those with a university education earn Y_U, with $Y_U > Y_{HS}$. **The private return to education is the increase in earnings** associated with moving from high school to university, per additional year of education.

$$r \approx \frac{Y_U - Y_{HS}}{Y_{HS}} \times \frac{1}{\Delta s}$$ *Δs=additional years of schooling

4.2 Measuring the Effect of Education on Productivity

There is a positive correlation between higher education and higher income, but there are two main interpretations.

1. **Human capital:** Education increases skills and productivity. More schooling makes workers more productive, so firms pay higher wages. Education directly raises income.
2. **Screening:** Education does not raise productivity but signals ability. High ability individuals are more likely to complete higher education, and firms use degrees to identify them.

The policy implications for the government differ depending on which interpretation is correct.

1. **Human capital:** If education increases skills and productivity, the government has a strong reason to support and subsidize education. Returns are social because higher productivity benefits the whole economy through growth, innovation, and higher tax revenues.

2. **Screening:** If education only signals ability and does not increase productivity, there is little justification for large public subsidies. <u>Returns are mainly private</u> because the higher wage reflects individual ability rather than a gain in social productivity.

Most empirical evidence suggests that a large share of the returns to education reflects human capital accumulation. However, some screening value likely exists, especially for obtaining diplomas such as a high school or university degree.

4.3 Measuring the Effect of Education on Other Outcomes

<u>Education affects many outcomes</u> beyond wages and productivity.

- Better educated individuals are more likely to <u>participate in the political process</u>, which strengthens democratic institutions. They are <u>less</u> likely to engage in <u>criminal activity</u>, contributing to social stability.
- Education is also associated with <u>better health</u> and healthier children, as well as a lower probability of engaging in risky behaviors such as smoking or heavy drinking.
- There are <u>strong intergenerational effects</u>. More educated parents tend to have better educated children, reinforcing human capital accumulation over time.

Overall, the evidence shows that increasing years of education generates both private returns, such as higher earnings and better life outcomes, and public returns, such as lower crime and better civic participation.

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5. FINANCING HIGHER EDUCATION

- Why Governments Finance Higher Education?
Higher education generates both strong private returns and important social benefits. Individuals earn higher wages, but society also gains through innovation, productivity growth, and civic engagement. At the same time, <u>credit constraints are severe</u>, because many capable students cannot borrow enough <u>to attend university</u>. Public intervention aims to correct these market failures and expand access, although the best mix of policy tools remains debated.

- Main Policy Instruments

- **Direct Public Provision:** Governments fund and <u>operate public universities</u>, often with <u>low or zero tuition</u>. This increases access but requires sustained public resources.
- **Grants And Scholarships:** <u>Non repayable transfers</u>, based on financial needs, that reduce financial barriers <u>for low-income students</u> and directly target equity.
- **Student Loans:** <u>Repayable after graduation</u>, sometimes income contingent. These help overcome liquidity constraints while sharing costs between students and the state.
- **Tax Incentives:** Tuition deductions or credits that reduce the effective cost of university, though they often <u>benefit middle- and higher-income families more</u>.

- Public vs Private Financing Across OECD: Across OECD countries, the balance between public and private funding differs widely. Nordic countries finance almost all tertiary education publicly, while the United States relies much more on private funding. Italy is around 70 percent publicly financed.

- OECD Evidence on Outcomes: There is a <u>positive relationship between tertiary spending</u> as a share of GDP <u>and tertiary attainment</u> among adults. Countries that spend more tend to have a higher share of university educated individuals. However, this relationship is not purely causal. Spending can expand access and completion, but institutional quality, labor market incentives, migration patterns, and demographic factors also matter (Luxemburg).

→ For example, Italy has relatively moderate spending but low tertiary attainment, suggesting that simply increasing budgets may not be enough. Improving student support, incentives, and institutional efficiency may be more effective.
→There are also <u>large differences</u> in performance both across countries and <u>within countries</u>. In Italy, the North South gap in test scores reflects differences in resources, teacher shortages, and management quality. Understanding these structural differences helps identify which policies are likely to produce the highest returns.

- Evidence on Financial Aid Dynarski 2003: Dynarski shows that f<u>inancial aid has a direct effect on college enrollment</u>. An additional 1000 dollars in need-based grants raises attendance by about 3 to 4 percentage points. The effects are strongest for low-income students, indicating that liquidity constraints, not lack of ability, limit access to university. Targeted aid therefore improves both efficiency and equity by increasing human capital and expanding access for disadvantaged students.

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6. EDUCATION: INPUTS THAT WORK

Economists analyze education using a production function. Schools combine inputs such as teacher quality, class size, instructional time, and peer effects to produce outputs like test scores, graduation, skills, and long run earnings. The <u>key policy question is which inputs generate the highest marginal returns</u>, given limited resources.

- The Challenge of Causal Identification: A major difficulty is that simple <u>correlations between inputs and outcomes can be misleading</u>. Schools facing more disadvantaged students often receive more funding, so higher spending may appear unrelated or even negatively related to performance. (High spending is not causing low performance, it happens because high spending is done because weaker students both receive more funds and perform worse on tests → <u>correlation does not imply causation</u>)
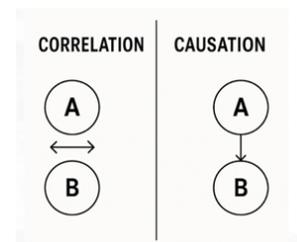
→ To identify true causal effects, researchers rely on <u>randomized experiments</u>, natural experiments, and policy reforms.

This framework guides the rest of the analysis. The goal is to understand which inputs truly improve outcomes, how cost effective they are, and where public resources should be targeted to generate the highest returns.

Research in education focuses on the main inputs that may affect student outcomes. These include class size, teacher quality, school resources and spending, curriculum and instructional time, accountability and school management, and early childhood education.
Each of these inputs can influence learning, but they differ significantly in effectiveness and cost.

6.1 An Education Input: Investments In Resources

A long running <u>debate</u> is whether <u>extra school resources actually improve student outcomes</u>. When we say resources, we mean things like infrastructure and buildings, textbooks and instructional materials, support staff, tutoring programs, and technology.

→ **The evidence is mixed.** Some studies find a weak link between higher spending and better performance, while other studies show that specific, well-designed investments can have large effects. A big reason for the mixed evidence is that resources are not always allocated randomly across schools.

- Problems Identifying Resource Effects: <u>Simple correlations between spending and outcomes can be misleading</u> because funding often flows toward schools with more difficulties. If a school has lower test scores or more disadvantaged students, it may receive additional money. Then, in the data, high spending can appear together with low performance, even if the spending is helping.

→ **This is reverse causality:** weak outcomes trigger more funding, not the other way around.
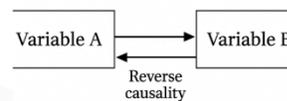
Because of this, naive estimates are often biased downward and can even suggest the wrong sign. To get credible causal evidence, researchers use randomized evaluations, natural experiments, or policy reforms that change funding rules in a way that is closer to random.

- When Does Money Matter Most?: Evidence suggests that resources tend to be most effective when they are allocated <u>early in a child's life</u>, targeted <u>to disadvantaged students</u>, and accompa<u>nied by improvements in teacher quality or school management</u>. The idea is that money works best when it changes something important in how teaching and schools operate, not when it is just spread everywhere.
This also means the marginal return to spending varies a lot across contexts. The same extra euro can have very different effects depending on who receives it and how it is used.

- Italy: Spending in International Perspective: Italy spends less per student than the OECD average, especially in primary and early secondary education. Investment levels also vary sharply across regions, which helps explain persistent regional gaps in school performance.
A key issue is that limited spending on early intervention reduces the potential for equal opportunity, because early gaps are harder and more expensive to fix later.

- Policy Implication; Targeted Investment: Overall, the evidence points to a clear pattern. Broad, untargeted increases in spending tend to generate modest gains, while <u>targeted investments, especially in disadvantaged areas, can have substantial payoffs.</u>
So policymakers should prioritize early childhood programs, strengthening teacher support and development, and improving school leadership and management, instead of focusing mainly on universal budget expansions.

6.2 Another Education Input: School Quality (Class Size)

School quality has a strong effect on long run outcomes such as earnings, employment, health, and civic participation. Even when controlling for years of schooling, students who attend higher quality schools tend to perform better in the labor market. This means that how education is delivered matters as much as how many years of education individuals receive.

To study this, researchers ask whether higher quality schools increase the returns to education. Measuring school quality requires clear indicators. The most common measures are average class size and school spending per student, which are used as proxies for the quality of educational inputs.

- The Tennessee STAR Experiment:

The STAR experiment randomly assigned students and teachers to small classes with 13 to 17 students or regular classes with 22 to 25 students. Because the assignment was random, differences in outcomes can be interpreted as causal effects of class size rather than differences in student background or school quality.

- Short run effects: Students in smaller classes performed significantly better on standardized tests, with especially large gains for minority and low-income students. These improvements appeared early in primary school and persisted in later grades.
- Long run effects: Students assigned to small classes were more likely to graduate high school, attend college, and earn higher wages as adults, suggesting that early class size reductions can generate lasting benefits.

Why Class Size Might Matter? → Smaller classes may allow teachers to provide more individualized attention, reduce classroom disruptions, and better tailor instruction to student needs. However, reducing class size is costly, so it is essential to evaluate its causal impact rather than rely on simple correlations.

Where it matters most? → The impact of class size reductions is strongest for disadvantaged students and in early grades. This implies that targeted reductions, such as in low-income areas, are much more cost effective than universal reductions.

- Example on Class Size and Cost Effectiveness:

- Consider a policy that reduces average class size from **24 to 18 students**.
- Evidence from randomized experiments suggests this increases test scores by about **0,15 standard deviations** for disadvantaged students.
- Estimated cost of this intervention: **€3000 per pupil per year**.
- **Back-of-the-envelope calculation**

Cost per 0,1 SD gain approx. = (3000 /0,15) * 0,1 = 2000

(*0,1 SD instead of 1 SD because the effect size is only 0,15 SD, so cost per 0,1 SD is more meaningful*)

The learning gains from reducing class size are real and statistically significant, but they are relatively expensive to achieve.

When compared to other interventions, especially policies that improve teacher quality, similar or even larger gains can often be obtained at lower cost. This suggests that class size reductions are most cost effective when targeted to early grades or disadvantaged students rather than applied universally.

6.3 The Strongest Input: Teacher Quality

 - **Teacher Quality as the Key Input:** Teacher quality is the <u>most important school-based determinant of student achievement</u>. Even within the same school, students assigned to a high-quality teacher learn significantly more than those assigned to a low-quality teacher. <u>Teacher "value added"</u> measures how much a teacher improves student test scores relative to expectations, controlling for prior achievement and student background. Although not perfect, value-added <u>measures reliably distinguish the most and least effective teachers.</u>

- **Evidence: Chetty, Friedman and Rockoff:** A one standard deviation increase in <u>teacher value added raises lifetime earnings</u> by about 250000 dollars per classroom. It also increases <u>test scores,</u> <u>college attendance</u>, the <u>quality of neighborhoods</u> students live in as adults, and improves later life outcomes such as <u>lower teen pregnancy</u>. These results show that teacher quality has very large, long <u>run effects on both private and social outcomes.</u>

- **Why Does Teacher Quality Vary?:** Variation in teacher quality comes from differences in motivation, preparation, classroom management, and instructional skill, not simply from formal qualifications or years of experience. <u>Institutional rigidities can prevent schools from rewarding high performing teachers</u>.
→ In Italy, salaries are highly centralized and mainly determined by seniority, with few mechanisms to reward effectiveness or attract strong teachers to disadvantaged schools. As a result, incentives for high performance are weak.

- **Why Accountability Matters:** Accountability systems aim to improve school performance by creating incentives for better student outcomes. Tools include <u>standardized testing</u> (<u>to compare</u> effectively performances of <u>different teachers</u>), public report cards, <u>teacher evaluations</u>, and <u>performance-based contracts</u>. When well designed, they can motivate improvement, but poorly designed systems risk teaching to the test or narrowing the curriculum.
→ In Italy, standardized testing is limited and accountability mechanisms are weak. Teacher evaluation is rare and often symbolic, so schools face little performance pressure, which may contribute to persistent regional disparities.

6.3 Early Childhood as the Highest Return Stage of Investment

- **Why Early Childhood Matters:** Early childhood is the stage where <u>investments generate the highest social returns</u> compared to interventions later in the education cycle. In the first years of life, cognitive and socio emotional skills are especially responsive to high quality programs. <u>Inequalities also emerge very early</u>, so if gaps are not addressed at this stage, they become <u>harder and more expensive to fix later</u>. As shown by Heckman, skill formation is dynamic: early investments not only have direct effects, but also increase the productivity of later investments, amplifying long term returns → skills build on each other over time.

- **Italy:** Access and Quality of Early Education: In Italy, enrollment is relatively high for children aged 3 to 5, but access is much more limited for those aged 0 to 3. Asili nido are scarce and unevenly distributed across regions, with coverage rates below European targets. This limited access contributes to early inequalities in cognitive and socio emotional development, and these gaps tend to persist throughout the schooling system, reinforcing long term disparities.

7. APPENDIX: EMPIRICAL EVIDENCE ON RETURNS TO EDUCATION

Empirical research strongly supports the human capital interpretation of education, but also shows that some screening exists.

7.1 Evidence: Returns to Schooling

1. **Duflo 2004 Indonesia:** School construction program increased years of schooling. Adults exposed to more school construction earned higher wages later in life. This shows that increasing schooling causes higher earnings, supporting human capital.
2. **Compulsory Schooling Laws:** When laws force students to stay longer in school, those students later earn higher wages than similar students who were not forced. This suggests schooling increases productivity, not just signals ability.
3. **Estimated Return:** Most studies find that each additional year of schooling increases wages by about 7 to 10 percent.

This supports the human capital model.

7.2 Screening and the Sheepskin Effect

Sheepskin effect: Obtaining a diploma increases wages more than just additional years of schooling alone. Some studies find that individuals who obtain a degree earn 10 to 25 percent more than individuals with similar years of schooling and similar test scores but without the degree.
This suggests education has some screening value, but it does not eliminate the human capital effect.

7.3 Evidence: School Spending and Long Run Outcomes

Jackson, Johnson, Persico 2016: A 10 percent increase in per pupil spending for disadvantaged students throughout schooling led to:
– Higher adult earnings
– Higher educational attainment
– Lower poverty rates
The improvements were driven by smaller class size, better teacher salaries, and more instructional time.
This shows that targeted spending can have large long-term returns.

7.4 Evidence: Early Childhood Programs

Perry Preschool Study: Provided intensive early childhood education to disadvantaged children.
Long term effects:
– Higher earnings
– More education
– Lower crime rates
The estimated social return was very high.
This strongly supports early childhood investment as one of the most effective education policies.

8. FINAL TAKEAWAYS

Key Lessons from the Empirical Evidence:

- Teacher quality has the strongest and most persistent effect on student outcomes.
- Targeted spending, especially early in life or for disadvantaged students, yields high returns.

- Accountability systems can improve performance when well designed and combined with autonomy.
- Class size reductions matter, but mostly for younger children and disadvantaged groups.
- Early childhood programs have the highest cost benefit ratios.

CHAPTER 3 – SOCIAL INSURANCE

1. RECAP ON INSURANCE

1.1 What Is Insurance and Why It Is Valuable
There are two main models of social insurance.
- **European Model:** In the European model, the <u>government plays a crucial role</u> in the direct provision of social insurance. Programs such as health insurance, pensions, and unemployment benefits are mainly provided and financed by the state. Protection is largely public.
- **Private Model (USA):** In the <u>private model</u>, social protection relies more on private expenditure, often <u>supported by fiscal incentives</u>. This includes: Household private direct expenditure (you pay the medicine when you get sick) AND Private insurance (you pay for the private insurance). Here, individuals rely more on private markets rather than direct government provision.

Insurance is a <u>promise to make a payment</u> if a specific negative event occurs, in <u>exchange for a premium</u>.

Because the future is uncertain, there are different possible outcomes, called states of the world. For example:
• No accident
• Accident

$$EU = (1 - p) \times U(\text{cons. with no adverse event}) + p \times U(\text{cons. with adverse event})$$

EU with No Insurance vs Insurance:
If the probability of an accident is p:

1) Without insurance:
• Wealth is w if no accident
• Wealth is w − d if accident
EU = (1 − p)U(w) + pU(w − d)

2) Now consider an insurance contract:
• b = reimbursement
• m = premium per dollar of coverage
• Total premium = mb

With insurance:
• Wealth is w − mb if no accident
• Wealth is w − mb − d + b if accident
Expected utility becomes:
EU = (1 − p)U(w − mb) + pU(w − mb − d + b)

Insurance is valuable because it helps individuals <u>level/smooth consumption across states of the world</u>: so instead of consuming a lot when nothing bad happens and very little when a negative event occurs, they can smooth their consumption and <u>avoid large drops in their standard of living</u>.

1.2 Actuarially Fair Insurance and Risk Aversion

If the <u>premium is actuarially fair</u> and the contract provides <u>full insurance</u>, then <u>risk averse individuals will always buy it</u>. This is because it maximizes their expected utility.

An insurance contract is actuarially fair when: **m = p** → This means the premium reflects exactly the probability of the bad event. The insurer charges a price equal to the expected loss. There is <u>no extra markup</u>

Full insurance means:: **b = d** → The reimbursement b is equal to the damage d. So if the accident happens, the individual is <u>fully compensated</u> and does not suffer any loss.

A risk averse person has a concave utility function. This means marginal utility is diminishing.
In simple words, they do not like risk. They prefer a certain outcome rather than a lottery with the same expected value. They are even willing to give up some money to avoid uncertainty.
The intuition is simple: risk averse people prefer giving up a small amount for sure rather than facing a small probability of a large loss.

Numerical Example:
Suppose Sam has a 1 percent probability of an accident that costs 30,000.
Insurance is actuarially fair, so the premium reflects that 1 percent probability. Sam's utility is concave because $U = \sqrt{c}$, which implies risk aversion.

Purchase	Hit?	C	$\sqrt{C}$	Expected Utility
No insurance	Yes	0	0	$0.01 \times 0 + 0.99 \times 173.2$
	No	30,000	173.2	$= \mathbf{171.5}$
Full insurance ($300)	Yes	29,700	172.34	$0.99 \times 172.34 + 0.01 \times 172.34$
	No	29,700	172.34	$= \mathbf{172.34}$
Partial insurance ($150)	Yes	14,850	121.86	$0.99 \times 172.77 + 0.01 \times 121.86$
	No	29,850	172.77	$= \mathbf{172.26}$

• Without insurance, expected utility is lower because Sam faces a big loss in one state.
• With <u>full insurance, expected utility is the highest</u>. Consumption is the same in both states, so risk is completely eliminated.
• With <u>partial insurance, expected utility is higher than no insurance</u> but <u>lower than full insurance</u>, because some risk remains.

The key result is that full insurance gives the highest expected utility when the premium is actuarially fair and the individual is risk averse.
This confirms the theory: risk averse individuals prefer full insurance at a fair price.

The Role Of Risk Aversion: Risk aversion measures how much individuals dislike risk.
<u>Risk averse</u> people <u>may</u> still <u>buy insurance even if it is not actuarially fair</u>. This is because they value stability and are willing to pay more than the expected loss to reduce uncertainty.
However, people differ in how risk averse they are. → If insurance premiums are extremely unfair, only the most risk averse individuals will buy it. Less risk averse individuals will prefer to take the risk.
So the demand for insurance <u>depends on how risk averse people are</u> and on how fair the premium is.

2. ASYMMETRIC INFORMATION AND ADVERSE SELECTION

2.1 Why Insurance Is a Public Finance Topic

So far, we assumed a perfect insurance market. With actuarially fair premiums and risk averse individuals, full insurance is bought and the outcome is efficient. In that case, there would be no role for the government.

→ Insurance becomes a public finance topic because real markets suffer from informational asymmetry. This means one side of the market has more information than the other. In insurance, individuals typically know more about their own risk than insurers do. When information is asymmetric, the private market equilibrium may not be Pareto efficient.

There are two main problems.

1. **Ex Ante Asymmetry, Called Adverse Selection:** This happens before the contract is signed. High risk individuals are more likely to buy insurance, while low risk individuals may opt out if the premium reflects average risk. This can generate losses for insurers and may even lead to market breakdown.
2. **Ex Post Asymmetry, Called Moral Hazard:** This happens after the contract is signed. Once insured, individuals may take fewer precautions because they do not bear the full cost of the damage.

Because of these problems, private insurance markets may provide too little insurance or fail. This is why government intervention, especially through social insurance, can improve welfare.

2.2 Pricing Under Asymmetric Information: Example

Suppose there are two types of individuals. Half of the population are careless drivers who text while driving. They have a 5% probability of a car accident. The other half are careful drivers. They have a 0.5% probability of an accident. 30000 is the loss if the accident actually happens.

Case 1: Full Information
If the insurance company knows each person's type, it can charge actuarially fair prices to each group.
For careless drivers, the fair premium is 1500 dollars. For careful drivers, the fair premium is 150 dollars.
In this case, the insurer breaks even. For example, among 100 careless drivers, it collects 150000 dollars and pays out 150000. Among 100 careful drivers, it collects 15000 and pays out 15000. There are no losses and no profits. The market works efficiently.

Case 2: Asymmetric Information with Average Price
Now suppose the insurer cannot observe who is careless and who is careful.
One option is to charge an average price, called pooling equilibrium. The average premium is:
0.5 × 1500 + 0.5 × 150 = 825 dollars.
At this price, insurance is a very good deal for careless drivers because they pay 825 instead of their fair price of 1500. They will buy insurance. Careful drivers instead face a premium much higher than their fair price of 150, so many of them will refuse.
If only careless drivers buy insurance, the insurer collects 82500 dollars per 100 careless drivers but still pays out 150000. This generates a loss of 67500. The contract is not sustainable.

Case 3: Asymmetric Information with Separate Prices
Suppose the insurer tries to charge different prices but still cannot observe types.

Careless drivers will pretend to be careful and try to pay 150 dollars. As a result, for every 100 careless drivers, the insurer collects only 15000 but still pays out 150000. The loss is 135000. This situation is even worse.

→ This is the core of adverse selection. Individuals know more about their risk than the insurer. High risk individuals are more likely to buy insurance.

In the pooling case, where the insurer charges the average premium, selling to both types requires low risk individuals to subsidize high risk individuals, and low risk individuals may not accept this. In the extreme case, only high-risk individuals remain insured and the market may collapse.

Information	Pricing Approach	Premium per Careless (100 people)	Premium per Careful (100 people)	Total Premiums Paid	Total Benefits Paid Out	Net Profits to Insurers
Full	Separate	$1,500	$150	$165,000 (100 x $1,500 + 100 x $150)	$165,000	0
Asymmetric	Separate	$1,500	$150	$30,000 (0 x $1,500 + 200 x $150)	$165,000	−$135,000
Asymmetric	Average	$825	$825	$82,500 (100 x $825 + 0 x $825)	$150,000	−$67,500

Does Asymmetric Information Always Cause Market Failure?
Not necessarily. It depends on how strong risk aversion is and on the contracts that are offered.
If low risk individuals have a high enough risk premium, meaning they strongly dislike risk, they may be willing to subsidize high risk individuals in a pooling equilibrium.

The risk premium is the extra amount that a risk averse individual is willing to pay above the actuarially fair price in order to eliminate risk.

2.3 Pooling vs Separating Equilibria
This is the same logic as in the car accident example, because we still compare pooling and separating equilibria under asymmetric information, but now we introduce contract design as a tool to induce self-selection instead of simply trying to charge different prices.

Pooling Equilibrium
A pooling equilibrium is a situation in which all types of individuals buy the same insurance contract, even though it is not fairly priced for everyone.
Low risk individuals pay more than their fair price. High risk individuals pay less than their fair price. There is cross subsidization, but everyone remains insured.

Separating Equilibrium Through Contract Design
Alternatively, the insurer may try to induce type revelation by offering two different contracts.
1. Contract A is designed for high-risk individuals. It offers full insurance at the actuarially fair premium for high-risk people.
2. Contract B is designed for low-risk individuals. It offers a lower premium, equal to the fair price for low-risk people, but only partial insurance.

The aim is separation. High risk individuals choose contract A because they value full insurance more. Low risk individuals choose contract B because the premium is lower and partial insurance is sufficient for them.
A separating equilibrium is a situation in which different types of individuals choose different contracts, and their choices reveal their true risk type.

Remaining Distortion And Market Failure

There is still a problem. <u>Low risk individuals would still prefer full insurance at their own fair price</u>, but that contract cannot be offered. If it were offered, high risk individuals would pretend to be low risk and buy it. As a result, even in a separating equilibrium, the allocation is distorted. Low risk individuals receive only partial insurance, even though under full information they would receive full insurance at their fair price.
For this reason, asymmetric information can still generate market failure, even if the market does not completely collapse.

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3. GOVERNMENT INTERVENTION IN INSURANCE MARKETS

3.1 Why Government Provides Insurance
Adverse selection can lead to market failure because healthy individuals may not be willing to buy insurance. If <u>mainly high-risk individuals remain insured</u>, the market becomes unstable and may not function efficiently.
The <u>government can address adverse selection</u> and improve market efficiency <u>in a number of ways like forcing people to buy insurance or providing free public insurance</u>. <u>However</u>, all these interventions <u>involve redistribution</u> from healthy individuals to sick individuals, which may be politically unpopular.

Adverse selection is not the only reason for government involvement in the insurance markets.
→
1. **Externalities:** Some activities create spillovers. <u>Vaccines generate positive externalitie</u>s because they protect others. <u>Car crashes create negative externalities</u> because they impose costs on third parties. In these cases, <u>private insurance choices do not fully reflect social costs and benefits</u>.
2. **Administrative Costs:** <u>Government run programs</u> such as Medicare may have <u>much lower administrative costs than private insurance</u>. This can make public provision relatively more efficient.
3. **Redistribution:** Governments may want to redistribute resources <u>from healthy to sick individuals for equity reasons.</u>
4. **Paternalism:** Governments may believe that individuals would choose to buy too little insurance on their own, so they intervene to <u>protect individuals from underinsuring themselves</u>.

3.2 Social Insurance vs Self Insurance
<u>Even if private insurance markets do not function well</u>, <u>individuals may still smooth consumption through self-insurance</u> (reduce the fall in consumption after the adverse event)

→ Self-insurance refers to private ways of smoothing consumption <u>after an adverse event</u>. This includes using one's own savings, increasing the labor supply of family members, or borrowing from friends and relatives.

Example Unemployment Insurance
People can insure <u>against unemployment</u> in several private ways.

1. They can draw on their <u>own savings</u>.
2. They can <u>borrow</u>. This can be in collateralized form, for example borrowing against home equity, or in uncollateralized form, such as credit card debt.
3. Other <u>family members</u> can increase their <u>labor earnings</u>.
4. They can receive <u>transfers from extended family</u>, friends, or local organizations.

<u>All</u> these mechanisms <u>reduce the fall in consumption caused by unemployment</u>.

→ The <u>amount of self-insurance</u> already in place <u>determines how effective social insurance is</u>.

If an individual has <u>no self-insurance</u>, each dollar of unemployment insurance directly reduces the drop in consumption caused by unemployment. There is <u>no crowding out of private self-insurance.</u>

If an individual has <u>complete self-insurance</u>, each dollar of unemployment insurance simply replaces one dollar of self-insurance. Consumption does not change. This is <u>complete crowding out of private self-insurance</u>.
If an individual has <u>partial self-insurance</u>, each dollar of unemployment insurance is partly used to smooth consumption and partly used to reduce private self-insurance. This is <u>partial crowding out</u>.

The importance of social insurance for consumption smoothing depends on two main factors.

1. **Predictability Of The Event:** It is easier to self-insure against predictable events, for example by increasing savings in advance. The <u>more predictable the risk, the smaller the benefit of social insurance.</u>
2. **Cost Of The Event:** It is harder to self-insure against very costly events, such as becoming seriously injured and unable to work. The <u>higher the cost of the risk, the greater the benefit of providing social insurance.</u>

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4. MORAL HAZARD AND OPTIMAL SOCIAL INSURANCE

4.1 Moral Hazard: Types and Consequences
The <u>main cost</u> of providing <u>SOCIAL insurance</u> is <u>moral hazard.</u> (it is a cost also for private insurance but here we focus on the public one).
Moral hazard refers to adverse actions taken by individuals or producers in response to being insured against adverse outcomes. Once people are insured, they may change their behavior because they no longer bear the full cost of their actions.

→ The existence of m<u>oral hazard implies that it may not be optimal for the government to provide the full insurance</u> that risk averse individuals would like. Even though people demand full insurance, providing <u>it can distort behavior</u> and reduce efficiency.

Two main factors determine how <u>severe moral hazard</u> is.

1. **Observability Of The Adverse Event:** If it is difficult to observe whether the adverse event has truly occurred, <u>individuals may falsely claim benefits or exaggerate losses</u>.
2. **Ease Of Behavioral Change:** If it is easy for individuals to <u>change their behavior in order to trigger</u> or increase <u>the adverse event</u>, moral hazard becomes more severe.

When analyzing social insurance programs, four main types of moral hazard are especially important.
1. **Reduced Precaution:** Individuals may <u>reduce effort to avoid</u> the adverse state. For example, if you have medical insurance, you may invest less in protecting your health.

2. **Increased Probability Of Entering The Adverse State:** Insurance may <u>increase the likelihood that individuals report</u> or enter the adverse state. For example, with workers' compensation, individuals may be more likely to claim that they were injured on the job.
3. **Increased Expenditures In The Adverse State:** Once in the adverse state, insured <u>individuals may spend more</u>. For example, with medical insurance, people tend to use more medical care.
4. **Supplier Responses:** Firms or providers may also change their behavior. For example, if workers are covered by workers' compensation, <u>firms may reduce their effort to prevent workplace accidents</u>.

Moral hazard is <u>costly</u> for two main reasons.

1. **Social Efficiency Loss From Distorted Behavior:** Insurance induced behavior <u>can reduce social efficiency</u>. For example, generous workers' compensation may reduce <u>labor supply</u> below the socially efficient level. Some people may reduce effort. Some may exit the labor force earlier. Some may claim disability instead of working.
2. **Higher Program Costs And Taxes:** If social insurance increases the frequency or cost of adverse events, the <u>total cost of the program rises</u>. This requires <u>higher taxes</u>, which further reduce social efficiency.

4.2 Optimal Social Insurance

Optimal social insurance <u>should provide partial</u>, but not full, insurance against adverse events. <u>Full insurance</u> maximizes consumption smoothing, but it <u>creates strong moral hazard</u>.

The optimal policy <u>balances</u> these two forces.

1. **Benefit Of Social Insurance**: The benefit is <u>consumption smoothing</u>. When an adverse event occurs, social insurance reduces the fall in consumption and increases welfare for risk averse individuals.
2. **Cost Of Social Insurance**: The cost is <u>moral hazard</u>. By insuring individuals against adverse events, behavior changes in inefficient ways and program costs increase.

The optimal level of insurance equates the marginal benefit of additional smoothing with the marginal cost from increased moral hazard.

→ <u>Asymmetric information both motivates and limits government intervention</u>. It motivates intervention because <u>private markets may fail due to adverse selection</u> BUT It limits intervention because insurance itself <u>creates moral hazard.</u>

For this reason, social insurance is justified, but it should not provide complete coverage.

CHAPTER 4 – HEALTHCARE SYSTEM

1. INTRODUCTION AND HEALTH SYSTEM MODELS

Health care systems mainly differ in who pays and who provides care.
There are four main models.

1. **National Health Insurance:** Funded through <u>general taxation</u> and <u>provided by the government</u>. <u>Coverage is universal</u>. Examples are the UK and Italy.
2. **Social Health Insurance:** Funded through <u>payroll contributions paid by employers and employees</u>. Care is mostly <u>provided by private providers</u>, but <u>access is universal through insurance funds</u>. The government regulates prices. Germany is an example.
3. **Single Payer:** Funded by <u>taxes</u> and <u>provided by the government</u>, with <u>one public insurer</u> covering everyone. Canada is an example.
4. **Private Insurance** Model: Funded mainly through <u>private insurance</u> and <u>provided by the private sector</u>. The US is the main example.

The basic <u>mechanism of insurance</u> is simple.

→ Individuals, or firms on their behalf, <u>pay monthly premiums to</u> an <u>insurance company</u>. In return, the insurance company <u>pays the providers of medical goods</u> and services for <u>most of the cost</u> of care used by the individual.

Patients usually <u>still pay part</u> of the cost through:

1. **Deductibles:** The amount <u>paid</u> out of pocket <u>before insurance starts covering expenses</u>.
2. **Copayment:** A <u>fixed payment</u> for each service.
3. **Coinsurance:** A <u>percentage</u> of each medical bill <u>paid by the patient</u>.

These payments are important because they affect incentives and are linked to moral hazard, which we will analyze later.

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2. THE U.S. HEALTH INSURANCE SYSTEM

In the US most people are covered by <u>private insurance</u> mainly <u>employer based</u>, a large share is covered by <u>public programs</u> like <u>Medicare and Medicaid</u>, and about 26 million people remain uninsured.

	People (millions)
Total population	**324.6**
Private	220.8
Employment-based	183.0
Direct purchase	33.2
Public	110.7
Medicare	58.8
Medicaid	55.9
Tricare/CHAMPVA	3.2
The uninsured	26.1
Data from: Keisler-Starkey and Bunch (2020), Table 1.	

2.1 Private Insurance: Provided By Employers

In 2019, about 68.5 percent of the US population had private health insurance, making it the main source of coverage in the American system.
<u>Private insurance</u> is provided in <u>two ways</u>:

1. **Employer Based Insurance:** Coverage offered through the workplace. This is the <u>largest share</u> of private insurance.
2. **Nongroup Insurance Market:** The market where individuals or families <u>buy insurance directly</u>, rather than through an employer.

So when we talk about private insurance in the US, we mainly mean employer-based coverage, plus a smaller individual market.

Since employer-based insurance plays such a central role, we need to understand <u>why firms provide it</u> ? There are two main reasons.

1. **Risk Pooling:** Employers can <u>group all employees into one insurance pool</u>. A risk pool is the group of individuals enrolled in the same plan. Large pools make <u>medical spending more predictable</u> because of the law of large numbers. When many people are insured together, average costs become more stable. Pooling workers also <u>reduces adverse selection</u>, since healthy and unhealthy employees are insured together.

2. **Tax Subsidy:** Employer provided insurance is <u>favored by the tax system</u>. <u>Workers</u> pay taxes on wages, but <u>DO NOT pay taxes on</u> compensation received in the form of <u>health insurance</u>. This creates a subsidy for employer-based insurance.

This example shows that even if buying insurance privately looks cheaper before taxes, a worker can end up with higher after-tax income when insurance is provided through the employer because of this tax advantage.

	Marginal Product, Wage	Employer Health Insurance Spending	Pre-Tax Wage	After-Tax Wage	Personal Health Insurance Spending	After-Tax, After-Health Insurance Income
Nigel	$30,000	0	$30,000	$20,000	$4,000	$16,000
Kim	30,000	$5,000	25,000	16,666	0	16,666

- While Nigel's private insurance is cheaper, Khadija ends up with more income after taxes due to the subsidy to employer-provided insurance.

This <u>subsidy is often misunderstood</u>. It <u>benefits employees</u>, not employers. <u>Firms are indifferent</u> between paying w<u>ages or</u> paying for <u>health insurance</u>, <u>because both are tax deductible</u> for the company. For them, it is simply total compensation.

→ Workers, however, prefer to receive health insurance instead of equivalent wages, because wages are taxed while employer provided insurance is not. This lowers their tax payments and increases their after-tax income.

<u>If the government wanted to remove this subsidy</u>, it would not need to raise corporate taxes. Instead, it would <u>include</u> employer spending on <u>health insurance as part of the employee's taxable income</u>.
This tax rule is one of the main reasons employer-based insurance dominates the US system.

2.2 Private Insurance: Nongroup Market
The other option to employer-based insurance is the nongroup market, where individuals buy insurance directly on their own.
<u>Historically</u>, this <u>market did not function well</u> in the US. Coverage was not always available, especially for people who needed it most.
→ In particular, individuals in poor health often faced serious problems. They were sometimes denied coverage altogether, or they could obtain it only at extremely high prices.

This happened <u>because insurers were worried about adverse selection</u> and high expected medical costs. As a result, the nongroup market was unstable and incomplete before major reforms.

2.3 Public Programs: Medicare, Medicaid, Tricare

Medicare

Medicare is a federal program that provides health insurance to all <u>people over age 65</u> and to <u>disabled individuals under age 65.</u>

Eligibility is linked to work history. Any citizen who has <u>worked for at least 10 years in Medicare covered employment</u>, and their spouse, is entitled to Medicare at age 65.

Medicare is <u>financed mainly through payroll taxes</u> paid by current workers, <u>regardless of whether they are currently using Medicare</u>, it is mandatory to pay it. So unlike general tax financed systems such as the Italian one, Medicare relies specifically on payroll contributions.

Medicaid

Medicaid is a joint federal and state program that provides <u>health care for the poor</u>. Unlike Medicare, which is age based, Medicaid is <u>income based</u>.

Coverage is targeted to specific groups:

1. **Cash Welfare Recipients:** Individuals who <u>qualify for cash assistance programs</u>.
2. **Low Income Children:** Most <u>poor children</u> in the US.
3. **Low Income Pregnant Women:** <u>Pregnant women</u> with <u>low income</u>.
4. **Very Low-Income Families:** In states that expanded Medicaid under the ACA, all <u>families below a certain income</u> threshold are covered.
5. **Low Income Elderly And Disabled:** For expenses not covered by Medicare.

So Medicaid acts as a safety net for the poorest segments of the population.

TRICARE/CHAMPVA

In addition to Medicare and Medicaid, there are <u>smaller public programs</u> linked to military service and veterans.

1. **TRICARE:** Administered by the Department of Defense and <u>covers military</u> retirees and the families of active duty, retired, or deceased service members.
2. **CHAMPVA:** The Civilian Health and Medical Program of the Department of Veterans Affairs. It provides coverage to <u>disabled dependents of veterans</u> and certain <u>survivors of veterans</u>.

Together, these programs show that the US system is not purely private. It is a mixed system where private insurance dominates, but public programs play a crucial role for the elderly, the poor, and military families.

2.4 The Uninsured And Why It Matters

After describing private and public coverage, the <u>remaining group</u> in the US system is those <u>without any insurance.</u>

There are about 26 million uninsured individuals in the United States. They tend to have lower than average incomes. However, they are not only unemployed people. In 2019, nearly three quarters of the nonelderly uninsured lived in families where at least one member worked full time. About 14.2 percent of the uninsured are children.

So lack of insurance is <u>not simply a problem of not working</u>. It is also linked to income levels, job characteristics, and access to affordable plans.

Why are some individuals uninsured?
1. **Uncompensated Care:** Some may <u>rely on</u> uncompensated care, meaning <u>health care provided for which providers are not reimbursed</u>. They expect that hospitals or doctors will treat them even if they cannot pay.
2. **High Cost:** Insurance may simply be <u>too expensive given their income</u>, health risks, and market prices.
3. **Adverse Selection:** <u>Insurers may refuse to cover high risk individuals</u>, or charge extremely high premiums, because they fear attracting mainly sick people.
4. **Underestimating Insurance:** Some individuals may <u>not correctly value the benefits of insurance</u> and choose not to buy it.

From a policy perspective, there are several reasons <u>why the uninsured matter</u>.

1. **Physical Externalities:** With <u>communicable diseases</u>, one person's lack of treatment can affect others. This creates public health risks.
2. **Financial Externalities:** When uninsured individuals receive <u>uncompensated care</u>, the <u>cost is often shifted to insured individuals through higher premiums</u> or <u>taxes</u>.
3. **Inappropriate Care:** The uninsured often <u>receive delayed or lower quality care</u>, which can worsen health outcomes and <u>increase long term costs</u>.
4. **Paternalism And Equity:** Society may <u>believe that everyone should have access</u> to basic health care, even if individuals would not choose to insure themselves.
5. **Job Lock:** People with insurance may avoid changing jobs because they fear losing coverage. This reduces labor mobility and can prevent productivity improving job matches. Research shows that job lock is quantitatively important. Uninsurance problem exists → Losing job may push you into that uninsured group → Fear of that outcome creates job lock.

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3. INSURANCE DESIGN AND INCENTIVES

3.1 Risk Protection Vs Moral Hazard

We now move from who is covered to how coverage should be designed. The key question is <u>how much of medical spending insurance should cover.</u>

The most generous plans provide first dollar coverage, meaning insurance pays for all medical spending and patients face little or no out of pocket payments.

At first glance, <u>full coverage seems ideal</u>, especially for risk averse individuals. <u>However</u>, the <u>benefit</u> from <u>insuring small</u> and predictable <u>medical expenses is limited</u>.

There are two main reasons:

1. **Small Risk:** <u>Risk averse</u> individuals <u>gain little additional utility from insuring small</u>, predictable expenses. Insurance is most valuable for large and unexpected shocks.
2. **Self-Insurance:** Individuals can more <u>easily pay for minor and predictable costs out of pocket</u> than for large, unpredictable medical events.

On the other hand, the moral hazard costs of very generous insurance can be large. When patients do not bear the full marginal cost of care, they tend to consume more medical services than is socially efficient.

1) Without insurance, patients face the full marginal cost of 100 dollars. They choose quantity Q1, where demand equals marginal cost. This is the efficient level of care.
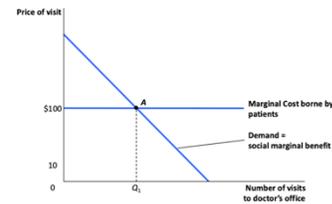
2) With generous insurance, the marginal cost borne by patients falls, for example to 10 dollars. Now patients move along the demand curve and increase consumption to Q2, because visits are much cheaper from their perspective.
However, the real resource cost of each visit is still 100 dollars.
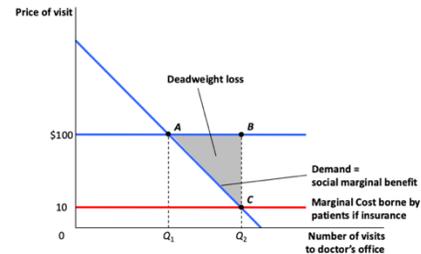
→ The extra visits between Q1 and Q2 cost society more than the benefit they generate. The triangle between demand and true marginal cost represents the deadweight loss caused by overconsumption.
This illustrates the central trade off of health insurance: it provides risk protection and consumption smoothing, but it also distorts behavior and leads to overuse of medical care.

Because of this trade off, full first dollar coverage is generally not optimal. First dollar coverage is weak in terms of additional risk protection for small, predictable expenses, but it creates large moral hazard.

Optimal Health Insurance:
It balances moral hazard against risk protection. Individuals should bear a significant share of routine medical costs within an affordable range, while being fully insured against very large and catastrophic expenses.
In reality, many plans are more generous than this benchmark, while others have no coverage at all, which raises the question of why people end up either uninsured or overinsured.

3.2 Provider Incentives And Payment Systems
After analyzing how insurance affects patients, we now shift to the supply side. Insurance does not only influence how much patients consume, but it also determines how medical providers are paid. The way providers are reimbursed strongly affects their behavior.

One traditional system is retrospective reimbursement.

Retrospective Reimbursement: Providers are reimbursed for the costs they have already incurred. If a doctor or hospital spends more, they are paid more.
→ This system creates clear incentives for overutilization. Since providers are paid regardless of the necessity or value of care, they have little reason to limit costs. The more services they deliver, the more they are reimbursed.

Because retrospective reimbursement encourages overprovision and rising costs, many systems shifted to managed care to better control provider incentives and spending.

Managed Care: An approach to controlling medical costs <u>using supply side restrictions</u>, such as <u>limiting the choice of providers</u> or <u>monitoring treatment decisions</u>.
There are two main forms:

1. **Preferred Provider Organization, PPO:** An organization that <u>negotiates with selected providers</u> to <u>obtain lower prices</u> on behalf of insured individuals. <u>Patients</u> have some flexibility but are <u>encouraged to use preferred providers.</u>
2. **Health Maintenance Organization, HMO:** An organization that integrates insurance and delivery of care. For example, it may <u>pay doctors and hospitals a fixed salary independent of how much care they deliver.</u> In the classic staff model, the HMO hires its own physicians and may own hospitals.

<u>Managed care organizations</u> are typically <u>paid using prospective reimbursement</u> rather than retrospective reimbursement.

Prospective Reimbursement: Providers are paid based on what treating a patient should cost, not on what they actually spend. The <u>payment is fixed in advance</u>.
→ Under prospective reimbursement, payment is the same regardless of actual spending. This creates <u>incentives to reduce costs</u>. However, the incentive problem is reversed. While retrospective reimbursement encourages excessive care, prospective reimbursement <u>may encourage insufficient care</u>. By delivering less care, the provider keeps a larger share of the fixed payment.

So on the provider side, the central issue is again incentives. Retrospective reimbursement pushes toward overprovision, while prospective reimbursement pushes toward underprovision. The challenge is to design payment systems that control costs without reducing necessary and valuable care.

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4. HEALTH CARE REFORM AND THE ACA

After understanding how the US system works and its incentive problems, the next step is reform. Historically, the United States has faced a long impasse over national health insurance.

4.1 Debate Over National Health Insurance
There has always been a <u>fundamental disagreement</u> about the direction reform should take.
<u>Some argue for a single payer system</u>, meaning government provided health insurance <u>for everyone</u>.

Supporters claim it:
1. **Universal Coverage:** Guarantees insurance for all.
2. **Low Administrative Costs:** Simpler system with less duplication.
3. **Equity:** Reduces inequality in access to care.
4. **Cost Control Through Budgeting:** Government can directly limit spending.

However, a public system also has disadvantages:
1. **High Government Spending:** It would dramatically increase public expenditures.
2. **Blunt Budgeting:** Budget limits may prevent the use of expensive but valuable technologies.
3. **Political Resistance:** Strong opposition from private insurers and other stakeholders.

Others prefer a private sector solution, possibly with subsidies. But this approach still faces problems:

1. **Adverse Selection:** Market failures remain.
2. **Cost Containment:** There is little evidence that private markets alone can control health care costs.

This disagreement explains why <u>reform in the US has been incremental rather than radical</u>.

4.2 Massachusetts Reform

In 2006, Massachusetts attempted to cover the remaining 9 percent of its population without insurance.

The reform was based on a "three-legged stool":
1. **Ban On Pre-Existing Condition Exclusions And Health Based Pricing:** Insurers could not deny coverage or charge higher prices based on health status.
2. **Individual Mandate:** A legal requirement that individuals obtain insurance, designed to prevent adverse selection.
3. **Subsidies For Low Income Families:** Public support to make coverage affordable.

The results were significant:
1. **Very Low Uninsurance:** The rate fell to about 3 percent compared to 18 percent nationally.
2. **Public Coverage Expansion:** About half of the new coverage came from Medicaid or subsidized plans.
3. **Lower Premium Growth In Nongroup Market:** Premiums fell relative to national trends.
4. **Costs In Line With Projections:** Reform costs were roughly as expected.
5. **Improved Health:** Some studies found better health outcomes.

This <u>model later became the basis for national reform</u>.

4.3 Affordable Care Act Structure

In 2010, President <u>Obama</u> signed the <u>Affordable Care Act</u>, largely inspired by the Massachusetts model.

The ACA adopted the same three-legged structure:
1. **Community Rating**: Prices could not vary based on health status.
2. **Individual Mandate**: Individuals were required to buy insurance.
3. **Medicaid Expansion And Subsidies:** Medicaid eligibility was expanded to all families below 138 percent of the federal poverty line, regardless of family structure, although some states opted out.

The goal was to expand coverage while preserving a largely private insurance system.

4.4 Cost Control Tools

A central <u>concern</u> behind the ACA was <u>rising health care costs</u>. Since 1950, the price index for medical care has risen by 2.1 percentage points more per year than inflation. However, much of the rapid rise in spending reflects quality improving technological change.

Reducing inefficient spending is difficult, but the ACA introduced five main cost control strategies:
1. **Cap The Tax Break For Employer Insurance:** Limit incentives for overly generous coverage.
2. **Increase Competition:** Promote competition among insurers.
3. **Depoliticize Rate Setting:** Reduce political influence in provider payment decisions.
4. **Comparative Effectiveness Research:** Fund research comparing which treatments work best.

5. **Alternative Payment Pilots:** Test new ways of organizing and reimbursing providers.

These <u>measures</u> aimed to <u>control spending without abandoning the mixed public private structure</u>.

4.5 Evidence And Political Backlash

Projecting the effects of such a large reform is difficult, but the Congressional Budget Office estimated that the ACA would insure 26 million additional people by 2019 and reduce the federal deficit by more than 100 billion dollars in the first decade and over 1 trillion in the next.

Early evidence largely supported these projections:
1. **Large Coverage Gains:** The number of uninsured fell by about 20 million, and the uninsurance rate declined by more than one third. Uninsurance rates across U.S. states declined sharply between 2014 and 2016 following the implementation of the ACA, but began rising again starting in 2017.
2. **Better Access And Health:** Studies suggest improved access to care, better self-reported health, lower emergency room use, and more preventive care.
3. **Slower Cost Growth:** Cost growth was historically low after passage, around 1.4 percent in 2013.

However, the <u>ACA's partial reform structure created more opponents than supporters</u>.

→ <u>Public support remained below 50 percent</u> even after implementation. This unpopularity contributed to major Republican gains in the 2016 election.
The reform's partial nature created both winners and losers. Many benefits, such as Medicaid expansion, were not clearly associated by voters with the law itself.

→ The <u>Trump</u> administration and Congress later <u>weakened the ACA</u>, most notably by <u>repealing the individual mandate.</u>
So the <u>ACA significantly expanded coverage and slowed cost growth</u>, <u>but</u> it remained <u>politically fragile</u>.

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5. THE ITALIAN HEALTH CARE SYSTEM

After analyzing the US system, it is useful to compare it with a different model. Italy follows <u>a national health service approach</u> rather than a mainly private insurance model.

5.1 SSN Structure And Principles

The Sistema Sanitario Nazionale, SSN, was introduced in 1978. Before 1978, Italy had an insurance-based system. The reform shifted to a universal national health service.
The SSN provides universal coverage and is <u>funded through general taxation</u>. It guarantees free of charge coverage at the point of service.

According to international rankings, the Italian system is considered one of the best in the world when comparing health expenditure as a share of GDP with health outcomes.
The <u>SSN is</u> a <u>regionally based</u> national health service. The national level ensures that the general objectives and fundamental principles of the system are respected. However, regional governments are responsible for ensuring the delivery of a benefits package to the population.

After the 1992 reform, <u>quasi market features were introduced</u>:

1. **Separation Between Purchase And Provision:** The <u>entity that buys health services is separated from the one that provides them.</u>
2. **Competition Between Public And Private Providers:** <u>Private providers can compete</u> with public ones, as long as they satisfy quality standards defined by the State.

So Italy combines universal tax financing with decentralized management and limited competition.

5.2 Institutional Levels

The system operates on four levels.

1. **Central Government, Ministry Of Health:** It controls the distribution of tax revenue for publicly financed health care. It <u>defines a national statutory benefits package</u> that must be offered to all residents in every region. This package is called the essential levels of care, LEA. The central government also <u>sets general guidelines</u> for prevention, diagnosis and therapies, and coordinates and monitors regional health activities.
2. **Regions:** Regions enjoy significant autonomy in determining the macro structure of their health systems. They organize and <u>deliver health services through</u> local health units, called <u>ASL</u>.
3. **ASL, Aziende Sanitarie Locali:** They are managed by a general manager appointed by the governor of the region. They are responsible for territorial planning. They <u>purchase and deliver primary care</u>, hospital care, outpatient specialist care and public health care. They are <u>funded through a fixed reimbursement per patient.</u>
4. **Health Care Providers, Hospitals And Physicians:** Public hospitals are either managed directly by local health units or operate as semi-independent public enterprises. Hospitals are funded through prospective payments based on DRGs, Diagnosis Related Groups. Each <u>hospital admission is classified into a group based on the patient's diagnosis</u> and treatment. The <u>hospital receives a fixed preset payment for that group</u>, regardless of the actual cost of care. General practitioners are paid a fixed amount per patient, with a maximum of 1500 patients. Hospital doctors are salaried, with pay determined by the State and varying by age and specialization.

This structure shows that Italy uses universal tax financing combined with regional autonomy and prospective payment mechanisms to control costs and provider incentives.

CHAPTER 5 – SOCIAL SECURITY / PENSION SYSTEM

1. INTRODUCTION AND MOTIVATION

Social security spending in Europe represents a large share of GDP and differs significantly across countries. In many cases, it accounts for one of the largest components of public expenditure.
Pension spending has generally increased over time, mainly as a consequence of population aging and rising life expectancy. This upward trend puts increasing pressure on public finances.

→ These trends motivate the central question of the chapter: why should the government provide social security?

1.2 Why Government Provides Social Security
The adverse event in this context is being too old to earn sufficient income. Retirement creates a risk of income loss.
In theory, the market solution would be private pension plans. Individuals save during their working life, invest in financial assets such as bonds or stocks, and use the accumulated assets to finance retirement. This is a fully funded approach.

However, private pension plans face important problems:
1. **Financial Risk:** Poor performance of financial markets or inflation can reduce future pensions. The replacement ratio, meaning the ratio of pension benefits to pre-retirement earnings, may be too low.
2. **Behavioral Biases:** Individuals may underestimate their future needs or believe they can work forever.

Because of these limitations, private pensions may be an inefficient way to deal with the social risk of losing earning capacity in old age. This provides the main justification for public pension systems.

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2. TYPES OF PENSION SYSTEMS

2.1 Introduction To The Two Systems
Pension systems differ mainly in how they are funded. The key distinction is between fully funded systems and pay as you go systems.

Fully Funded System:
In a fully funded system, social security contributions paid by workers are invested in the capital market. These contributions accumulate over time and are used to finance the worker's own future pension.
In this model, each generation essentially saves for its own retirement. Contributions are transformed into financial assets, and the pension depends on the accumulated capital plus the return obtained in financial markets.

Here, workers' contributions flow into a fund. The fund accumulates resources and then finances the pensions of the same generation when they retire. The arrows pass through the fund rather than directly from workers to retirees.

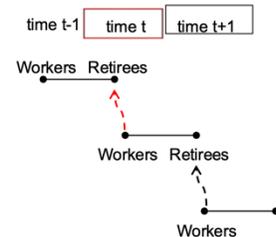→ This system is based on capital accumulation.
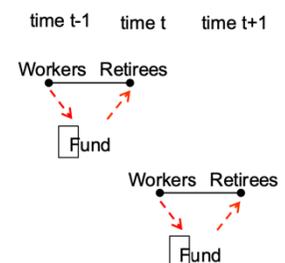
Pay-As-You-Go System:

In a pay as you go system, the <u>revenue collected in each period is used to pay pensions in the same period</u>. Contributions are not saved or invested.

Public social security systems have traditionally been unfunded. Taxes or social contributions paid by workers today go directly to today's retirees.

This structure is based on an intergenerational pact: active workers finance the pensions of current retirees because they expect that when they retire, the next generation will finance theirs.

Workers at time t pay contributions that immediately finance retirees at time t. There is no fund or accumulation of assets. The arrows go directly from workers to retirees in each period.

→ This system is <u>based on intergenerational transfers</u> rather than capital accumulation

2.2 Financing Method Comparison

To understand how pension systems operate, consider a simple two period model: one working period and one retirement period.

During the working period at time t−1, an individual earns income and pays contributions equal to a fraction of wages:

$C_{t-1} = \alpha W_{t-1}$

During retirement at time t, the individual receives a pension P_t.

→ The key difference between systems lies in how C_{t-1} is transformed into P_t.

Pay-As-You-Go System: In a pay as you go system, the revenue collected in each period is used to pay pensions in the same period. This means: C_{t-1} finances P_{t-1} AND C_t finances P_t. → Contributions from current workers are directly transferred to current retirees. This structure is based on an intergenerational agreement. <u>Each generation finances the previous one</u>, expecting the next generation to finance theirs. There is no accumulation of assets.

Fully Funded System: In a fully funded system, contributions paid during the working period are invested in the capital market. The pension received in retirement is equal to the contributions paid, augmented by the market return i → $P_t = C_{t-1}(1 + i)$. Here, resources are accumulated and grow over time through investment. The system follows an insurance perspective, where <u>each individual finances their own retirement</u> through savings and capital returns.

2.3 Rate Of Return Comparison

To compare PAYGO and fully funded systems, we consider two generations.
• The former generation works at time t−1 and retires at time t.
• The latter generation works at time t and retires at time t+1.
We define:
• Nt and Nt−1 = number of workers in each period
• wt and wt−1 = average wage
• Wt = Ntwt and Wt−1 = Nt−1wt−1 = total wage
• α = contribution rate, proportional to wages

We assume:
• wt = wt−1(1+m), where m is the productivity growth rate
• Nt = Nt−1(1+n), where n is the population growth rate, assumed equal to worker growth
Then total wages evolve as:

$$W_t = N_t w_t = N_{t-1}(1+n)w_{t-1}(1+m) = W_{t-1}(1+n)(1+m)$$

This expression will determine the return in the PAYGO system.

Pay-As-You-Go System:

In a PAYGO system, the total pensions paid at time t are equal to the total contributions paid at time t:

$$P_t^{PG} = \alpha\, W_t = \alpha\, W_{t-1}(1+n)(1+m)$$

So the pensions received by retirees at time t depend on:
• The contribution rate α
• Total wages in period t
• Population growth n
• Productivity growth m
The term (1+n)(1+m) represents the gross return factor of PAYGO.

Fully Funded System:

In a fully funded system, pensions paid at time t are equal to the contributions paid at time t−1 plus the return obtained in financial markets:

$$P_t^{FF} = \alpha\, W_{t-1}(1+i)$$

Here i is the market interest rate.
The gross return factor is (1+i).

So the fully funded system's return depends only on capital market performance.

Implicit Return:

The implicit return of a pension system as:
(Pt / Ct−1) − 1
This measures the percentage return a generation obtains on the contributions it paid during working life.

- $(P_t^{PG}/ \alpha\, W_{t-1})-1 = (1+n)(1+m)-1 = 1+n+m+nm-1 \approx n+m$ (paygo implicit return rate)

- $(P_t^{FF}/ \alpha\, W_{t-1})-1 = (1+i)-1 = i$ (fully funded return rate)

So:
• PAYGO return ≈ n + m
• Fully funded return = i

When Is PAYGO Better?

PAYGO gives a higher return than fully funded if:
(n + m) > i
That is, if population growth plus productivity growth exceeds the market interest rate.
If instead i is higher than n + m, the fully funded system yields a higher return.

PAYGO Example:

Period	Number of Young Workers	Earnings per Young Worker	Taxes Paid by Young Worker	Total Taxes Paid	Number of Old Retirees	Benefits to Old Retirees	Taxes Paid by Old Retirees	Rate of Return
1	100	$20,000	0	0	0	0	0	—
2	105	$21,000	$2,100	$220,500	100	$2,205	0	Infinite
3	110	$22,050	$2,205	$242,550	105	$2,310	$2,100	10%
4	115	$23,153	$2,315	$266,225	110	$2,420	$2,205	10%
5	121	$24,310	0	0	115	0	$2,315	-100%

• Population and earnings grow by 5 percent per year.
• Payroll tax rate is 10 percent.
• The system is unfunded.
In period 1, the first generation of retirees receives pensions without having paid contributions. Their return is infinite. From period 3 onward, the return stabilizes at 10 percent, equal to the growth rate of wages and population. If at some point workers stop contributing, retirees receive nothing even if they paid contributions before. The return for the last generation becomes −100 percent.

Conclusions On <u>PAYGO</u>:
1. **Pro:** It allows immediate payment of pensions even if contributions were not previously paid.
2. **First Generation Effect:** The <u>generation alive at the introduction benefits enormously</u>.
3. **Last Generation Effect:** <u>If the system stops</u> being financed, the <u>last contributing generation loses everything.</u>

These extreme intergenerational redistribution effects are specific to PAYGO and do not occur in a fully funded system.

2.4 Method For Calculating The Pension Benefit Comparison

After comparing financing and returns, the next step is understanding how pensions are calculated for individuals.
There are two methods under PAYGO and one for the fully funded.

PAYGO Method 1: Earnings Based
In the earnings based method, the pension received each year is equal to a share, called the coefficient of return, of the pensionable earnings, multiplied by the number of years of contribution.
Define:
• β = coefficient of return
• w_P = pensionable earnings
• L = years of contribution
Using this method, the pension is:

$$P = \beta \times w_P \times L$$

This means:
• The <u>higher the pensionable earnings</u>, the <u>higher the pension</u>.
• The <u>longer the contribution period</u>, the <u>higher the pension</u>.
• The <u>larger the coefficient β</u> set by law, the <u>higher the pension</u>.

→ How Is <u>Pensionable Earnings</u> Defined?
The pensionable earning w_P can be defined in two different ways.

1. **Last Salary Method:** w_P is equal to the <u>last salary before retirement</u>, w_L.

→ In this case: $$P = \beta \times \mathbf{w}_L \times \mathbf{L}$$

So the pension depends heavily on the final wage.

2. **Lifetime Average Method:** wP is an <u>average of the salaries received during the working life,</u> <u>augmented by a revaluation rate r</u> set by the government. The idea is that past wages are updated using r so that they are expressed in comparable terms.

→ Example with L = 3 and wages w1, w2, w3: $$w_p = \frac{w_1(1+r)^2 + w_2(1+r) + w_3}{3}$$

Here:
• The oldest wage is multiplied by $(1+r)^2$
• The second wage by $(1+r)$
• The last wage is not revalued
This avoids giving too much weight only to the final salary.

PAYGO Method 2: Contribution Based:
In the contribution-based method, the pension is linked directly to <u>total contributions paid during working life</u>. The pension is computed using the equation:

$$C = AV(P)$$

where:
• C is the sum of contributions paid during the working period, <u>augmented by a revaluation rate r set by the</u> <u>government.</u>
• AV(P) is the actual value of the pension flow, computed at the end of the working period based on life expectancy.

→ Example with L = 3 and wages w1, w2, w3:

$$C = \alpha w_1(1+r)^2 + \alpha w_2(1+r) + \alpha w_3$$

Here α is the contribution rate paid each year.
So contributions accumulate over time and are revalued using r.

But pensions are not paid once. They are paid every year during retirement. So we must compute the <u>actual</u> <u>value</u>, meaning the present value, of that entire stream.

Suppose the pension P is constant over time, even though in reality there may be indexation.
Define e(L) as the years of life expectancy at the day of retirement.
If e(L) = 2, the actual value of the pension at retirement is:

$$AV(P) = \frac{P}{(1+r_z)} + \frac{P}{(1+r_z)^2}$$

where rz is the discount rate applied to future pensions.

<u>In the simplified case wher rz=0 we have:</u>
If rz = 0, then:

$$AV(P) = e(L) \cdot P$$

$$C = AV(P) \rightarrow C = e(L) \cdot P \rightarrow P = \frac{C}{e(L)}$$

This shows that the annual pension equals accumulated contributions divided by expected years of retirement.

The pension P:

• Increases with C, and therefore with α, r, wages w and years of contribution L.
• Decreases with e(L), meaning that higher life expectancy reduces annual pensions.

The term 1/e(L) is called the transformation coefficient. It is the coefficient that converts accumulated contributions C into the annual pension P.

→ If the transformation coefficient reflects real life expectancy, it allows the system to adjust automatically to population aging, transferring part of the burden to retirees.

Fully Funded:
In a fully funded system, the pension is computed using the same logical condition:

$$C = AV(P)$$

But here C is the sum of contributions augmented by the market interest rate i, not by a government revaluation rate.

→ Example with L = 3:

$$C = \alpha w_1(1+i)^2 + \alpha w_2(1+i) + \alpha w_3$$

So contributions grow at the market interest rate.

The actual value of pensions is computed as before:

$$AV(P) = \frac{P}{(1+rz)} + \frac{P}{(1+rz)^2}$$
$$\text{If } r_z=0 \rightarrow \quad P = \frac{C}{e(L)}$$

So structurally the formula is similar to contribution based PAYGO, but the accumulation process is different:
• In PAYGO, accumulation uses a revaluation rate chosen by the government.
• In fully funded systems, accumulation depends on the market interest rate i.

SUMMING UP →

	PAYGO – Earnings- based	PAYGO - contribution-based	Fully-funded
Financing	Contributions paid by active workers (intergenerational agreement)	Contributions paid by active workers (intergenerational agreement)	Contributions payed by the retirees when they were workers
Pension Bill	Depends on: wages, contribution rate, productivity and number of employed	Depends on: wages, contribution rate, productivity and number of employed	Depends on: wages, contribution rate and capital market interest rate
(Individual) Pension	Depends on pensionable earnings, years of contribution and coefficient of return	Depends on: - Contributions payed during the entire working life - Contribution revaluation rate (r) - years of life expectancy at the day of retirement	Dipends on: -Contributions payed during the entire working life - Capital market interest rate - years of life expectancy at the day of retirement

3. JUSTIFICATIONS AND ECONOMIC EFFECTS

3.1 Market Failures And Paternalism
After comparing PAYGO and fully funded systems, the key question is: <u>why should the State intervene</u> at all?

There are two main reasons why the State may intervene in the pension system:
1. **Adverse Selection:** Insurance markets may experience market failures because individuals have more information about their own life expectancy than insurance companies. This <u>informational asymmetry</u> can <u>prevent private pension markets from functioning efficiently</u>.
2. **Paternalism:** Policymakers are concerned that people do not save enough during their working life to finance retirement. <u>Individuals may underestimate their future needs</u> or assume they will be able to work longer than they actually can, <u>so the State imposes mandatory contributions</u> to guarantee income in old age.

→ This leads to an important question: <u>does the public pension system</u> actually realize consumption stabilization, or does it simply <u>crowd out private saving</u>?

3.2 Living Standards Of The Elderly

USA Evidence: In the United States, there is a striking <u>negative correlation</u> over time between the <u>poverty rate of the elderly and the size of the Social Security program</u>. As Social Security spending increased, poverty among people aged 65 and older declined.

Italy Evidence: in Italy, a <u>similar correlation is observed</u>. The reduction in the relative poverty rate among the elderly is associated with an increase in pension benefits. This would seem to confirm a <u>positive effect of public pensions on the stabilization of consumption in retirement</u>.
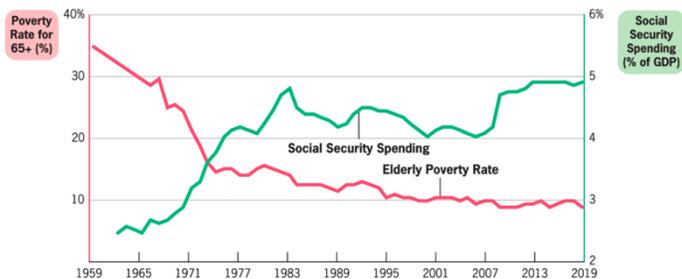
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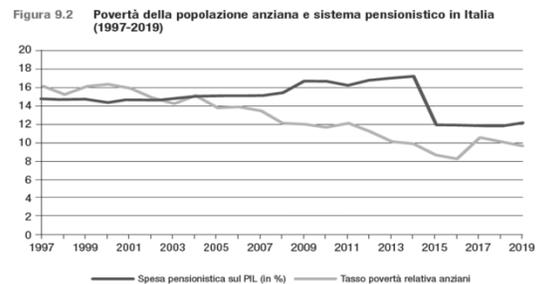
Italy

3.3 Retirement Incentives And Moral Hazard
The Impact Of The Pension System On The Choice Of Retirement Age:
The <u>pension system</u> guarantees an income to retirees. This provides insurance against the loss of earnings in old age.
However, it <u>may also create a moral hazard problem</u>. Once a pension program is in place, a worker may have an <u>incentive to move up the beginning of the retirement period</u> in order to start collecting pension benefits earlier.
The key question is why the pension system can influence the retirement decision.

→ The mechanism is what is called <u>implicit taxation on labor</u>. If working one additional year implies paying contributions for one more year and receiving one year less of pension benefits, then the ma<u>rginal cost of continuing to work may exceed the marginal benefit of a slightly higher pension</u>. This creates an incentive to retire earlier.

Social Security And Retirement: Theory:
To understand the mechanism, consider the costs and benefits of working one additional year, for example at age 62.
Costs:
1. Pay an extra year of payroll taxes on earnings.
2. Receive one year less of Social Security benefits.

Benefits:
1. Higher Social Security benefit level through actuarial adjustment.
2. Increase in the pension level.

If the additional pension increase is small compared to the extra taxes paid and the lost year of benefits, then working longer is implicitly taxed. This discourages labor supply at older ages.

Moral Hazard: Evidence in the USA and Italy:
The evidence compares Social Security spending and labor force participation of older workers.

1. **United States:** Over time, when Social Security spending as a share of GDP increased, labor force participation among people aged 65 and older declined. In the 1960s and 1970s, the program grew rapidly and labor force participation decreased. Both flattened in the mid 1980s, and in recent years both have risen. This suggests that <u>when pensions become more generous, older workers may retire earlier.</u>
2. **Italy:** A similar pattern appears in Italy. As Social Security spending increased, labor force participation among older individuals declined. When the system became less generous or was reformed, participation increased. Again, this is <u>consistent with the idea that pension systems affect retirement incentives.</u>
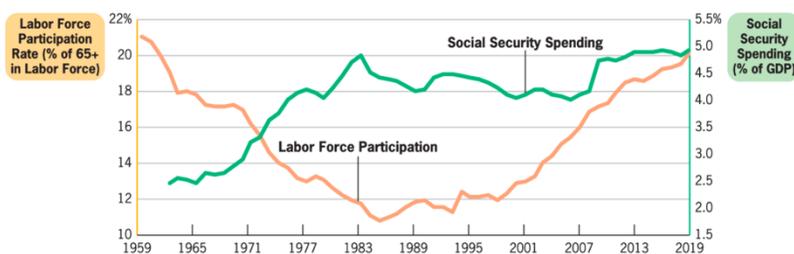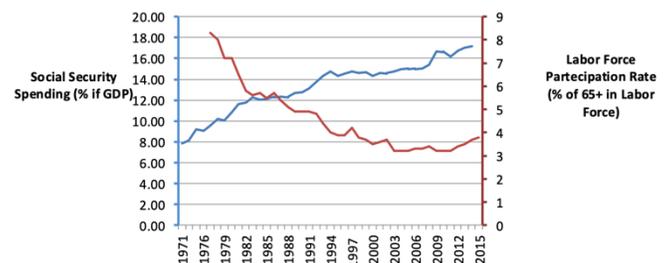
USA   Italy

Social Security And Retirement: Evidence On Retirement Hazard:
The <u>retirement hazard rate</u> measures the <u>probability that an individual exits the labor force at a given age</u>, conditional on having worked up to that age.
In the United States, the male hazard rate shows sharp spikes at specific ages. In particular, it increases strongly at:
1. **Age 62:** which is the Early Entitlement Age, EEA. This is the first age at which individuals become eligible to claim Social Security benefits.
2. **Age 65:** which was historically the Full Retirement Age, FRA. This is the age at which individuals could receive full benefits without actuarial reduction.

These ages are key eligibility thresholds in the Social Security system. The fact that retirement rates spike exactly at these institutional ages suggests that many individuals time their retirement decision to coincide with benefit eligibility. This is <u>strong evidence</u> that the pension system affects retirement behavior and creates <u>incentives to retire earlier once benefits become available.</u>
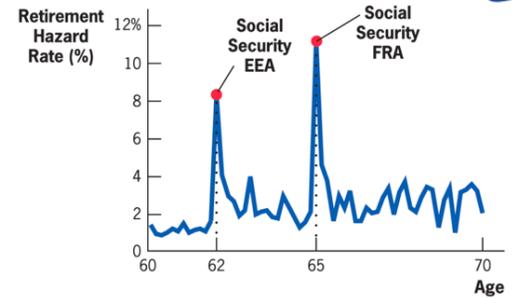
Implicit Social Security Taxes And Retirement Behavior:
Across countries, there is large variation in how strongly Social Security systems discourage work at older ages. <u>Countries with larger disincentives to continue working tend to have much higher nonparticipation among older workers</u>. This cross-country correlation reinforces the idea that pension design affects retirement behavior.
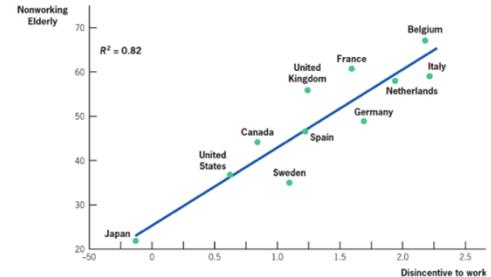
3.4 Policy Implications
The evidence on retirement behavior has clear <u>implications for how governments should design pension systems.</u>

1. **Avoid Penalizing Continued Work:** If the system implicitly taxes additional years of work, many individuals will retire earlier than they otherwise would. This reduces labor supply among older workers and worsens financial sustainability. Governments should <u>avoid designing rules where the marginal cost of working an extra year exceeds the marginal benefit.</u>
2. **Reward Later Retirement:** Pension systems should be structured so that working longer leads to a fair increase in pension benefits through proper actuarial adjustment. When <u>additional work is rewarded rather than penalized</u>, the moral hazard effect is reduced and labor force participation at older ages increases.

These implications show that pension design is not only about redistribution, but also about incentives and labor supply.

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4. FINANCIAL SUSTAINABILITY AND REFORMS

4.1 Demographic Pressures
Social Security faces a major fiscal imbalance. It is becoming increasingly difficult for young generations to finance the benefits of older generations.

The main <u>reasons</u> are:

1. **Rising Life Expectancy:** Pensions must be paid for more years.
2. **Falling Birth Rates:** Fewer workers finance more retirees.
3. **Lower Wage Growth:** Contributions grow more slowly.

The demographic pressures described above create specific <u>dangers for pay as you go pension systems</u>, because a rising number of retirees relative to workers makes it increasingly difficult to finance pensions through current contributions.

In the US, the number of people over 65 per 100 working age individuals rises from 13 in 1950 to 42 in 2060. This means that each worker will have to support many more retirees than in the past. As this ratio increases, PAYGO systems become financially harder to sustain.
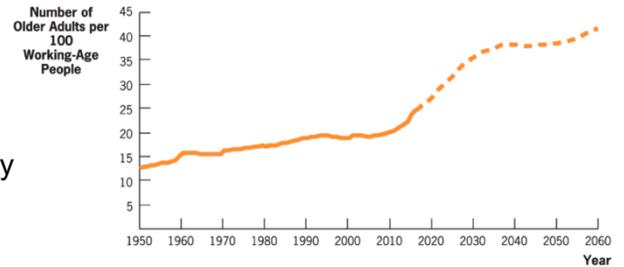
4.2 Financial Equilibrium In Pay As You Go And Adjustments

After seeing how pension systems affect retirement behavior and demographic pressure, we now analyze the <u>condition under which a PAYGO system is financially sustainable</u>.

A pay as you go system is in financial equili<u>brium when total pension expenditures are exactly equal to total contribution revenues</u>.

This condition can be written as:

$$P \cdot N_r = \alpha \cdot N_w \cdot w$$

where:

• P is the average pension
• Nr is the number of retirees
• Nw is the number of workers
• w is the average wage
• α is the payroll tax rate

The left hand side represents total pension spending. The right hand side represents total contributions collected from workers.

→ Financial equilibrium in a PAYGO system therefore depends on:

• Demographic factors, especially the ratio of workers to retirees
• Average wages
• Pension levels

→ <u>If the population ages</u>, the number of retirees Nr increases. This puts pressure on the system because more pensions must be paid with the same or fewer workers.

To <u>keep the system in balance</u>, a <u>pension reform</u> may:
1. **Increase α:** Workers pay higher contributions.
2. **Reduce P:** Pensioners receive lower pensions.
3. **Increase The Retirement Age:** Individuals remain workers longer, which reduces Nr and increases Nw.

There are also <u>other possibilities</u> that are not strictly pension reforms:
1. **Increase Nw:** For example through higher female labor force participation or immigration.
2. **Increase w:** Through higher productivity and economic growth.

All these adjustments affect the equilibrium condition $P \cdot N_r = \alpha \cdot N_w \cdot w$

4.3 Incremental Reforms

Given the financial imbalance of PAYGO systems, many additional reforms can be introduced without completely changing the system.

There are two broad directions for incremental reforms.

1. **Increase Social Security Revenues:**
   The system can collect more contributions from workers. This can be done by:
   - Raising the payroll tax rate on taxable wages.
   - Extending the base of taxable wages, meaning taxing a larger share of earnings.
2. **Reduce Social Security Benefits:**
   The system can reduce what it pays out. This can be done by:
   - Raising the retirement age to match increasing life expectancy.
   - Lowering benefits for all eligible recipients.
   - Transforming the system into a more welfare-oriented program, where benefits decrease as recipients' income increases.

These reforms keep the PAYGO structure but adjust its parameters to restore financial balance.

4.4 Fundamental Reforms

More radical reforms have also been proposed. These aim to change the structure of the system itself.

Two main proposals are:
1. **Invest The Trust Fund In Stocks:**
   Instead of investing only in safe assets, the fund could invest in equities to obtain higher returns.
2. **Privatization:**
   Replace part or all of the public PAYGO system with a privately funded system based on individual accounts.

→ A privately funded pension system with individual accounts is often said to have three advantages:

1. The capital would be in the hands of individuals rather than the State.
2. It would respect consumer sovereignty over investment choices.
3. Returns could be higher because funds are invested in financial markets.

However, there are important concerns.

Critical issues include:
1. A crucial question is: how can the current generation of pensioners be supported during the transition to a private system?
2. A private system may not truly offer a higher return, because the implicit debt toward the first generation of pensioners must still be financed.
3. Administrative and management costs would likely be very high.
4. Policymakers might not fully respect consumer sovereignty over pension savings.

So while fundamental reforms promise higher returns and more individual control, they create serious transition and implementation challenges.

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5. THE ITALIAN PENSION SYSTEM

5.1 Demographic Trends In Italy

The elderly dependency index in Italy rises sharply over time, meaning that the number of people aged 65 and over relative to the working age population increases dramatically. This implies that fewer workers will have to support more retirees, putting <u>strong pressure on the PAYGO pension system</u>.

Since the 1990s, Italy has experienced significant population aging due to rising life expectancy and declining birth rates. The age distribution shows a shrinking younger population and a growing elderly population, reinforcing the financial strain on the pension system.
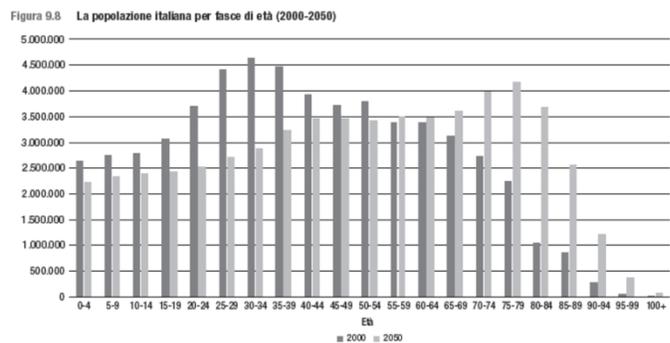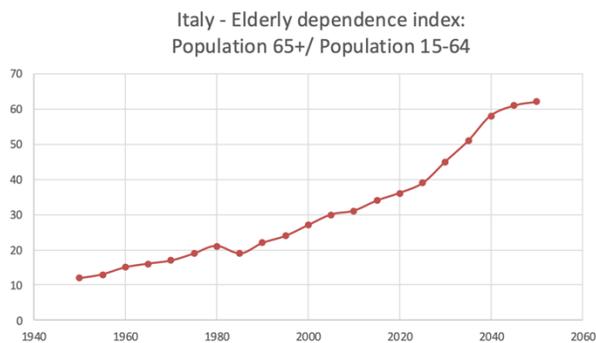
5.2 Reform Timeline

1)Pre-Amato System

<u>Before the 1992 reform</u>, the Italian pension system was based on an <u>earnings-related calculation method</u>. The pensionable earnings were calculated as the average of earnings over the last five years of work. The coefficient of return was β = 2 percent.

Pensions were indexed both to wage growth and to inflation. This meant that pensions increased not only with prices but also with general wage growth, making them quite generous over time.

2)The Amato Reform (1992)

The Amato reform <u>kept the earnings-related calculation method</u>, but it cha<u>nged how pensionable earnings were calculated</u>.

Instead of using the average of the last five years of earnings, pensionable earnings were calculated as the average over the entire working life, appropriately revalued. This reduced the incentive to inflate final salaries.

The statutory retirement age increased:

1. From 60 to 65 for men.
2. From 55 to 60 for women.

To qualify for old-age pensions, at least 20 years of contributions were required.

For seniority pensions, at least 35 years of contributions were required.

Pensions were no longer indexed to wage growth, but only to inflation. This means pensions in subsequent years increase only in line with prices, not wages.

From an intergenerational equity perspective, <u>those who were already retired were favored</u> relative to younger cohorts, because the reform mainly affected future retirees.

3) The Dini Reform (1995)
The Dini reform introduced a major structural change while <u>remaining within a PAYGO</u> system.
It <u>shifted from the earnings-related calculation method to a contribution-based calculation method</u>.

Under this method:
1. Contributions are accumulated by applying a 33 percent contribution rate to earnings.
2. The accumulated amount grows at a rate equal to the five-year moving average of nominal GDP growth.
3. The accumulated amount is then multiplied by a conversion coefficient that depends on life expectancy at retirement.

This conversion coefficient ensures equality between accumulated contributions and total pension benefits. The lower the life expectancy at retirement, the higher the annual pension. <u>This mechanism discourages early retirement</u>.

→ The contribution-based calculation method <u>reduces the level of pensions compared to the previous system</u>. The conversion coefficients are updated every ten years to reflect changes in life expectancy and to avoid financial imbalances due to population aging.
The retirement age is set within a window between 57 and 65 years. However, since benefits increase if retirement is postponed, it becomes advantageous to retire later.
Pensions continue to be indexed only to inflation.
This system applies only to individuals who started working from 1 January 1996 onwards. For those who already had more than 18 years of contributions in 1995, a mixed or pro-rata system applies.

4) Between The Dini Reform And The Fornero Reform
Several intermediate reforms were introduced.
1. **Prodi (1998):** The age requirements for seniority pensions were raised to harmonize rules across different categories of workers.
2. **Maroni Law (2004):** Eliminated the retirement flexibility introduced by the Dini reform. From 1 January 2008, a single requirement was introduced:
   - Either 40 years of contributions,
   - Or 35 years of contributions and 65 years of age for men and 60 for women.
3. **Prodi (2007):** Introduced a quota system to make access to pensions more flexible. Eligibility combined chronological age and years of contributions.
4. **2009:** Equalization of the retirement age for men and women.

5) The Fornero Reform (2011)
The Fornero reform applied the <u>contribution-based calculation method to everyone starting from 1 January 2012.</u>

Even for those who had more than 18 years of contributions in 1995, a pro-rata system applies: earnings-related calculation up to 2011 and contribution-based calculation from 2012 onward.
Adjustments to life expectancy, which determine eligibility requirements and conversion coefficients, are made every two years starting from 2019.
Contribution rates increased for both self-employed workers and employees.

The quota system for retirement was abolished and new criteria were introduced.

For old-age pensions:
1. At least 20 years of contributions are required.
2. The statutory retirement age gradually increases to reach 67 years for everyone by 2020.
3. The pension benefit must be at least 1.5 times the social allowance.

For early retirement pensions:
1. A lower statutory age is allowed.
2. Stricter contribution requirements apply.
3. There is a penalty of 1 percent for each year of retirement before age 62, and 2 percent for each additional year beyond the first two years of early retirement, applied to the earnings-related component.

For workers under the contribution-based method, early retirement is possible at age 63 with at least 20 years of effective contributions, provided the monthly pension exceeds 2.8 times the social pension.
Indexation to inflation in 2012–13 was granted only for pensions below three times the minimum benefit.

5)Post-Fornero Flexibility Measures
After the Fornero reform, the issue of flexibility reemerged. Some workers want to retire earlier and are willing to accept a penalty.

Examples of flexible mechanisms include:
1. APE sociale
2. Quota 103
3. Opzione Donna

These measures allow earlier retirement under specific conditions, often with financial penalties or restrictions.

5.3 Long Run Pension Spending Outlook: 2000-2070
Public pension spending in Italy increases until around the 2040s due to population aging, but then gradually declines toward 13.7 percent of GDP by 2070. This pattern shows that although demographic pressure raises spending in the medium term, the structural reforms introduced after the 1990s, especially the contribution based system and the life expectancy adjustments, improve the long run sustainability of the pension system.

Public pension spending over GDP in Italy (2000-2070)
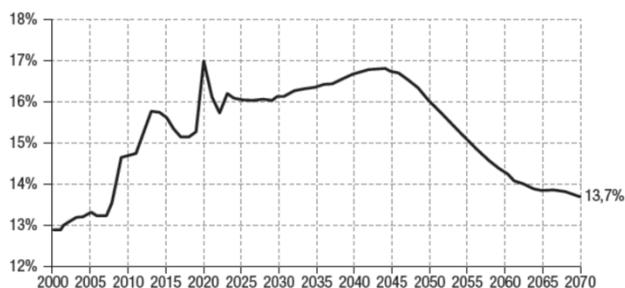
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