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# HANDOUTS

# PUBLIC FINANCE

## -SECOND PARTIAL-

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It is a useful tool for studying the subject, but it does not guarantee preparation that is as exhaustive and complete for passing the exam as the material recommended by the University.

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# CHAPTER 1 – INTRODUCTION TO TAXES

## 1. WHY STUDY TAXATION

Taxes are economically huge because they finance a massive share of public spending. In most advanced countries, the government collects between 30% and 45% of the value of the GDP in taxes. This is because higher incomes, stronger institutions, and larger public services make it both easier and more necessary for governments to collect more taxes in advanced countries.

Italy is above the average, meaning its government collects a larger share than many other nations (43% vs 34%). These differences happen because each country makes its own political choices, for example about how much public healthcare or social insurance the state should provide.

- **Tax Trends (1965–2023):** If we look at history since 1965, the trend shows that almost every developed country has steadily increased its tax-to-GDP ratio to fund growing public services.

- **Comparing Countries Today:** There is a large gap between high tax and low tax countries, mainly due to different welfare state models. Countries like Denmark and France have very high taxes, Italy is also above average, while countries like Mexico, Chile, and the US collect less because they rely more on private services.

## 2. TYPES OF TAXATION

### 2.1 Types Of Taxation (The "Grocery List") 🛒

You can think of these as the "grocery list" of taxes because they are the specific, individual items that show up on your "receipt" from the government. Later we will group them into 3 macro categories.

1. **Taxes On Earnings:**
    - **Payroll Tax:** tax on the income people earn from working. It is taken directly from wages or salaries.

This type of tax is especially important because it is the main way governments finance social insurance programs, such as Social Security, unemployment insurance, and Medicare. So, when people work and earn income, part of that income is used to fund these public systems.

2. **Taxes On Individual Income:**
    - **Individual Income Tax:** tax paid by individuals on income earned during the year. It includes not only wages from work, but also other sources like interest from savings or investments. Compared to payroll tax, it applies to a broader set of income (such as interest from savings or investments) and is sometimes calculated on the total income of a family, not just one worker.
    - **Capital Gains Tax:** tax on profits made from selling assets. If someone sells assets like stocks, real estate, or artwork for a higher price than they bought them, the gain is taxed. This focuses on income from investments rather than regular earnings.

3. **Taxes On Corporate Income:**
    - **Corporate Income Tax:** tax on the profits of corporations. Governments tax companies separately from individuals to make sure that income earned from capital is still taxed. Without this, some profits could escape taxation through the individual system.

4. **Taxes On Wealth**
    - **Wealth Taxes:** taxes on the value of assets owned, not on income. They are based on what a person or family owns, such as real estate, stocks, jewelry, or artwork.
    - **State/Local Property Tax:** tax based on the value of real estate. Usually collected by local governments and applied to houses or land.
    - **Estate Tax:** tax on wealth transferred after death. It is based on the value of assets left behind, such as money or property passed to others.

5. **Taxes On Consumption**
    - **Sales Tax:** tax paid when buying goods or services. Consumers pay it at the point of sale, and sellers collect it and pass it to the government.
    - **Excise Tax:** tax on specific goods only. It applies to particular products like cigarettes or gasoline, often to raise revenue or discourage their use.

## 2.2 The Italian Case 🇮🇹

Italy has a labor heavy tax system, meaning most government revenue comes from taxing wages and salaries through income and payroll taxes.
Other taxes play a smaller role:

- inheritance and wealth taxes
- capital income taxation

Consumption taxes are relevant, but they are not as important as labor taxes.

## 2.3 Direct Vs. Indirect Taxation ⚖️

So HOW to tax exactly? There are 2 ways: directly and indirectly

1. **Direct Taxes:** taxes levied on income or wealth such as
    - Individual/Personal Income Tax
    - Corporate Income Tax
    - Property and Inheritance Tax

Direct taxes are typically progressive (people who earn more pay more) and harder to collect (they require information about the individual income or wealth).

2. **Indirect Taxes**: taxes levied on transactions such as
    - Value Added Tax (VAT)
    - Excise Taxes

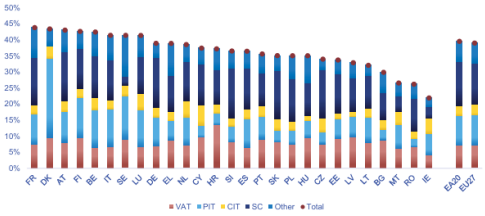
Indirect taxes are typically not progressive (do not change based on income level) and easier to collect (charged at the point of sale and collected by businesses).

## 2.4 Macro-Categories (The Economic Logic) 💡

After looking at the specific types of taxes in detail, we can group them into broader categories based on what is being taxed, which helps us understand how governments raise revenue at a more general level.

Governments raise revenue mainly from:

- **Labor taxes** (income tax + social security contributions/payroll )
- **Consumption taxes** (VAT, excises)
- **Capital & wealth taxes** (capital income, property, inheritance)




## 2.5 Focus On Labor 👷

Labor can be taxed through personal income tax and social security contributions (both the employee social security contributions and the employer social security contribution).
Labor is the main source of tax revenue in most countries → in most OECD countries, governments are mainly financed by taxing income from work.

If we sum
Personal income taxes + employee social security contribution + employer social security contribution
= TAX WEDGE

It is the difference between what the employer pays (cost of labor for the employer) and what the worker actually receives (net take home pay of the worker).
→ Example: If a firm pays 100 and the worker receives 60, the tax wedge is 40.
The tax wedge measures the total tax burden on labor It shows how much of the cost of employing someone goes to taxes instead of the worker.

The labor tax wedge is important because it affects behavior:

- **Work incentives:** if taxes are high, working becomes less attractive
- **Labor supply decisions:** people may choose to work less or not work
- **Cross country comparisons:** helps compare how heavily different countries tax labor

Italy has a relatively high labor tax wedge (since it relies heavily on labor taxes). This means the gap between what firms pay and what workers receive is large, similar to countries like Belgium and Germany, and higher than in the US.

## 2.6 Focus On Consumption 🛍️

Consumption is mainly taxed through VAT (Value Added Tax), which is paid when people buy goods and services, so it taxes spending instead of income.
VAT is important because it is a major source of revenue in Europe, and it is considered relatively neutral since it does not strongly affect decisions about saving (since it raises prices both now and in the future and therefore tends to have little effect on the intertemporal choice of consumption, unlike income taxes which affect incentives as we will see later).
However, VAT rates differ across countries, so some countries tax consumption more than others (they have a higher VAT rate, most countries fall between 19 percent and 23 percent)

## 2.7 Focus on Capital & Wealth 💎

**1) Capital Income:** Capital income includes earnings from assets (BOTH owned and sold), such as interest, dividends, and capital gains. Capital income is NOT the same as capital gains → Capital gains are only one component of capital income and arise specifically when an asset is sold at a higher price than it was purchased.
Compared to labor and consumption, taxes on capital raise a small share of total government revenue, so they are less important in most tax systems.

→ In many countries, capital income is taxed at proportional rates, meaning the same rate applies regardless of income level. Several European countries follow this approach, including Italy, Germany, and Nordic countries, where financial income is often taxed at relatively low or proportional rates.
In Italy, most financial income is taxed with a flat tax, with even lower rates for some assets like government bonds. There are large differences across countries, showing that capital taxation depends on policy choices.

**2) Wealth (Property and Inheritance):** Property taxes are usually applied to real estate like houses and land, and are often managed by local governments, because they are tied to specific locations and used to finance local services.
Inheritance and gift taxes exist in most countries, but they generate very limited revenue for governments.

Italy relies more on recurring property taxation than on inheritance taxes, so it taxes owning property over time more than transferring wealth after death. Compared to countries such as France, Belgium, or Germany, inheritance taxation in Italy is relatively low, meaning wealth transfers are taxed less heavily.

As a result, wealth taxation overall plays only a minor role in total tax revenues, especially compared to labor and consumption taxes.

## 2.8 Final Takeaways On Taxes 🎯

1. Taxes are economically large in advanced economies
2. Labor is the main tax base
3. Italy relies heavily on labor taxation
4. Economic behavior responds to marginal incentives (ex: tax wedge)
5. Consumption taxes play an important supporting role
6. Capital and inheritance taxes raise limited revenue

# CHAPTER 2 – TAX DESIGN AND FAIRNESS

## 1. CORE CONCEPTS OF TAXATION

### 1.1 Basic Notation of Taxes 🔢

Before analyzing tax design we need to introduce a few basic terms and concepts:
**Y** = tax base (or taxable income)
**T** = total amount of taxes paid
**Average Tax Rate (ATR)** = percentage of total income that is paid in taxes $\bar{t} = \frac{T}{Y}$
**Marginal Tax Rate (MTR)** = percentage that is paid in taxes on the next euro earned in income $t' = \frac{\partial T}{\partial Y}$
**Statutory Tax Rate** = the official rate set by law
**Effective Tax Rate** = the actual share of income you pay after deductions and exemptions

Usually, the effective rate is lower than the statutory rate, since not all income is taxed (because of deductions and exemptions).

### 1.2 Types Of Tax Systems 📊

Taxes can take 3 different forms:

1. **Proportional:** A tax is proportional if the average tax rate does not change with the tax base: all taxpayers pay the same proportion of their income in taxes. This means everyone pays the same percentage, no matter how much they earn
2. **Progressive:** A tax is progressive if the average tax rate increases when the tax base increases: higher marginal tax rates are applied to higher tax bases. This means richer individuals pay a higher percentage of their income in taxes
3. **Regressive:** A tax is regressive if the average tax rate decreases when the tax base increases. This means poorer individuals pay a higher percentage of their income compared to richer individuals

## 2. TAX PROGRESSIVITY AND DESIGN

### 2.1 Definition Of Tax Progressivity 📈

Taxes T depend on income Y ("are a function of"), as income changes, taxes change → this is true in ALL systems. What changes across systems is how they depend on income:
Proportional → T increases at a constant rate
Progressive → T increases more than proportionally
Regressive → T increases less than proportionally

We can understand progressive taxes by looking at the ATR and the MTR.

To see how the average tax rate changes when income increases → basically we ask: if you earn a bit more, does your average tax rate go up or not? To do this, we take the derivative of the ATR with respect to Y (which is NOT the MTR → MTR is about the last euro and the derivative of ATR is about how the average evolves)

$$\frac{\partial \bar{t}}{\partial Y} = \frac{\partial(\frac{T}{Y})}{\partial Y} = \frac{t'Y - T}{Y^2} = \frac{t' - \bar{t}}{Y}$$

If the derivative is positive, the average tax rate increases with income → progressive tax
If it is zero → proportional
If it is negative → regressive

Since Y is always positive, the sign depends on the numerator, so it is equivalent to saying that:
If MTR > ATR → progressive tax
If MTR = ATR → proportional
If MTR< ATR → regressive

A progressive system creates redistribution, meaning income is effectively transferred from richer to poorer individuals. Because the government takes more from high incomes and finances spending that benefits everyone, especially low incomes.

Now the question is: how do governments make that happen in practice? → There are three main ways which all create progressivity, but they differ in the mechanisms, consequences and effects.

## 2.2 Achieving Tax Progressivity: Tax Brackets

The idea is simple: income is divided into ranges, and each range is taxed at a different marginal rate.
In the example, income up to 28,000 is taxed at 23%, income between 28,001 and 50,000 at 35%, and income above 50,000 at 43%.
What matters is that each part of income is taxed separately, not the whole income at the highest rate.

Example (Italy)

| Tax brackets (in euro) | Marginal tax rate |
|---|---|
| **0-28.000** | 23% |
| **28.001-50.000** | 35% |
| **Over 50.000** | 43% |

**Example: Income**=52000 euro
Tax=
0,23x28000+0,35x22000+0,43x2000=6440+7700+860=15000

Marginal tax rate=0,43> average tax rate=15000/52000=0,288

As we can see the MTR > ATR.

## 2.3 Achieving Tax Progressivity: Tax Credits

Here we do not have any brackets. We have a FLAT MTR which is the same for everybody.
In this model taxes are defined as: **T = (t * Y) – f**
This means you first apply a constant tax rate t to income, and then subtract a fixed amount f.
→ everyone faces the same marginal tax rate t′ = t but the key is the fixed reduction f.
The tax credit f is the same for everyone → What changes is its importance relative to income

If we compute the average tax rate: $\bar{t} = \frac{T}{Y} = \frac{tY - f}{Y} = t - \frac{f}{Y} \Rightarrow \bar{t} < t$

In this care t′ = t is the statutory tax rate and $\bar{t}$ is the effective tax rate (which in most cases is lower due to tax credits).
This shows that the average tax rate depends on income.

- For low income, f//Y is large → average tax rate is much lower
- For high income, f/Y is small → average tax rate is closer to t

So as income increases, the average tax rate ATR increases. And MTR always > ATR → progressive.

## 2.4 Achieving Tax Progressivity: Deductions ✂️

Here we also do not have any brackets. We also have a FLAT MTR which is the same for everybody.
In this model taxes are defined as: **T = t * (Y − d)**
This means you first subtract a fixed amount d from income, and then apply a constant tax rate t.
→ everyone faces the same marginal tax rate t′=t but the key is the deduction d.
The deduction is the same for everyone. What changes is its importance relative to income.

If we compute the average tax rate: $\bar{t} = \frac{T}{Y} = \frac{t(Y-d)}{Y} = t - \frac{td}{Y} \overset{\text{interest)}}{\Rightarrow} t < t$

This shows that the average tax rate depends on income.

- For low income, d//Y is large → average tax rate is much lower
- For high income, d/Y is small → average tax rate is closer to t

So as income increases, the average tax rate ATR increases. And MTR always > ATR → progressive.

## 2.5 Real World Patterns Across Countries 🌍

Which of the three methods has the most redistributive effect? → TAX CREDITS
→ Since they give the same fixed reduction to everyone → this represents a larger benefit relative to income for low-income individuals and can reduce taxes to zero → strongest redistribution

In real tax systems, governments do not rely on just one tool. Tax brackets, deductions, and tax credits are usually combined, even though in theory one of them alone is enough to generate progressivity.

Over time, there has been a simplification of tax systems. Countries have reduced the number of tax brackets significantly, moving from very complex systems with many brackets to simpler ones with fewer rates.
Despite this simplification, the top marginal tax rate remains crucial. It is often used as a key indicator of how progressive a tax system is, especially for high income individuals.

Top marginal tax rates have decreased over time across countries, showing a general trend toward less extreme taxation of high incomes. There is large variation across countries, meaning different governments choose very different levels of progressivity.

Progressive systems in the real world can also have elements that are not progressive. For example, caps on social contributions mean that contributions stop increasing after a certain income level. This is a real-world feature present even in otherwise progressive tax systems, even though it introduces a regressive element by lowering the tax burden on higher incomes.

The key distinction in tax systems is in the real world is:

- **Average tax rate** → matters for **redistribution** because it tells how much people actually pay overall
- **Marginal tax rate** → matters for **behavior** because it affects incentives, like whether people choose to work more

## 2.6 Types of Taxes and Distributional Effects ⚖️

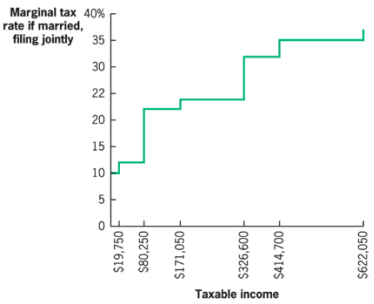
1. **Direct Taxes**: especially income taxes, are usually progressive, meaning richer individuals pay a higher share of their income. However, this mainly applies to labor income. Capital income is often taxed at lower rates and is much less progressive, which limits overall redistribution.
2. **Indirect Taxes:** such as consumption taxes, can be regressive. Lower income individuals spend a larger fraction of their income on consumption, so they end up paying a higher share in these taxes compared to richer individuals.
3. **Social Contributions:** are typically proportional, since they are applied as a constant rate on income. However, in practice there are often floors and ceilings, which can make them slightly less proportional at very low or very high-income levels.

Overall, the distributional impact of a tax system depends on the combination of these different types of taxes.

# 3. MEASURING FAIRNESS OF TAX SYSTEMS

## 3.1 A Practical Example of ATR and MTR ✏️

Suppose a woman named Ranya lives in the USA.
Gross Income = 200,000 $
Taxable Income = 180,000 $
And the USA applies different tax brackets to create a progressive system, with the following rates:




Total Tax Bill = (19,750x0.1)+(60,500x0.12)+(90,800x0.22)+(8,950x0.24) = $31,359

Her **marginal tax rate** is 24%

Her **average tax rate** is

$$\frac{Total\ Tax\ Payments}{Total\ Income} = \frac{31,359}{200,000} = 15.7\%$$

As expected, MTR > ATR, which is the condition for a progressive tax system.

## 3.2 Fairness: Horizontal and Vertical Equity 👨

Measuring how fair an income tax system is difficult because it depends on how we measure tax rates and how we define what fairness means. One way is with horizontal and vertical equity.
A system is considered to be fair from a tax standpoint, if it has high vertical and horizontal equity.

1. **Horizontal Equity:** If two people have the same ability to pay or same income, they should pay the same taxes, even if they make different economic choices.

As an example of a NOT FAIR system under horizontal equity, imagine this scenario.
State 1 applies a uniform sales tax of 5% on all purchases, so everyone is treated the same.
State 2 instead uses a random system: every time you buy something, a coin is flipped. If it is heads, you pay no tax; if it is tails, you pay 10%.
→ On average, both systems raise the same revenue. However, State 2 violates horizontal equity, because two identical individuals making the same purchase can end up paying very different taxes just due to luck

2. **Vertical Equity:** It means that individuals with higher income or more resources should pay more taxes than those with less.

Vertical equity is fully satisfied only in a progressive system, because only there higher income individuals pay a higher share of their income. Vertical equity can be reached in one of the three ways seen before: tax brackets, tax credits and deductions.

# 4. DEFINING THE TAX BASE AND DEVIATIONS

## 4.1 Haig Simons income definition 🧠

To pay taxes we must first define what income is. The Haig Simons definition says that income should include everything that increases your ability to consume during the year. So it is not just what you spend, but your total economic resources.

More concretely, income is:

1. what you consume during the year
2. plus any increase in your wealth

For example, if you earn money and save part of it, that saving still counts as income because it increases your future ability to consume.
The Haig Simons approach treats all income the same, which is good for horizontal equity, because people with the same resources are treated equally.
The idea is to capture your true ability to pay taxes, not just what you choose to spend. However, this definition is hard to apply in practice for two reasons:

1. **Measuring Ability To Pay:** It is difficult to measure someone's real "power to consume", especially when changes in wealth are unclear or not realized.
2. **Nonconsumption Expenditures:** Not all spending reflects real consumption. Some expenses, like medical or work-related costs, are necessary and, even if they are technically consumption, do not increase well-being, so taxing them can be unfair.

→ Because this ideal definition is difficult to apply in practice, real tax systems introduce several deviations from Haig Simons.

## 4.2 Deviations From Haig Simons ⚠️

Expanding from the concept just said in the last bullet point → one reason for deviations is that some expenses are not DESIRED consumption, but unavoidable costs. If we taxed them as normal income, we would overestimate people's ability to pay. Even if they are technically consumption, they do not increase well being or reflect true economic resources, so they are often excluded.

1. **Property And Casualty Losses:** These are not desired consumption but unpredictable expenses and do not increase well-being.
2. **Medical Expenditures:** Although technically consumption, they are not considered true consumption because they are necessary and do not increase well-being, so they are excluded.

3. **State And Local Tax Payments:** These are not treated as true consumption since they reduce available resources without increasing well-being, so they are often deducted to avoid overstating income.

Another reason is that some expenses are needed just to earn income, not to consume.

1. **Legitimate Costs Of Doing Business:** Costs like equipment or work-related expenses should be deducted, because they are necessary to generate income. It is NOT always clear what counts as a real business cost, which creates problems and room for manipulation.

## 4.3 A Deviation from Haig Simons: Externalities and Charitable Giving

Haig Simons says all income should be treated equally, with no special treatment. But in reality, if you donate money, you get a tax break. Donations for charity would be considered consumption, and therefore be taxed, but sometimes they are not for policy reasons. WHY are they excluded? → POSITIVE EXTERNALITIES

For example, donations to homeless shelters help people directly and also create a broader social benefit.

Charitable giving is likely to be underprovided if left entirely to private choice so the government has two policy options to decide between:

1. **Subsidizing Homeless Shelters (CROWD OUT):** if the government directly subsidizes homeless shelters, private individuals may reduce their own donations because they know the government is already helping. This is called crowd out. So public spending can partly replace private giving instead of adding to it.
2. **Subsidizing Charitable giving (CROWD IN):** If instead the government gives a tax subsidy for donations, giving becomes cheaper for private individuals. This can encourage them to donate more. In this case the policy can crowd in private contributions rather than replace them.

If the government decides to go with the second option, there are pros and cons to it.

1. **Marginal Effect (PRO):** if people donate more because of the tax break, then the policy works → more charity → socially beneficial
2. **Inframarginal Effect (CON):** If people would donate anyway, the government is just giving them a tax benefit without changing behavior → loss of tax revenue with no gain

→ It is a good policy only if the marginal effect is large enough to outweigh the inframarginal waste.

How does the government decide between the two options? (crowd out vs crowd in)

→ **Rule:** Mathematically, a tax break is better than direct government spending if the increase in charity generated by one euro of tax break is greater than one. If this condition holds, then reducing direct spending and increasing tax incentives would raise total charitable giving. So the choice depends on which tool creates more extra donations for each euro the government gives up.

In the real world, evidence suggests that charitable giving DOES respond to incentives. In particular, if the price of giving falls by 1%, the amount of giving tends to rise by about 1%. This suggests that tax incentives can have an important effect on behavior.

Between the two policy options, there is also a MORAL/economic trade off underneath. Direct government provision means the government decides where resources go, so it imposes its own preferences. Tax subsidies instead let private individuals choose where to donate, which better respects consumer sovereignty.

So should the government let the citizens decide on their own? → MAYBE it would NOT be EFFICIENT: many individuals do not do much research before donating, so they may give to causes that are not very effective. As a result, private giving does not always guarantee that resources are allocated in the best possible way

# 5. UNIT OF TAXATION AND HOUSEHOLD ISSUES

## 5.1 Unit Of Taxation: Individual Vs Household And Trade Offs 👨‍👩‍👧‍👦

The unit of taxation is the entity on which taxes are calculated.
→ The unit of taxation can be the individual OR the household/family.

The unit of taxation matters because taxes depend not only on income AND how the system defines the taxpayer. In practice, tax liabilities vary with marital status, number of earners, and presence of children. Because of this, many systems end up favoring single earner couples or households with one main earner. This also affects behavior, since family taxation influences decisions such as whether a second person chooses to work.

A key policy question is whether taxes should be based on individual income or total family income, since this choice affects both fairness and incentives.

Ideally, a tax system should satisfy three principles:

- **Progressivity:** Higher income leads to higher average tax rates
- **Across Family Horizontal Equity:** Families with the same total income pay the same taxes
- **Across Marriage Horizontal Equity:** Individuals are not taxed differently just because they are married or not

However, it is IMPOSSIBLE to achieve all three goals at the same time, so any tax system involves trade offs. These trade offs lead to concrete problems such as the marriage tax.

## 5.2 Unit Of Taxation: The Marriage Tax And Its Implications 👰

A marriage tax means that two people pay more taxes after getting married than they would pay if they stayed single.

Consider a tax system with:
- 10% tax rate on income up to $20,000
- 20% marginal rate up to $80,000
- 30% marginal rate on any income above $80,000

Consider two couples:

| | Individual Income |
|---|---|
| Yasmin<br>Doug | 140,000<br>10,000 |
| Jan<br>Elena | 75,000<br>75,000 |

These two couples have the same total income 150,000 but they have different distributions.

**1) IF individuals are taxed SEPARATELY:**

**Total tax liability Yasmin=** 10% × $20,000 + 20% × ($80,000 − $20,000) + 30% × ($140,000 − $80,000) = $32,000

**Total tax liability Doug=** 10% × $10,000=$1,000

→ TOTAL = 33,000

**Total tax liability Jan =** 10% × $20,000 + 20% × ($75,000 − $20,000) = $13,000

**Total tax liability Elena=** 10% × $20,000 + 20% × ($75,000 − $20,000) = $13,000

→ TOTAL = 26,000

So even with the same total income, the tax burden is different because income is distributed differently across individuals.

**2) IF individuals are taxed based on TOTAL FAMILY INCOME:**

**Total tax liability Family=** 10% × $20,000 + 20% × ($80,000 − $20,000) + 30% × ($150,000 − $80,000) = $35,000

Both couples are taxed on 150,000 → Total tax becomes 35,000 for both → This creates a marriage tax:

- Yasmin and Doug go from 33,000 to 35,000
- Jan and Elena go from 26,000 to 35,000

**CONCLUSION:** This shows the trilemma of the three principles: if you tax based on individual income, across family horizontal equity is not met because families with the same total income pay different taxes (33,000 vs 26,000); instead, if you tax based on total family income, across marriage horizontal equity is not met because couples pay more taxes when married (33,000 vs 35,000 and 26,000 vs 35,000).

So why do we care about this dilemma in the REAL LIFE? There is no perfect system that makes taxation both fair across families and neutral with respect to marriage. Some couples are penalized, others benefit.

→ This matters because:

- Taxes can affect behavior with respect to marriage. Society may want to encourage marriage, not discourage it with higher taxes. In theory, the IDEAL SYSTEM would NOT DISTORT the decision to marry, but in reality it sometimes does (trilemma).
- Taxes can affect behavior inside the household, in particular, high taxes on the second earner can make working less attractive. (second earner = earns less but is taxed at a higher MTR because he is in the family). So taxes affect the behavior of the second earner.

## 5.3 Unit Of Taxation: Second Earner Effect 👨🏻‍💼

Focusing on the second earner, we can see how he is disincentivized to work when income is taxed based on the FAMILY and not on the individual.

With joint taxation, the second earner is taxed at the household's marginal tax rate, not their own.

Example:
Suppose the tax rate is 20% up to €50,000 and 40% above €50,000. One spouse earns €60000 and the other earns 20,000.

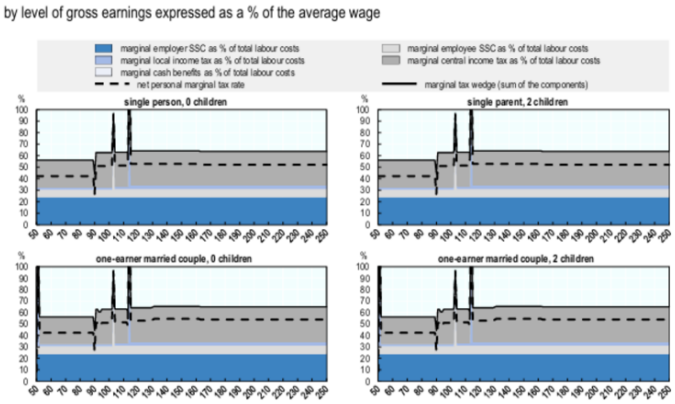
- One spouse earns 60,000 → already in the 40% tax bracket.
- If the second spouse earns 20,000 → that income is ALSO taxed at 40%.

So: Even though the second person earns relatively little, they are taxed at a high rate. This reduces the benefit of working. → The second earner may decide NOT TO WORK OR WORK LESS (labor supply effect).

## 5.4 Labor Supply: Marginal Tax Wedge And Distortions

The MARGINAL tax wedge shows how much of an extra euro earned from working is lost to taxes, contributions, and reduced benefits instead of going to the worker.

The graph compares different types of households across income levels. The vertical axis shows the percentage of the extra euro that is taken away, while the different colors represent taxes, social contributions, and lost benefits. Together, they shoe the marginal tax wedges in Italy in 2022.




The key point is that when income increases, people do not keep all of the additional earnings, but give part away → Marginal Tax Wedge.

The spikes where the individual suddenly pays so much (high tax wedges spikes in the graph) is because:

- The tax wedge includes taxes plus benefits lost
- At certain income thresholds, a benefit or tax credit is suddenly withdrawn
- So earning a bit more means:
  - paying normal tax
  - plus losing the benefit

Example:

- Below 20k → receive 2k benefit
- Above 20k → benefit = 0
- Earning 1 extra euro → lose 2k

So the effective tax wedge jumps sharply because the loss of benefits acts like an extra tax.

In Italy the tax wedge is high and highly non-linear, with sharp spikes driven by tax, contribution, and benefit changes that distort work incentives at specific thresholds → This matters because at those points, working more gives little extra income, which can discourage people from working more.

# CHAPTER 3 – TAX INEFFICIENCIES

## 1. TAXATION AND DEADWEIGHT LOSS

### 1.1 Why taxes create inefficiency (DWL)

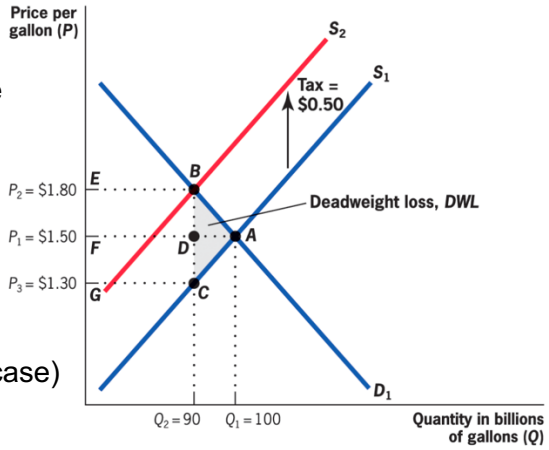
Taxes do not only raise revenue, but they also affect how efficiently the economy works. In a market without problems, the competitive equilibrium already gives the most efficient outcome, so no government intervention is needed.

NOW we will examine the inefficiencies of taxes on GOODS in the goods market and later we will see how these inefficiencies also apply when INCOME is taxed in the LABOR market.

When taxes are introduced, people try to reduce their tax burden, and this changes their behavior. As a result, the economy moves away from the efficient outcome.

- **Substitution Effect:** People substitute away from the taxed good or activity and choose less efficient alternatives

**EXAMPLE:** in the initial equilibrium in A, the efficient level of gasoline was reached. At B, a new tax of 50 cents PER GALLON is imposed on the PRODUCERS. This makes the quantity decrease below the efficient level. Now there are two new prices: consumers pay 1,80 (which is 0,30 more than they would have paid) and producers receive 1,30 (which is 0.20 less than they would have received).




The GREY area is the DWL. Why is there a "loss" for society? People keep buying as long as the SMB (the demand curve in this case) is above the SMC (the old supply curve in this case, which was efficient). With the tax, the new quantity is Q2 = 90, but there are a number of trades = Q1 – Q2 = 10, for which SMB is above SMC, but cannot happen because of the tax. These trades (10 units in this case) do not happen because the tax raises the price for the consumers, which are not willing to buy that much anymore.

The Deadweight Loss is imposed on SOCIETY → producer surplus lost + consumers surplus lost.

Would the DWL, Q2 and P2/P3 change if the tax was imposed on CONSUMERS INSTEAD? →NO, it does not matter if the tax is imposed on consumers or producers.

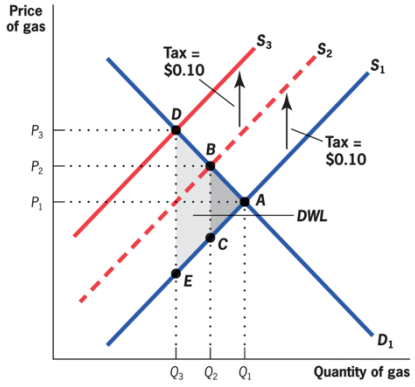
### 1.2 Mathematical Formula of DWL

Mathematically we can derive the formula of the DWL. The step-by-step derivation is not required to know.

$$DWL = -\frac{1}{2} \times \Delta Q \times \tau \quad \rightarrow \quad \Delta Q = \frac{\eta_s \eta_d}{(\eta_s - \eta_d)} \times \tau \frac{Q}{P} \quad \rightarrow \quad DWL = -\frac{\eta_s \eta_d}{2(\eta_s - \eta_d)} \times \tau^2 \frac{Q}{P}$$

The c $\eta_s$ and $\eta_d$ are the elasticity of supply and demand, $\tau$ is the tax rate, and Q and P are the quantity and price.
Since the DWL rises with the square of the tax → the MARGINAL DWL, which is the extra loss caused by increasing the tax slightly, rises with the tax rate.
→ Intuition: Each extra increase in the tax creates more damage than the previous one.

The graph shows how deadweight loss changes when the tax increases step by step. Start at point A with no tax. Then a first small tax is introduced, moving the equilibrium to B and creating a first DWL triangle. When the tax is increased again by the same amount, the equilibrium moves further left and a second DWL is added.




The key point is that the second DWL is larger than the first, even though the tax increase is the same. This happens because the DWL depends on the square of the tax rate ($\tau^2$), so total DWL grows more than proportionally with the tax.

How do we know the DWL does NOT grow proportionally with the tax rate? Because if that was the case then the derivative of it (which is the marginal DWL) must have been a constant → but it is not a constant, it depends on the tax rate $\tau$ → this means the DWL grows MORE than proportionally with the tax rate $\tau$.

→ The marginal DWL, is the extra loss from increasing the tax slightly.

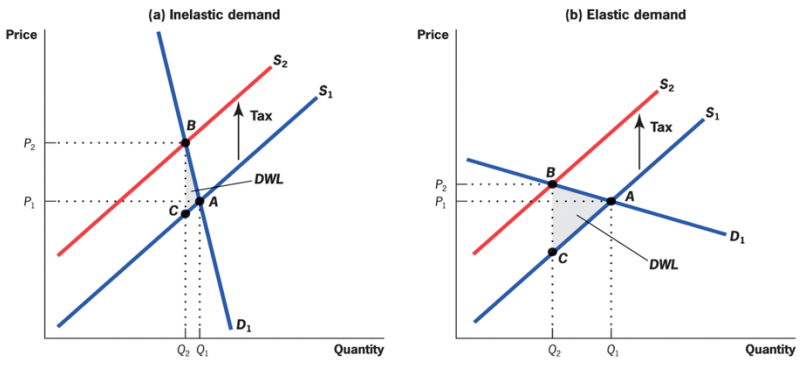
## 1.3 DWL: Role Of Elasticities

We understood that taxes create inefficiencies in society through the DWL. But there is a factor which can greatly increase the effect of this loss → ELASTICITY

The more elastic the demand or the supply are → the BIGGER will be the loss for society.
The reasoning is simple: the more you are elastic, the more you react (change your consumption Q) to a price change. Therefore if consumers or producers are elastic and a tax is imposed, they will react much more to the price change → so they will change a lot the Q consumed/produced → a bigger DWL will be caused

To analyze the effect of elasticity we consider the case of inelastic vs elastic demand. The tax applied is the SAME in both cases, but it produces different quantity and prices effects.

In the case of inelastic demand, quantity changes very little after the tax because consumers do not react much to price increases, so most of the adjustment happens through prices, with consumers paying a higher price and therefore bearing most of the tax burden (the less elastic you are, the bigger the share of the tax you pay).

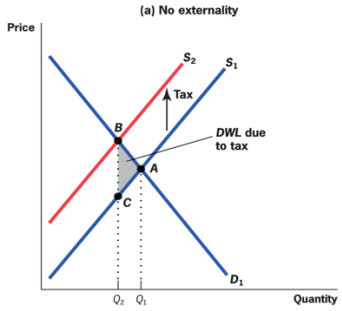



In contrast, with elastic demand, consumers react strongly to the tax, so quantity falls a lot, while the increase in price is smaller because firms cannot

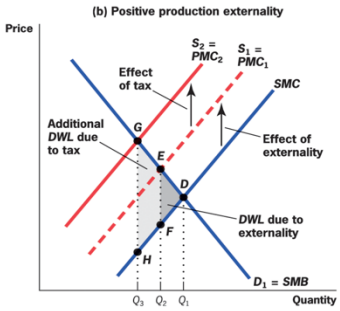
pass much of the tax onto consumers, meaning producers bear a larger share of the tax.

### 1.4 DWL: Role Of Preexisting Distortions 🕰️

Another factor that can increase the deadweight loss of a tax is the presence of preexisting distortions in the market which ALREADY made it INEFFICIENT.




In the first graph, there is no distortion. The market is already efficient, so when a tax is introduced it creates a DWL equal to the triangle from the lost trades.




In the second graph, there is already a positive externality, meaning the market was not producing enough even before the tax. So there was already some inefficiency. When the tax is added in this case, it makes the situation even worse. Quantity falls even further away from the efficient level, so more beneficial trades are lost. → DWL is BIGGER.

So the DWL is larger because:

- there was already a problem
- the tax adds an additional distortion

Tax (inefficiency) + positive externality (inefficiency) = BIGGER INEFFICIENCY

Why is the additional DWL created by the tax bigger than the previous DWL created by the positive externality? → SAME reason as before, because the DWL grows more than proportionally with the tax rate.

## 2. REAL WORLD RESPONSES TO TAXES

As we have seen, when a tax is introduced the quantity bought decreases. WHY? →This happens because taxes make consumption more expensive, so people buy less. In other words, people CHANGE THEIR BEHAVIOR in response to the tax, for example by avoiding taxed goods or reducing their consumption.

### 2.1 CASE STUDY: Window Tax 🪟

In 1696, King William III of England needed money to finance a war, so he introduced a new tax based on the number of windows in a house, since windows were seen as a good indicator of the house's value. However, people reacted to this tax. To pay less, they started boarding up or removing windows. This made houses less pleasant and less valuable to live in, which created a deadweight loss. So the tax did not just raise revenue, it also reduced welfare by distorting people's choices.

→ To test whether people were really responding to the tax, researchers looked at how the number of windows changed when tax rules changed.
Between 1747 and 1757, the tax system had "notches":

- no tax for houses with fewer than 10 windows
- 6 pence per window for 10 to 14 windows
- 9 pence per window for 15 to 19 windows
- 12 pence per window for 20 or more

This meant that the marginal tax rate jumped enormously on building the 10th, 15th, or 20th window.

By looking at the data on windows, we can see that most of houses now had 9, 14, and 19 windows. This means many people chose to stop just before the higher tax thresholds to avoid paying more. This is exactly what we would expect if people change behavior to avoid taxes.

→ One might think that maybe houses naturally had 9, 14, or 19 windows for other reasons. But this is not the case.

In 1761, the government changed the rule and started taxing houses with 8 or 9 windows. This created a new incentive to have 7 or fewer windows.
After this change, the data shows that:

- 27% of houses had 7 windows
- only 5% had 6 windows
- only 3% had 8 windows

→ This sharp concentration at 7 windows confirms that people were ADJUSTING THEIR BEHAVIOR because of the tax.

### 2.2 Tax Avoidance Behavior – Other Examples 🚨

There are also other real-world examples of how people actively adjust their behavior in order to avoid taxes, creating DWL.

1. **Salt Tax Example:** When salt was heavily taxed, Tuscan bakers stopped using it, changing their production and creating a lasting effect, since Tuscan bread is still saltless today.
2. **Cyprus Building Tax:** Since the tax applied only to finished houses, homeowners avoided it by leaving structures technically unfinished, for example by adding steel bars on the roof. The DWL came from the houses being less useful or delayed.
3. **Shoes Vs Slippers Tax:** Because shoes were taxed more than slippers, firms modified their products slightly to classify them as slippers and pay less tax. The DWL came from resources spent on pointless redesign.
4. **Alberobello Trulli:** There was a tax on houses, so people built homes (called Trulli) that could be quickly dismantled to avoid paying it, leading to less stable and less efficient housing.

## 3. EQUITY–EFFICIENCY TRADE OFF 19-22

### 3.1 Efficiency Costs of Progressive Taxation 💸

Until now we analyzed how taxes created inefficiencies in the GOODS market. Now we see how taxes can create inefficiencies in the LABOR market, when income is taxed → and also how those inefficiencies are BIGGER depending on the tax system used (proportional vs progressive).

To see this we will use an **EXAMPLE:**
Suppose there are two people, one with a wage of $10 per hour and one with a wage of $20 per hour.
For both, a 10% rise in wages leads them to supply 10% more labor (elasticity of labor supply = 1).
Elasticity of labor demand is also 1.

**1)** Suppose initially we have a PROPORTIONAL tax system. The government imposes an equal tax to both the low-wage worker and the high-wage worker.


The tax makes working less rewarding, therefore both low and high wage workers reduce their labor supply because working is less attractive and leisure becomes more attractive.

This creates a DWL in both markets, ABC in the low wage and EDF in the high wage.
EDF is bigger than ABC because in a competitive labor market, the wage equals the marginal product of labor, so the high-wage worker has a higher marginal product of labor. Society loses twice as much when the high-wage worker reduces her hours than when the low-wage worker reduces her hours. The total DWL is now ABC + EDF

**2)** Now suppose we shift to a PROGRESSIVE tax system. In order to collect the same tax revenues as before, since low wage are now NOT taxed, the government must tax even more than before the high wage.
This results in an increase in the DWL equal to GEFI. The total DWL is now GDI.
The previous DWL of ABC from the low workers is gone, but the increase in the DWL of the high workers (GEFI) is BIGGER than ABC!!! So the TOTAL DWL is bigger in the second case. The problem is that under a progressive system more tax is placed on high wage workers, and since their work creates more value, reducing their hours causes a bigger loss for society, making the TOTAL DWL LARGER than under a proportional tax for the SAME REVENUE (why do we accept it and have progressive systems then? Because we must also take into account fairness and redistribution of resources, not only economic efficiency).

## 4. OPTIMAL TAXATION

After having analyzed how taxes create inefficiencies, and when those inefficiencies are larger, we now move to how governments can design optimal tax policies.
We move from the POSITIVE QUESTION = how taxes create DWL and how big is it
to the → NORMATIVE QUESTION = how we should DESIGN taxes to minimize DWL or improve welfare.

### 4.1 Tax Smoothing Over Time ⏳

In optimal taxation, the goal is to raise a given amount of revenue while minimizing deadweight loss. The key idea here is that deadweight loss does not increase linearly with the tax rate, it increases more than proportionally.

So if the government sets very high taxes in some periods and very low taxes in others, the high-tax periods create a very large distortion in behavior, because people strongly reduce work or consumption when taxes are high. The low-tax periods do not compensate for this, since distortions are small there.
Instead, if the government spreads taxes more evenly over time with a constant medium rate, behavior is distorted less in each period, and total deadweight loss is lower.

→ The intuition is simple: large tax spikes are very costly in terms of efficiency, so it is better to smooth taxes over time to avoid big distortions.

## 4.2 The Ramsey/Inverse Elasticity Rules and Equity Implications 🧵

The goal of optimal taxation is to raise a given amount of revenue while minimizing deadweight loss.
This is exactly what optimal commodity taxation is about: deciding how to set taxes ACROSS DIFFERENT GOODS in the best possible way.

→ The Ramsey Rule gives the answer to this problem. It says that taxes should be chosen so that the extra DWL created by raising one more unit of revenue is the same across all goods.

The formula: $\frac{MDWL_i}{MR_i} = \lambda$

This means:

- **MDWL$_i$**: the extra deadweight loss caused by increasing the tax on good i
- **MR$_i$**: the extra revenue the government gets from that increase
- **λ**: the value of one additional euro of government revenue, meaning how useful that euro is in public use compared to private use

The intuition is: if one good creates a lot of distortion when taxed, you should tax it less and shift taxation toward goods that create less distortion. In equilibrium, everything is “balanced” so that no tax can be rearranged to reduce total inefficiency.

Then we can simplify the Ramsey rule. IF SUPPLY is PERFECTLY ELASTIC, only demand matters. In that case, the Ramsey rule becomes the Inverse Elasticity Rule:

The formula: $\tau_i^* = -\frac{1}{\eta_i} \times \lambda$

This tells you that the optimal tax depends on the elasticity of demand.

- If demand is **inelastic** (people don’t react much), the optimal tax is higher
- If demand is **elastic** (people react a lot), the optimal tax is lower

The intuition is: when demand is elastic, a tax causes a big reduction in quantity, so many mutually beneficial trades disappear and deadweight loss is large. When demand is inelastic, quantity barely changes, so the distortion is small.

Optimal taxation therefore needs to balance two key practical rules:

1. **Broad Base Rule**: it is better to tax many goods at moderate rates rather than a few goods at very high rates. This is because deadweight loss increases more than proportionally with the tax rate, so concentrating taxes creates large inefficiencies.
2. **Elasticity Rule**: tax more heavily goods that are less responsive to price changes.

## 4.3 Equity Implications Of The Ramsey Model 👩‍⚖️

Up to now, the Ramsey model focused only on efficiency. It tells us how to set taxes to minimize deadweight loss, without considering who actually pays them.

→ When we apply this to real goods, a problem appears. Cereal has low elasticity, so it should be taxed more, while caviar has high elasticity, so it should be taxed less. But cereal is mainly consumed by poorer people, while caviar is consumed by richer people.

So following the Ramsey rule would mean taxing poor people more than rich people.

This is efficient, but clearly unfair. It WORSENS VERTICAL EQUITY because the tax burden falls more on low-income individuals.

This shows the main limitation of the Ramsey model: it ignores fairness.

## 4.4 Optimal income taxation 🏁

After seeing that the Ramsey model can lead to unfair outcomes, the focus shifts to optimal income taxation, where fairness is included.

Instead of choosing taxes across goods, the government now chooses taxes across income groups. The objective is to maximize social welfare, while still raising the required revenue.

The key difference is that here we care not only about efficiency, but also about how income is distributed. This is captured by the social welfare function, which reflects how much society values the well-being of different individuals.

→ Because of this, there is a trade-off. The EQUITY- EFFICIENCY TRADE OFF →

1) In the LABOR MARKET: Higher taxes on rich individuals improve redistribution, but reduce incentives to work and create inefficiency. Lower taxes improve efficiency but reduce equity.

2) In the GOODS MARKET: Higher taxes on inelastic goods improve efficiency by reducing deadweight loss, but can be unfair since these goods are often necessities, while lower taxes improve equity but reduce efficiency.

OPTIMAL TAXATION balances this trade off.

# CHAPTER 4 – TAXES ON SAVINGS

## 1. INTERTEMPORAL CHOICE FRAMEWORK

When we talk about taxes on savings, it is important to first clarify what savings mean in this context. Savings are part of capital income and represent the part of income that an individual does not consume today, but instead sets aside in order to earn a return. This return is given by the interest rate. In this framework, we are mainly thinking about simple and safe saving instruments, not risky assets. So the idea is something like a bank savings account or a “conto deposito”, where the money left aside earns interest over time.

Before introducing taxes, we first need to understand how the choice between consumption and saving works in the normal case. This is what the intertemporal choice model explains. The key idea is that deciding how much to save is really the same as deciding how to allocate consumption across time. In other words, the individual is choosing how much to consume today and how much to consume tomorrow.

→ To make this simple, the model considers two periods.
In period 1, the individual is working and earns income Y.
In period 2, the individual is retired and earns nothing.

The person chooses how much to consume in the first period, cW, and how much to consume in the second period, cR. Savings are not treated as a separate choice, but as what is left over after current consumption.

This is why savings are written as: $S = Y - c^W$

These savings then earn interest r. So the amount available for future consumption is the savings multiplied by (1+r), where r is the interest rate.

This gives: $(1+r)S = c^R$ or $c^R = (1+r)(Y - c^W)$

This is the central relationship of the model. It shows that future consumption depends on how much is saved today and on the interest rate. The more the individual saves, the more she can consume tomorrow, and the higher the interest rate, the greater the reward from postponing consumption.

This relationship is called the intertemporal budget constraint, and it captures the trade-off between present and future consumption. It tells us how much future consumption can be obtained by giving up consumption today.
The key intuition is that if the individual consumes 1 more unit today, she must give up (1+r) units of consumption tomorrow. So the opportunity cost of consuming today is future consumption.

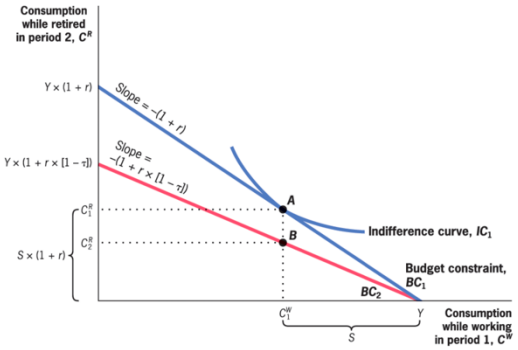
→ This explains WHY the interest rate matters → A higher interest rate makes saving more attractive, while a lower interest rate makes current consumption relatively more appealing.

# 2. TAXES ON SAVINGS AND THEORETICAL EFFECTS

## 2.1 Taxes on Savings: Ambiguous Effects on Saving Behavior 🔄

Once taxes on savings are introduced, they reduce the effective return from saving. This means they lower the after-tax interest rate, and therefore change the intertemporal budget constraint.

Now with the tax rate applied to the returns on savings → the budget constraint rotates downward (the slope changes) because for the same consumption today you get less consumption tomorrow (the government takes part of the return). Even though the return on savings goes down (lower after tax interest rate), we CANNOT determine for sure if the individual will save less or more today.




This ambiguity is given by the opposite forces of the SUBSTITUTION EFFECT and the INCOME EFFECT.

1. **Substitution Effect:** when taxes reduce the interest rate, saving becomes less attractive because you get less future consumption for giving up consumption today, so people prefer to consume more now and save less → SAVINGS DOWN
2. **Income Effect:** when taxes reduce the return, people feel poorer overall, so they cut consumption (including today's consumption) and may save more to have enough resources in the future → SAVINGS UP

These two effects contrast each other and the final effect on savings depends on which one prevails:

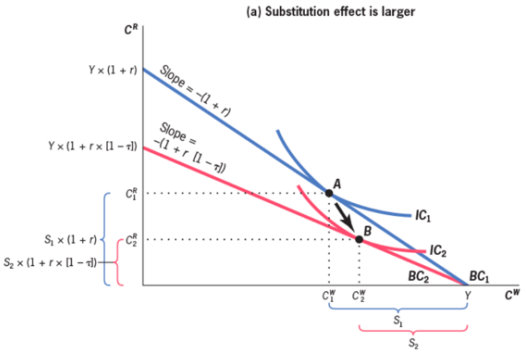
- If substitution effect > income effect → savings fall.
- If income effect > substitution effect → savings rise.

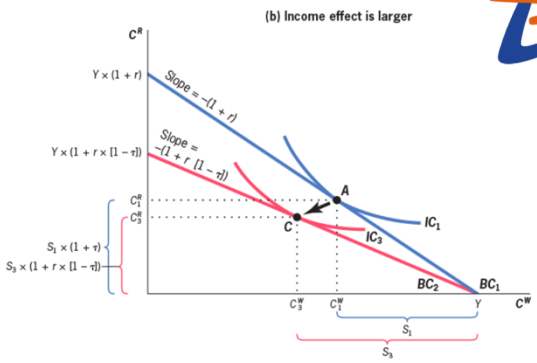
How to understand which of these effects prevails? PREFERENCES! Individuals have different preferences and therefore might value present consumption or future consumption more. Now we will see the cases of two different people.

After the tax is introduced, the budget constraint rotates in the same way in both graphs, but individuals make different choices because their preferences differ → DIFFERENT INDIFFERENCE CURVES → the choice of the individual is the intersection between the indifference curve and the budget constraint!

Important observation: the consumption tomorrow cR falls in ANY CASE, what changes is by HOW MUCH it falls → which depends on preferences and which effect prevails today.

**1)** In the first case, the individual cares more about present consumption, so the substitution effect dominates. The individual BORROWS and moves from point A to point B, consumes more today ($C^W_2$), saves less ($S_2$), and as a result future consumption ($C^R_2$) falls by a lot.






**2)** In the second case, the individual cares more about future consumption, so the income effect dominates. The individual moves from point A to point C, consumes less today ($C^W_3$), saves more ($S_3$), and future consumption ($C^R_3$) still falls, but by less.

Logically, we would think the substitution effect is the main one→ lower return → saving is less attractive → people save less

But in a target savings model, people have a goal like → "I want to have X money for retirement"
So: → if the interest rate falls → they earn less on savings → to still reach the same target → they save more today

## 2.2 Taxes On Savings: Empirical Challenges 🧩

Even though the theory explains the mechanisms, in practice it is difficult to measure how taxes affect saving because of several real-world complications.

1. **Relevant Interest Rate Problem:** It is hard to know which interest rate people actually respond to, because there are many rates in the economy and individuals may face different ones.
2. **No Clear Comparison Problem:** Interest rates usually change for everyone at the same time, so it is difficult to compare a treated group with a control group and isolate the effect of taxes.
3. **Different Saving Instruments:** People use many different assets to save, each with different returns and tax rules, making it hard to identify one clear effect.
4. **Long Time Horizon Problem:** Saving decisions take place over many years, so it is difficult to observe behavior and establish clear cause and effect.

## 2.3 Taxes on Savings: The Role Of Inflation 📈

Another factor to consider in savings decision is inflation.
Most countries tax return on savings based on the NOMINAL interest INCOME, using the nominal interest rate in currency terms.
→ however, this can distort the REAL return after tax of your savings, making it really low or even negative if inflation is HIGH.

The relationship between nominal and real interest rates is: $$Real\ interest\ rate\ (r) = \frac{1 + Nominal\ interest\ rate\ (i)}{1 + Inflation\ rate\ (\pi)} - 1$$

But the taxes are calculated on the nominal interest rate, NOT the real one.

**EXAMPLE:** Suppose you have 100, the nominal interest rate is 10%, inflation is also 10%, and the tax on interest is 50%. If you save, you earn 10 in interest, but you pay 5 in taxes, so you end up with 105. However, because prices have increased by 10%, those 105 are only worth about 95.5 in real terms. So you started with 100 and ended up with less purchasing power. If instead you had not saved and simply consumed the 100 today, you would have kept its full value. This shows that even though you earn interest, taxation combined with inflation can make saving reduce your real purchasing power, which discourages saving.

**EXAMPLE:**
**Without inflation:** tax reduces your return (110 to 105)
**With inflation but no tax:** your real return is already lower (110 with higher prices → 100 real)

**With both inflation and tax:** you get hit twice
→ you pay tax on nominal gains
→ your real purchasing power falls (100 → 95.5)

| Case | Inflation | Tax Rate on Interest | Savings | Nominal Interest Rate | Interest Earnings | After-Tax Resources | Price of Skittles | Bags of Skittles |
|---|---|---|---|---|---|---|---|---|
| No inflation | 0% | 0% | 100 | 10% | $10 | $110 | $1.00 | 110 |
| | 0% | 50% | 100 | 10% | $10 | $105 | $1.00 | 105 |
| Inflation | 10% | 0% | 100 | 10% | $10 | $110 | $1.10 | 100 |
| | 10% | 50% | 100 | 10% | $10 | $105 | $1.10 | 95.5 |
| Constant real rate | 10% | 0% | 100 | 21% | $21 | $121 | $1.10 | 110 |
| | 10% | 50% | 100 | 21% | $21 | $110.5 | $1.10 | 100.5 |

Save $100, 10% real interest rate, 50% tax on interest.

# 3. REAL-WORLD DEVIATIONS: CONSTRAINTS AND BEHAVIORAL BIASES

The traditional intertemporal model we have seen so far has a lot of ASSUMPTIONS, for example:

1. **Full Rationality:** individuals make perfectly logical decisions and always choose what is best for them.
2. **Perfect Foresight:** individuals know exactly what will happen in the future, like income and interest rates.
3. **No Borrowing Constraints:** individuals can borrow as much as they want against future income.
4. **Single Discount Rate:** individuals have one consistent way of valuing the future relative to the present.

We will first show how these assumptions in reality are not always true, and then introduce new alternative models to take into consideration these assumptions.

## 3.1 Liquidity Constraints and Precautionary Saving 🚫

Some individuals face borrowing constraints, meaning they CANNOT BORROW against future income to increase the consumption of today, even if they would like to→ they consume less today and SAVE MORE than the model predicts.

→ If households cannot borrow, their consumption becomes much more dependent on their current income. This means that if income suddenly falls, they cannot smooth consumption by borrowing, so they are forced to reduce consumption immediately.
Because of this, saving takes on a different role. Instead of just being a way to earn a return, saving becomes a buffer against uncertainty. Individuals save more in order to protect themselves against possible negative shocks in the future, such as losing income.

As a result, changes in the interest rate (because of taxes) become less important. Even if the return on savings changes, individuals may not adjust their saving much, because their main goal is to maintain a safety buffer rather than respond to incentives.

This leads to what we call precautionary motives. Individuals who are risk-averse or face uncertainty tend to save more in order to insure themselves against future risks. Because of this, their saving behavior is less responsive to after-tax interest rates, since the need for security dominates the effect of returns.

Borrowing constraints and income risk lead to what is called buffer-stock saving: individuals save mainly to protect themselves rather than to maximize returns.

1. **Target Asset Level:** households aim to keep a minimum level of savings as a safety buffer, so they always want to have some assets available in case of bad shocks

2. **Saving Adjustment:** saving decisions are driven by the need to maintain this buffer, so people save more when they are below the target and less when they are above it
3. **Limited Role of Interest Rates:** changes in after-tax interest rates matter less, because individuals are not mainly reacting to returns but to the need for security

This provides an alternative explanation for why saving does not respond strongly to taxes, since behavior is driven more by precaution than by incentives.

### 3.2 Self Control and Behavioral Models 🤑

Some individuals have the opposite problem → they save LESS than the model predicts because of behavioral biases.

1. **Present Bias:** individuals give too much importance to consumption today compared to the future, so they prefer spending now instead of saving
2. **Difficulty Following Plans:** even if they want to save for the future, they struggle to stick to long-term plans and end up saving less

→ As a result, they choose a level of saving that is lower than what would be optimal for their long-term well-being

Because of these behaviors, individuals do not respond strongly to taxes on the interest rates, but they are very influenced by tools like automatic saving, defaults, and commitment devices.

Tax incentives often do not increase total saving. Instead, they MAINLY CHANGE WHERE PEOPLE SAVE, NOT HOW MUCH → shifting money across different accounts rather than increasing overall saving.

## 4. TAX-ADVANTAGED SAVING AND POLICY DESIGN

Focusing on individuals with self-control problems, the goal is to understand how policies can help them SAVE MORE.
These individuals want to save but fail to do so because they overvalue present consumption. For this reason, they rely on commitment mechanisms, which are tools that make saving easier or automatic.

1. **Automatic Payroll Deductions:** part of the salary is directly saved before the individual can spend it, reducing the temptation to consume.
2. **Early Withdrawal Penalties:** accounts like 401(k) and IRA impose costs if money is withdrawn early, discouraging individuals from using their savings.
3. **Default Contribution Rates:** individuals are automatically enrolled in saving plans with a preset contribution rate, so they save even if they do nothing.
4. **"Save More Tomorrow" Plans:** programs where people commit in advance to automatically increase their savings in the future, usually when their income rises.

Evidence shows that these tools are very effective. Defaults, in particular, strongly increase participation and the amount saved, because many individuals follow the default option without changing it.

These policies have a much stronger effect on saving behavior than changes in after-tax returns → because individuals with self-control problems do not react much to interest rates, but respond strongly to automatic or imposed saving mechanisms.

## 4.1 Tax Advantaged Retirement Accounts: 401(K) and IRA 🎁

Governments encourage private saving by offering tax-preferred accounts, which give tax advantages to individuals who save for retirement.
In the U.S., the two main examples are 401(k) plans and IRAs.

1. **401(k) Plans:** retirement accounts offered by employers, where individuals contribute part of their salary. Contributions are tax-advantaged up to annual limits and employers often match a portion of the contribution, increasing total savings.
2. **Individual Retirement Accounts (IRA):** personal retirement accounts, mainly used by low- and middle-income individuals. Contributions are typically made before tax, and taxes are paid later when the money is withdrawn.

The key economic question is whether these tax advantages actually increase total saving, or whether individuals simply move their existing savings into these accounts without saving more overall.

There are two main types of retirement plans:

1. **Defined Benefit (DB):** retirement income is predetermined and depends on salary and years worked. The individual does not control contributions or returns.
2. **Defined Contribution (DC):** retirement income depends on how much the individual contributes and the returns earned over time.

401(k) plans are the most common type of Defined Contribution (DC) plan, since the final outcome depends on contributions and investment performance.

The tax treatment works as follows:

1. **Contributions:** contributions are excluded from taxable income, so the individual does not pay taxes when the money is invested
2. **Accumulation:** funds grow without being taxed, so interest and returns accumulate fully over time
3. **Withdrawals:** withdrawals are taxed later, during retirement, as regular income

This creates a clear advantage. Since returns are not taxed while the money is growing, the effective return to saving is HIGHER compared to normal saving.

Individuals are encouraged to contribute up to the contribution limit to FULLY BENEFIT from the tax advantage.

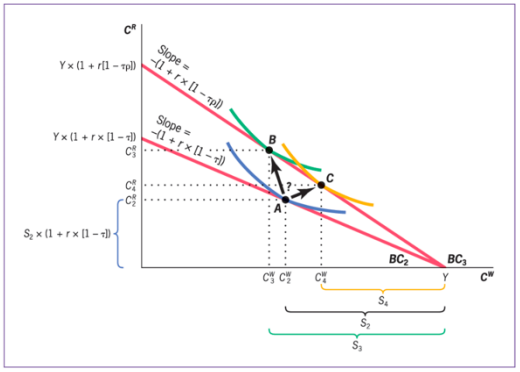
With these accounts, individuals face two saving options:

1. **Save Normally:** individuals pay tax on interest every year, reducing returns
2. **Save in IRA or 401(k):** no tax on contributions or returns while invested, and taxes are paid only at withdrawal

For individuals with low levels of saving → all savings can be placed inside the tax-preferred account, so they fully benefit from the higher after-tax return.

With an IRA or 401(k) the budget constraint changes when saving is tax-favored through an IRA or 401(k). The budget line becomes steeper because the return to saving is higher. Just like in the standard intertemporal model, the individual can make different choices depending on preferences, leading to either higher or lower saving depending on whether t he substitution or income effect dominates.

Figure 22-3

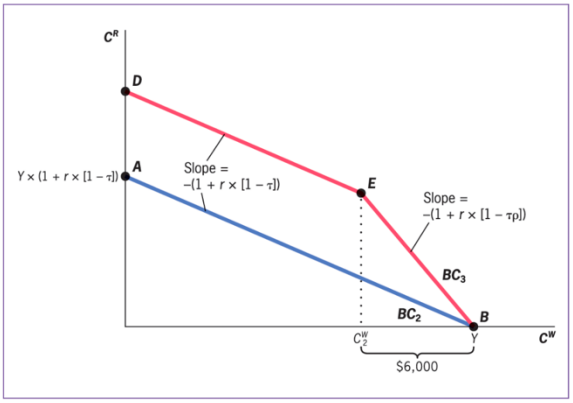





Individuals initially face a budget constraint $BC_2$ with a slope $-(1 + r \times [1 - \tau])$. When retirement savings are tax-subsidized, the budget constraint moves to $BC_3$, with a higher slope $-(1 + r \times [1 - \tau \times \rho])$. This leads to a substitution effect toward more savings and an income effect toward less savings.

If the substitution effect is larger, then first-period consumption will fall from $CW_2$ to $CW_3$, and savings will rise from $S_2$ to $S_3$. If the income effect is larger, then first-period consumption will rise from $CW_2$ to $CW_4$, and savings will fall from $S_2$ to $S_4$.

This graph shows what happens when there is a CONTRIBUTION LIMIT in the IRA. The budget constraint becomes kinked because the higher return applies only up to the limit. Up to the limit, saving is tax-favored and gives a higher return. Beyond the limit, saving is taxed normally, so the return falls back to the standard level, creating a change in slope.






The availability of IRAs raises the return to savings less than $6,000 from $-(1 + r \times [1 - \tau])$ to $-(1 + r \times [1 - \tau \times r])$, where r is the net tax preference from using an IRA. Once savings is above $6,000, the IRA simply increases period-two income, and the return to each dollar of savings returns to $-(1 + r \times [1 - \tau])$.

The marginal saving is the portion of saving that is affected by the tax benefit, meaning each additional unit that receives the higher return.
Up to the limit, saving has a higher marginal return, so each additional unit of saving is more attractive. Beyond the limit, saving is taxed normally, so the marginal return falls back to the standard level.

→ This means that the tax benefit mainly applies to inframarginal savings, that is, the savings the individual would have made anyway. As a result, it increases the return on existing savings, but may not increase total saving much.

This difference in marginal returns across levels of saving LEADS TO TWO TYPES OF SAVERS:

1. **Low Savers:** all their saving is below the limit, so it is fully marginal and benefits from the higher return, making it more likely that their saving increases.
2. **High Savers:** they save above the limit, so only a small part is marginal, while most is inframarginal and just gets a higher return without changing saving behavior.

This matters because tax subsidies can increase saving for low savers, but for high savers they mainly raise returns without increasing total saving.

The FINAL QUESTIONS ARE:
**1)** Tax subsidies may increase private saving, but this does not necessarily lead to higher national saving? → This is because government revenue may fall, increasing deficits, and individuals may simply shift their assets across accounts instead of saving more.

**2)** Do IRAs and 401(k)s raise total saving or simply re-label existing saving (shift money across accounts)?

→ To answer this questions, we now look at the empirical evidence (CHETTY).

## 4.2 Alternative Tax Treatment: ROTH IRA ⏮️

Before looking at empirical evidence, there is one more type of account to consider: the Roth IRA.

Roth IRAs reverse the timing of taxation compared to traditional IRAs:

1. **Contributions:** made after tax, so individuals pay taxes upfront
2. **Accumulation and Withdrawals:** returns grow tax-free and withdrawals are not taxed

The economic implication is that, for many savers, Roth IRAs are equivalent to traditional IRAs if tax rates remain constant over time.
The main difference is the timing of tax revenue for the government, which also creates different political incentives.

By offering tax-free withdrawals in retirement (instead of the usual upfront deduction), the government makes saving more attractive and encourages people to invest earlier and longer.

# 5. EMPIRICAL EVIDENCE ON SAVING RESPONSES

## 5.1 Empirical Evidence: Key Questions ⁉️

We now move to the empirical evidence, which aims to understand how individuals actually respond to tax-preferred saving accounts.

The second question empirical question in consideration has two possible answers:

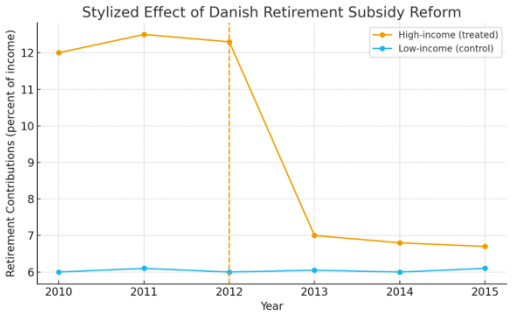
1. **Elasticity Question:** do individuals increase total saving when after-tax returns rise? This tests how sensitive overall saving is to financial incentives
2. **Substitution Question:** do individuals shift savings between accounts with different tax treatments? This captures whether individuals reallocate existing savings rather than creating new saving

Modern empirical analysis uses quasi-experimental variation, meaning it exploits policy changes or differences across groups that mimic a natural experiment, in order to identify causal effects on saving behavior.

## 5.2 Empirical Evidence: Results on Saving Behavior 📊

Chetty et al. (2014) study a Danish reform that reduced the tax subsidy for retirement contributions for high-income workers. The reform only affected top-bracket taxpayers, while lower-income workers were unaffected. This allows a clean comparison between a treated group and a control group. The study also uses a large administrative dataset covering the entire population, making the results very reliable.

→ After the reform, contributions among high-income workers fell sharply, while contributions among lower-income workers did not change. The response was immediate and large. This shows that tax incentives do matter, but mainly in terms of WHERE people save.



However, when looking at total saving, the result is different. Despite large changes in retirement account contributions, TOTAL PRIVATE SAVING DID NOT INCREASE. Individuals compensated by increasing saving in other accounts. The reduction in retirement saving was almost perfectly offset by an increase in taxable saving.

The implication is clear: tax subsidies mostly cause reshuffling, not new saving.

In contrast, when saving is mandatory, the effect is very different. In Denmark, mandatory employer retirement contributions increased total saving one-for-one. Workers who were forced to save more → did not reduce saving elsewhere. This shows that mandates are much more effective than subsidies in increasing total saving.

To explain these results, Chetty et al. distinguish between two types of individuals:

In the first experiment (tax subsidy cut), mostly active savers responded. They noticed the change and reshuffled money between accounts. Passive savers didn't react much.

In the second experiment (mandatory contributions), passive savers are why total saving increased. They didn't actively offset the forced saving elsewhere, they just... went along with it.

- **Active Savers:**
  - adjust savings across accounts
  - respond strongly to price incentives (react to changes in the relative cost/benefit of different savings options)
  - substitution effect dominates (shifting between accounts)
- **Passive Savers:**
  - contribute fixed amounts and rarely change behavior
  - do not offset mandatory contributions
  - are strongly influenced by default rules (contribution rates that are automatically applied)

→ The main result is that MOST individuals are passive savers. This explains why mandates and default rules have large effects, while tax incentives have limited impact on total saving.

## 5.3 Policy Implications 📝

The distinction between active and passive savers has important policy implications.

Tax incentives mainly affect active savers, who are typically higher-income individuals and respond to financial incentives by adjusting their saving across accounts. In contrast, passive savers, who represent the majority of individuals, do not respond much to incentives but are strongly influenced by defaults, automatic enrollment, and mandatory saving rules.

This leads to clear conclusions about subsidies:

1. **Less Effective At Raising Total Saving:** because most individuals are passive and do not change their behavior.
2. **More Regressive:** because they mainly benefit higher-income active savers.
3. **Less Cost-Effective:** compared to automatic mechanisms like defaults and mandates, which have a stronger impact on behavior.

Overall, this modern view strongly influences policy debates in Europe and the United States.

# 6. INTERNATIONAL CONSENSUS ON SAVING BEHAVIOR

## 6.1 Cross-Country Evidence on Saving and Taxation 🌍

Across OECD countries, capital income tax rates differ widely. Despite these differences, household saving rates are relatively similar across countries, suggesting that → taxes alone do not explain saving behavior.

Countries with strong mandatory retirement systems (which raise total saving) show low sensitivity of saving to tax incentives. This means that when saving is already enforced or guided by institutions, individuals do not respond much to changes in tax benefits.

This evidence shows that behavioral and institutional factors matter more than tax incentives in determining saving behavior.

## 6.2 Focus On Italy: Household Saving Behavior 🇮🇹

Italy's household saving rate has been decreasing since the 1990s.
It is lower than in Germany and France, similar to Spain, and below the OECD average, showing that differences in tax systems do not explain saving behavior very well.

The data also shows fluctuations over time, with a spike around 2020 and then a sharp decline, but no sustained increase, meaning temporary shocks affect saving but do not change the long-run trend.
This pattern is explained by demographic aging and slow income growth. Older households tend to save less because they are closer to retirement or already using savings, and low-income growth leaves less room to save.

→ The implication is that tax incentives are likely to have limited effects, since saving behavior is mainly driven by these broader economic and demographic factors.

## 6.3 CONCLUSIONS: Empirical Consensus on Tax Incentives and Saving 📌

These are the main conclusions from the empirical evidence.

1. **Substitution Across Accounts:** individuals strongly shift savings between accounts when tax incentives change.
2. **Effect on Total Saving:** with tax incentives, overall saving does not increase much, the effect is small or zero.
3. **Role of Mandates and Defaults:** automatic enrollment and mandatory saving have large effects on behavior → they raise total saving.
4. **Importance of Behavioral Factors:** saving decisions are driven more by behavior than by after-tax returns (inertia, defaults, and passivity drive most saving decisions)
5. **Response of High-Income Individuals:** higher-income individuals react more to tax incentives
6. **International Differences:** differences in saving rates across countries are explained by institutional factors like mandatory pensions and default enrollment rules, not just by differences in tax incentives.

# CHAPTER 5 – TAXES ON RISK TAKING AND WEALTH

## 1. TAXATION OF RISK TAKING AND CAPITAL GAINS

### 1.1 Basic Model: Risk Taking Under Capital Income Taxation

In this first part (risk taking taxation) we analyze why taxing risk taking, meaning investing in risky assets, affects behavior.

When the government taxes gains but also deducts losses, it effectively shares both the upside and downside of every investment. This makes losing less painful, so the investor can scale up their position to restore the original after-tax return, ultimately taking more risk, not less.

Consider a simple investment of $100. With probability 1/2, it pays $120, giving a gain of +20. With probability 1/2, it pays $80, giving a loss of −20. The expected return is zero, since gains and losses cancel out.

| Policy | Investment | Payoff if Win | Payoff if Lose | Tax Rate if Win | Tax Deduction if Lose | After-Tax Winnings | After-Tax Loss |
|---|---|---|---|---|---|---|---|
| (1) No tax | $100 | $20 | −$20 | 0 | 0 | $20 | −$20 |
| (2) Tax | $100 | $20 | −$20 | 50% | 50% | $10 | −$10 |
| (3) Loss offset | $200 | $40 | −$40 | 50% | 50% | $20 | −$20 |
| (4) No loss offset | $200 | $40 | −$40 | 50% | 0 | $20 | −$40 |
| (5) Progressive tax | $200 | $40 | −$40 | 75% | 50% | $15 | −$20 |

Now look at the three cases (FOCUS ON ROW 1/2/3):

1. **No Tax:** → Gain = +20 and Loss = −20
2. **50 % Tax With Full Loss Deduction:** → Gain = +10 and Loss = −10
3. **50 % Tax With Full Loss Deduction and Adjusted Investment of $200:** → Gain = +40 before tax → +20 after tax and Loss = −40 before tax → −20 after tax

The investor can undo the effect of the tax by doubling the investment (row 3). This restores the same final outcomes as without tax, but requires taking more risk.

The main takeaway is that with full loss deductibility, taxes do not discourage risk taking. They can actually increase it.

### 1.2 Real World Complications: Partial Loss Offset and Progressive Taxes

Even though it might seem straightforward to assume that taxes increase risk taking for sure → IT IS NOT
There are real world complications such as less: less-than-full tax offset and progressive tax schemes which make it hard to settle on a clear correlation in the real world.

**1) Losses Are Not Fully Deductible:** The first complication is that in reality losses are not fully deductible.
Tax loss offset refers to how much investors can deduct their investment losses from taxable income. When this offset is incomplete, the government no longer shares risk equally with the investor.
In the simple model, the investor could undo the effect of taxation by increasing the size of the investment. This is no longer possible when losses are not fully deductible.

**FOCUS ON ROW 4:** Consider the case where losses cannot be deducted. The investor doubles the investment to $200. If the investment succeeds, the gain is +40 before tax and +20 after tax. If it fails, the loss

is −40 and is not reduced. The downside is larger than the upside, so increasing the investment does not restore the original situation.

The consequences are that:

1. **Investor Cannot Offset Taxes:** increasing the size of the investment no longer restores the original payoff
2. **Lower Incentives To Take Risk:** the investor bears more downside risk, making risky investments less attractive

**2) Progressive Taxation:** A second complication comes from progressive taxation, which creates asymmetry between gains and losses.
**FOCUS ON ROW 5:** Consider the case where gains are taxed at 75 percent while losses are only deductible at 50 percent. If the investor doubles the investment to $200, the outcomes become:

- Gain: +40 before tax → +15 after tax
- Loss: −40 before tax → −20 after tax

Here, gains are taxed more heavily than losses, so the upside is smaller than the downside.

1. **Winning Investment:** gains may be taxed at higher marginal rates
2. **Losing Investment:** losses are often deducted at lower rates

This asymmetry reduces the after-tax expected return from risky investments.

In reality, tax systems combine these features. Losses are only partially deductible and tax rates are progressive, so gains and losses are treated differently.

→ Once these real-world complications are introduced, the effect of taxation on risk taking is no longer clear. It depends on the details of the tax system and becomes an empirical question, with limited evidence available.

Theoretical predictions are ambiguous because of incomplete loss offset, progressive taxation, and differences in how realized and unrealized losses are treated (realized losses are losses on assets that are actually sold and can be deducted, while unrealized losses exist only on paper and are typically not deductible). Empirical evidence is limited, but existing studies suggest that taxation has only modest effects on risk taking and that these effects depend heavily on the specific design of the tax system.

## 1.3 Application: Human Capital Investment 🎓

Now we move from financial investments to another important form of risk taking, investment in human capital, meaning education.

Education can be seen as a risky investment because its returns are uncertain. On average, each additional year of schooling increases earnings by about 7 %, but actual outcomes vary across individuals.

The parallel is clear: just like with financial investments, a labor tax that applies to both gains (high earnings) and losses (low earnings) shares the risk with the investor, potentially encouraging more investment in education to restore the desired after-tax income. That is the same scaling-up mechanism as in the capital income model.

But the **key difference** is progressive taxation. In the capital income model, the tax rate (in the basic model before the complications) was assumed flat, so the government shared risk symmetrically. With progressive income taxation, successful outcomes (high earnings from education) are taxed at higher rates than unsuccessful ones, which breaks that symmetry and creates a genuine disincentive.

→ This is why the net effect on human capital is unclear. There is NOT a clear answer on the net impact of income taxation on human capital investments.

## 1.4 Capital Gains Taxation and Lock In Effect 🔒

Now we return to financial investments and focus on capital gains, because their taxation creates important behavioral effects.

A capital gain is the difference between the purchase price and the sale price of an asset. For example, buying a stock at 100 and selling it at 140 generates a capital gain of 40.

A key distinction is how different types of income are taxed. Interest income is taxed on accrual, meaning taxes are paid each period as the return is earned. Capital gains, instead, are taxed on realization, meaning taxes are paid only when the asset is sold. This difference is important because it changes the timing of taxation and therefore investor behavior.

1. **Taxation on Accrual:** taxes are paid each period on the return earned in that period, which is theoretically efficient but difficult to implement because asset values are not always easy to measure
2. **Taxation on Realization:** taxes are paid only when the asset is sold, which creates incentives to delay selling and leads to strategic behavior

→ Because taxes on capital gains are only paid upon realization, investors have an incentive to delay selling assets that have increased in value. By postponing the sale, they POSTPONE THE TAX PAYMENT, which increases the present value of after-tax returns → because the longer you delay the tax payment, the more your money compounds untaxed, so your effective after-tax return is higher than if you had paid the tax immediately upon the gain.

This creates the LOCK IN EFFECT, where investors hold assets longer than they ideally should.

This logic assumes tax rates stay constant over time. If you expected tax rates to rise in the future, the incentive to delay would weaken (or even reverse), since postponing means paying a higher rate later.

**Consequences:**

1. **Reduced Market Liquidity:** fewer assets are traded because investors delay selling
2. **Inefficient Allocation:** assets are held too long, inefficiently, instead of moving to more productive uses
3. **Distorted Decisions:** investment choices are driven by tax considerations rather than economic fundamentals

## 1.5 Policy Debate: Should Capital Gains Taxes Be Lower? 📝

There is an ongoing debate about whether capital gains should be taxed at lower rates, because these taxes affect investment behavior, fairness, and government revenue.

**Arguments For Lower Capital Gains Taxes:**

1. **Protection Against Inflation:** part of the increase in asset prices is just inflation, not real profit. If taxes are applied to the full nominal gain, investors are taxed on income they did not truly earn
2. **Improved Efficiency Of Capital Transactions:** high taxes create a lock in effect, where investors delay selling assets. Lower taxes reduce this problem and allow assets to move more easily to better uses
3. **Encouragement Of Entrepreneurship:** many business founders earn returns in the form of capital gains. Lower taxes can support entrepreneurship, although this effect is limited because the policy is not very targeted.

**Arguments Against Preferential Treatment:**

1. **Violation Of Haig Simons Principle:** from a fairness perspective, all types of income should be taxed equally since Haig Simons treats all income in the same way with no special treatment.
2. **Regressive Benefits:** capital gains are mostly earned by rich individuals, so lower taxes mainly benefit the top of the income and wealth distribution.
3. **Encouragement Tax Planning:** people can try to reclassify income as capital gains to pay lower taxes, for example by using loopholes or re-labeling labor income.
4. **Revenue Loss And Limited New Investment:** c cutting capital gains taxes reduces government revenue, but most of the benefit goes to existing past gains (windfalls for current holders), NOT to encouraging new investment, so the cost outweighs the benefit.

## 1.6 Evidence: Effects on Capital Gains Realizations ⏱️

Now we move from theory to evidence and ask how capital gains taxes affect realizations and tax revenue in practice.

→ The key issue is that capital gains are taxed only when realized, so tax rates mainly affect when investors decide to sell assets.

A clear example comes from the United States. In 1986, a capital gains tax increase was announced to take effect in 1987. Investors reacted by selling assets earlier to avoid the higher future tax. As a result, capital gains realizations spiked in 1986. Once the higher tax rate came into force in 1987, realizations fell back to levels similar to 1985.
This pattern shows that investors respond strongly to tax changes by shifting the timing of realizations. Data over time confirm this behavior, with clear spikes in realizations before tax increases and during stock market booms. However, this response is mostly short term. Because realizations are shifted across time rather than created, the overall effect on tax revenue in the long run is limited (IN THIS SPECIFIC EXAMPLE).

When US states change capital gains taxes, investors adjust their behavior accordingly: when taxes fall (net-of-tax rate rises), realizations increase, and when taxes rise, realizations fall.

However, the response is relatively small. The elasticity of capital gains with respect to the tax rate is estimated between -0.3 and -0.5, meaning realizations are fairly inelastic. Investors react, but not by much, so raising capital gains taxes can still INCREASE TOTAL TAX REVENUE despite the behavioral response.

# 2. TAXATION OF WEALTH

Now we start the second part of the chapter, which focuses on how governments tax wealth.

## 2.1 Wealth Taxes: Transfer Taxes 🎁

The first step is to understand one specific way wealth is taxed, when it is transferred from one person to another.

Transfer taxes are an important type of capital tax because they apply when wealth changes hands.

1. **Transfer Tax:** a tax applied when assets move from one individual to another.
2. **Gift Tax:** applies when someone gives assets to another person while still alive.
3. **Estate Tax:** applies when a person dies and their assets are passed on to others.

So the key idea is that these taxes do not apply every year like income taxes, but only when wealth is transferred.

→ Looking at the data, the importance of transfer and wealth taxes varies a lot across countries. Some countries collect almost nothing from these taxes, while others rely on them more.
On average across OECD countries, transfer and wealth taxes together represent a small share of total government revenue, less than 1%.

## 2.2 Debate on Estate Taxes 🏷️

Now that we understand what transfer taxes are, we move to the main debate: should wealth, especially through ESTATE taxes, be taxed?

There are arguments both in favor and against estate taxes.

**Arguments For Estate Tax:**

1. **Extremely Progressive Revenue Source:** taxing wealth transfers mainly affects very rich individuals, so it is a way to raise revenue from those with the highest ability to pay
2. **Limiting Wealth Concentration:** without these taxes, wealth can accumulate across generations and create powerful dynasties, increasing inequality
3. **Incentives To Work:** if individuals inherit large amounts of wealth, they may have less incentive to work and be productive

**Arguments Against Estate Tax:**

1. **Moral Objection To The "Death Tax":** some argue it is morally wrong to tax individuals at death. However, transfer taxes are not limited to death, since they also apply to gifts between living persons. Additionally, 98% of those who die pay no estate tax at all, which weakens the moral objection considerably.
2. **Double Taxation:** wealth is taxed when earned as income and then taxed again when transferred, although this is common in tax systems (sales tax) and does not necessarily reduce savings
3. **Administrative Difficulties:** individuals may need to sell assets to pay the tax, although this problem may not be very large in practice

4. **Avoidance And Fairness Issues:** in practice, those with enough wealth and sophistication can avoid the tax through loopholes like trust funds, meaning only the unsophisticated end up paying it. This is why some refer to the estate tax as a "voluntary tax."

This explains why the tax is highly progressive, meaning it mainly affects the rich, but still politically controversial, because it is very visible and often perceived as unfair.

## 2.3 Wealth Taxes: Property Taxation 🏠

After transfer taxes, another important way governments tax wealth is through property taxation, which applies to real estate.

A property tax is a tax on the value of real estate, including both the land and any buildings on it.

Across countries, property taxes are an important source of revenue for local governments, but their importance varies widely. The share of revenue from property taxes differs a lot across countries, and Italy is roughly in the middle.

The amount of tax paid depends on the assessed value of the property. However, homeowners are not always taxed on the full value. They are often taxed only on a fraction of it, called the assessment ratio. These ratios differ widely across countries, which means the effective tax burden can vary a lot.

There are two key distinctions in how property taxes are designed:

1. **Residential Homes Versus Businesses:** some governments tax business property at lower rates to encourage economic activity and attract firms.
2. **Land Versus Improvements:** land is in inelastic supply, meaning taxing it does not distort behavior or reduce its availability, making it an efficient tax base. In practice however, separating land value from the value of structures built on it is difficult, so both tend to be taxed together.

Governments often go further and give special tax advantages to businesses.

**Examples from Gruber:**

1. Washington offered Boeing a tax break of 8.7 billion dollars → wanted Boeing to stay and invest there
2. New York offered Alcoa 5.6 billion dollars → wanted Alcoa to operate and create jobs
3. Wisconsin heavily subsidized Foxconn → wanted Foxconn to build factories

→ These policies aim to attract firms, increase employment, and raise local property values. However, while one state may benefit, the overall national effect is ZERO, because firms simply move from one state to another. This creates competition between states rather than new economic activity.

## 2.4 Wealth Concentration and Tax Policy: Saez And Zucman 💰

Modern research, especially by **Saez and Zucman**, shows that wealth is becoming more concentrated over time. The share of wealth held by the top 1 percent has increased significantly since the 1980s, and the top 0.1 percent has grown even faster. At the same time, capital shares (the fraction of national income going to owners of capital like stocks, land, and businesses, rather than to workers' wages) have increased globally → This is mainly because capital income, such as returns from investments, goes disproportionately to already

wealthy households. Because rich people own most capital, when a larger share of income comes from capital, inequality increases. As a result, wealth grows faster than income for the rich ($r > g$).

This trend is visible in the data. The share of wealth held by the top 1 percent declined during the mid 20th century but has risen again strongly since around 1980. This shows that wealth concentration changes over time and is influenced by economic conditions and policies.

The key implication is → debates about capital taxation cannot be separated from inequality. How we tax capital directly affects how wealth is distributed in the long run.

Countries respond differently, and there is large variation in how wealth is taxed.

1. **Net Wealth Taxes:** ANNUAL taxes on the total wealth an individual owns. They still exist in a few countries such as Spain and Norway, but many countries like France, Denmark, and Sweden have abolished them due to administrative difficulties and tax avoidance.
2. **Estate And Inheritance Taxes:** taxes applied when wealth is transferred across generations. These remain common, but rates and exemptions differ widely across countries.

In practice → wealth taxation often complements capital income taxation rather than replacing it.

To understand the tradeoffs involved, we look at Saez's framework, which highlights the tension between equity and efficiency.

1. **Equity:** wealth is more concentrated than income, and returns to wealth are higher for rich households. Without taxation, wealth accumulates over generations and leads to persistent inequality
2. **Efficiency:** wealth is harder to measure and track than income. There are risks of tax avoidance, offshoring, and disputes over valuation. In addition, annual wealth taxes can create problems for individuals who have high wealth but low liquid income.

The conclusion is that → wealth taxation is feasible and can reduce inequality, but it faces important practical challenges.

So in practice, how do governments actually tax wealth? → Over time, countries have shifted away from annual wealth taxes and TOWARD TAXING WEALTH THROUGH INHERITANCE AND CAPITAL GAINS.

However, the way capital gains and inheritance taxes are currently designed often benefits the wealthy rather than reducing inequality. A clear example is the step-up in basis at death: when someone inherits an asset, its value is reset to the current market price, meaning all gains accumulated during the original owner's lifetime are never taxed. This, combined with preferential capital gains treatment (taxing capital gains less than labor income), disproportionately benefits wealthy households. Transfer taxes like inheritance taxes are progressive and could help, but they are politically unpopular and weak in practice. As a result, most countries end up relying mainly on capital income taxation.

The overall conclusion is that capital taxation shapes long-run inequality more than labor taxation. How governments tax capital gains, inheritances, and wealth transfers is therefore a central factor in determining whether wealth concentration increases or decreases over time.

*P.S. If you like the topic of wealth taxes and wealth concentration, I recommend watching GARY STEVENSON youtube channel, he is an advocate for wealth taxes and wealth redistribution in the UK.*

# 3. CAPITAL AND WEALTH TAXATION IN ITALY

We now conclude by looking at a concrete example, Italy, to see how these ideas work in practice.

## 3.1 Capital Income Taxation In Italy 🇮🇹

Italy taxes capital income differently from labor income. While labor income is taxed progressively, capital income is taxed at proportional rates, meaning a flat rate that does not depend on income level

**Main Components:**

1. **Financial Income:** interests, dividends, and capital gains are generally taxed at a 26 % rate
2. **Government Bonds:** lower preferential rate of 12.5 % on public debt instruments such as BTP and BOT
3. **Capital Gains on Equities:** usually taxed at 26 % and only when realized.
4. **Investment Funds:** are also taxed at 26 %, with some special rules when they include government securities.

## 3.2 Wealth Taxation In Italy 🇮🇹

Looking at wealth transfers, Italy stands out for having one of the lowest inheritance taxes in Europe. It collects very little revenue from these taxes, with rates and taxable bases much lower than countries like France, Belgium, Germany, and Spain. In practice, many estates pay ZERO inheritance tax.

This means that Italy relies much less on transfer taxation than most advanced economies.
The data on inheritance confirms this. → A relatively large share of the population receives some inheritance or gift, but the tax burden remains low, especially compared to other countries.

Finally, looking at property taxation, Italy has some specific features. Property taxes, such as IMU, are not applied to primary residences. This is mainly for political and distributional reasons, since many households hold most of their wealth in housing and may not have enough liquid income to pay the tax.

## CONCLUSIONS ON CHAPTER 5 📌

Evidence shows that taxes influence behavior, but their effects are often limited and context dependent.

In capital gains taxation, taxes mainly affect the timing of realizations, as seen in the lock in effect and empirical evidence. In risk taking, theoretical predictions are ambiguous and depend on factors such as loss deductibility and progressive taxation. In wealth taxation, preferential treatment of capital gains and inheritance rules affect outcomes, but their impact depends on specific policy design.

Overall, behavior, institutions, and broader economic factors play a more important role than tax incentives in shaping decisions.

# CHAPTER 6 – TAX REFORM AND CONSUMPTION TAXATION

## 1. FUNDAMENTAL TAX REFORM

Laws about taxes can be changed through a tax reform. There are several reasons which we will see for which a reform makes sense, although it would come with some political and economic difficulties.

### 1.1 First Reason For A Tax Reform: Increasing Tax Compliance 🚨

Improving tax compliance means making sure that people actually pay the taxes they owe. Governments care about this because a significant amount of taxes is not paid, either illegally or through legal loopholes.

1. **Tax Compliance:** refers to all efforts aimed at reducing tax evasion. In simple terms, it means increasing the amount of taxes that are correctly reported and paid. To improve compliance, the government must reduce tax evasion.
2. **Tax Evasion:** is the illegal nonpayment of taxes. This happens when individuals hide income or misreport information to pay less tax than they should.
3. **Tax Avoidance:** is legal. It refers to using the rules of the tax system, such as deductions or exemptions, to reduce one's tax burden.

Real world examples show that tax evasion is widespread and not limited to wealthy individuals.

**Evidence From USA:** In the United States, taxpayers used to claim dependents (family members you financially support, most commonly **children**, that you can claim on your tax return to reduce your tax bill) simply by writing their names on tax forms. When a reform required people to also provide Social Security numbers for dependents over the age of 5, about 6 million dependents suddenly disappeared. This suggests that many of those claims were not real.

A similar pattern appeared with childcare tax credits. When the law required taxpayers to report the Social Security numbers of childcare providers (babysitters, daycare, etc.) 2.6 million providers disappeared from the records. Again, this indicates that many claims were fraudulent.

**Evidence From Greece:** Another example comes from Greece. Property taxes were based on self reported house values, which led many people to underreport the value of their homes. In a wealthy suburb, only 324 residents reported having a swimming pool, which was clearly unrealistic. When the government started using tools like helicopter surveillance and satellite images, people reacted by covering their pools to avoid detection. This shows how individuals actively respond to enforcement efforts.

To understand this behavior, economists use the → THEORY OF TAX EVASION

The key idea is that individuals face a trade off when deciding whether to evade taxes. If they are not caught, they save money. If they are caught, they face penalties or even jail. As a result, tax evasion is a decision made under risk.

The decision depends on comparing BENEFITS and COSTS at the margin.

1. **The Marginal Benefit Of Evasion:** is the amount of tax saved by hiding one additional unit of income. This is directly linked to the tax rate. A higher tax rate increases the benefit of evasion.
2. **The Marginal Cost Of Evasion:** is the expected penalty. This depends on two main factors:
    a. the probability of being audited
    b. the size of the penalty if caught

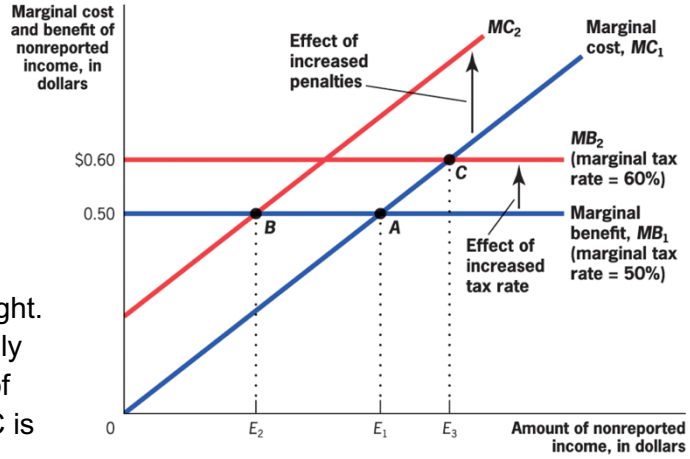
Policy changes affect this decision in predictable ways. Higher penalties or a higher probability of being caught (increase in audits) increase the marginal cost of evasion, so individuals cheat less. On the other hand, higher tax rates increase the marginal benefit of evasion, so individuals have a stronger incentive to cheat more.

The key implication is that tax evasion is not random. People respond to incentives. If evasion becomes more profitable, it increases. If it becomes riskier or more costly, it decreases.

To understand this better we look at an example in the graph:

The marginal Benefit per dollar of evasion is the marginal tax rate faced by the evader because underreporting by 1$ saves tax payments by τ¢. The marginal benefit curve is therefore a horizontal line at τ. (this is why the MB curve is horizontal).

The marginal cost of evasion is the marginal penalty paid per dollar of evasion times the probability of getting caught. Both the penalty and the probability of getting caught are likely to rise with the amount of evasion so that the marginal cost of evasion rises with the amount of evasion. (this is why the MC is upward sloping).




Individuals choose how much income to hide by equating marginal benefit and marginal cost. This determines the optimal level of evasion.

1. **Initial Case:** The optimal level of evasion is at the intersection of $MC_1$ and $MB_1$ at point A, which determines the initial amount of evasion.

2. **Increased Cost:** When penalties or audit probability rise, the marginal cost curve shifts up from $MC_1$ to $MC_2$, so the new intersection moves from A to B, leading to lower evasion.

3. **Increased Benefit:** When the tax rate increases, the marginal benefit curve shifts up from $MB_1$ to $MB_2$, so the new intersection moves from A to C, leading to higher evasion.

We now look at more evidence on tax evasion.

**Evidence On Tax Evasion Across Countries:** Tax evasion is widespread in all countries. This is measured by the tax gap, which is the difference between taxes owed and taxes actually paid. The size of this gap varies a lot across countries:

1. **United States:** about 630 billion dollars in 2020, equal to 16.7 percent of tax revenue

2. **Sweden:** about 10 percent of tax revenue
3. **Pakistan:** about 69 percent of tax revenue, showing much higher evasion in developing countries

In Europe, the focus is on the VAT compliance gap, which measures how much VAT revenue is lost. This is only a proxy for noncompliance, so it includes more than just evasion:

1. fraud, evasion, and avoidance
2. bankruptcies or inability to pay
3. errors or miscalculations

This means differences across countries in the map reflect not only cheating, but also economic conditions, government policies, and data quality.

**EMPIRICAL EVIDENCE: What Determines Tax Compliance?:** The theoretical model predicts that tax compliance depends on incentives such as tax rates, penalties, and the probability of being audited. However, testing these predictions in reality is difficult because of an important empirical problem.

People who evade taxes may be systematically different from those who do not. This makes it hard to isolate cause and effect. For example, if people facing higher tax rates evade more, it is unclear whether this is caused by the tax rate itself or by the fact that higher income individuals are more likely to cheat.

Similarly, it is difficult to measure the effect of punishment on tax evasion, because we only observe those who actually evaded and got caught. We never see the people who were deterred by the threat of punishment and chose not to evade in the first place, making it impossible to estimate the full effect of punishment on behavior.

→ To overcome this problem, economists use randomized experiments.

1. **Kleven Et. Al. Study:** A key study by Kleven et al. uses a sample of 40,000 Danish taxpayers. Half of them were randomly selected to be audited, while the other half were not. In the following year, another randomization was done: some taxpayers received letters threatening an audit, while others did not. This allows researchers to identify causal effects. The main findings are:

    a. **Third party reported income:** Evasion is very low when income is reported by third parties, such as employers. This is because individuals cannot easily hide this information.
    b. **Self-reported income:** Evasion is much higher when individuals report income themselves. This type of evasion responds strongly to audits and audit threats.
    c. **Tax rates:** Higher tax rates increase evasion, but a large part of the response happens through legal tax avoidance rather than illegal evasion.

2. **Slemrod et al. (2001):** Threatening an audit increased reported income for low- and middle-income individuals, but reduced reported income for high income individuals. One explanation is that richer individuals may interpret the audit letter as the first step in a negotiation with the tax authority, so they strategically report lower income at first. Appeals to morality or conscience had no effect.

3. **Boning et al. (2018):** Auditing firms led them to report more income. Interestingly, firms connected to the same tax preparer also increased their reported income. This shows that enforcement can have network effects.

4. **Slemrod et al. (2019):** In Pakistan, a policy that forced taxpayers to publicly disclose their tax liabilities increased compliance, especially among individuals who were more easily identifiable, such as politicians or people with unusual names.

**Why should we care about Tax Evasion?:** At first sight, one might think tax evasion is not a major issue, because the government could in principle collect the same revenue with high tax rates and evasion as with lower rates and no evasion.
→ However, this is misleading because tax evasion creates both an efficiency problem and an equity problem.

1. **Efficiency Problem:** Tax evasion narrows the tax base and reduces efficiency. A more efficient system has a broad tax base and lower tax rates. When people evade taxes, part of the base disappears, so the government may try to raise tax rates to recover the lost revenue. But this is only partly effective, because higher tax rates increase the incentive to cheat. As a result, raising tax rates to offset the revenue loss from evasion is partially self defeating. → In general, broadening the tax base improves efficiency unless the excluded activity creates a positive externality. Tax evasion clearly creates no positive externality, so if tax rates have to rise because of cheating, efficiency falls.

2. **Equity Problem:** Tax evasion makes the tax system less fair.

    a. **Vertical Equity:** Wealthy individuals have much greater scope for tax evasion than lower income groups. This is because much of the income earned by the rich is in forms that are not directly reported to the IRS, while most income taxes owed by lower income groups are directly withheld from their wages. As a result, richer individuals can reduce their tax burden more easily, at the expense of poorer taxpayers.
    b. **Horizontal Equity:** Individuals with the same income should pay the same amount of tax. But if one person evades taxes and another does not, the evader ends up paying less, which is clearly unfair.

## 1.2 Second Reason For A Tax Reform: Making The Tax Code Simpler 🧹

The second reason to pursue a tax reform is to make the tax code simpler. The current tax system is very complex, and this creates large costs for taxpayers in terms of time, effort, and money.

→ A clear example is the process of filling out tax forms. In 2014, the IRS estimated that it would take about 16 hours for an individual to complete their tax return (Form 1040). This shows that paying taxes is time consuming even for a single person.

Looking at the whole economy, the cost is even larger. In 2000, taxpayers in the United States spent about 3.2 billion hours filling out tax forms, with a total cost of 18.8 billion dollars. On average, this corresponds to 26.4 hours and 209 dollars per taxpayer. These are real costs that do not produce any economic benefit.

The complexity of the tax system has also increased over time. The number of pages of instructions for the main tax form grew from 2 pages in 1940 to 217 pages in 2017. This shows a clear trend toward a more complicated system.

Because of this, a common argument for tax reform is → to simplify the system by reducing administrative complexity. One way to do this is to eliminate or limit exemptions and deductions, which are a major source of complexity.

However, this is NOT a PERFECT solution. Reducing exemptions and deductions may simplify the structure of the tax code, but it can also increase reporting requirements. As a result, the overall effect on simplicity is uncertain.

## 1.3 Third Reason For A Tax Reform: Improving Tax Efficiency ⚙️

The third reason to pursue a tax reform is to improve tax efficiency. The main idea is that taxes are costly not only because people pay them, but because they change behavior.

What matters for efficiency is how individuals and firms react to taxes. If taxes do not change behavior, there is no efficiency loss. But in reality, people adjust their decisions when tax rates change.

A simple way to study this is to ask: how does changing the tax rate affect total tax revenues? The answer DEPENDS on how strongly people react.

→ This is captured by the elasticity of tax revenues with respect to the tax rate. If elasticity is high, it means that when tax rates change, people significantly change their behavior, for example by working less, avoiding taxes, or hiding income. As the elasticity of revenues rises, the deadweight loss from taxation also rises (highlighting the equity efficiency trade off from chapter 3). This means that when behavior is very responsive, taxes create larger distortions and become more inefficient.

When tax rates change, revenues are affected in two different ways:

1. **Direct effect:** If nothing else changes, a higher tax rate increases tax revenue because the government collects more per unit of income.
2. **Indirect effect:** In reality, people change their behavior (in the 4 ways below) and this reduces the tax base. So the government may end up collecting less than expected.

These indirect effects are crucial because they explain why increasing tax rates does NOT always lead to higher revenues. There are four main channels:

1. **Gross income effect:** Higher tax rates can reduce total income because people may choose to work less, save less, or take fewer risks. For example, if work is taxed more, individuals may decide it is not worth working as much.
2. **Reporting effect:** Even if people earn the same income, they may report less of it to the tax authority to avoid paying higher taxes.
3. **Income exclusion effect:** People may not hide income, but instead use more legal ways to reduce taxable income, such as deductions, exemptions, or special tax treatments.
4. **Compliance effect:** Higher tax rates can increase tax evasion, meaning more people illegally avoid paying taxes.

## 1.4 First Difficulty Of A Tax Reform: Political Pressures for a Complicated Tax Code 🏛️

The Tax Reform Act of 1986 is often seen as a successful example of tax reform, because it broadened the tax base and reduced tax rates at the same time. This is exactly what an efficient and simple tax system aims to achieve.

→ However, this success did not last. Over time, new policies reversed these improvements. In 1993, top tax rates were increased again. In 1997, the Taxpayer Relief Act introduced many new tax credits. Further reforms in 2001 and 2003 continued to add complexity to the system.
As a result, the tax code became complicated again, despite the earlier reform.

This raises an important question: WHY is it so difficult to maintain a simple, broad based tax system over time? → There are two main explanations for this, one political and one economic.

The political explanation focuses on how different groups gain or lose from tax policies.

**1)** Political pressure is strongest when a small group gains a lot, while the costs are spread across many people who each lose only a little. In this case, the group that benefits has a strong incentive to lobby for the policy, while the rest have little incentive to oppose it.

→ For example, continuing the Bush tax cuts would save about 3% of Americans a very large amount of money, around 810 billion dollars. Because the gains are concentrated, this group pushes strongly to keep the policy.

**2)** Another factor is how voters see policies → Many people dislike direct government spending, but are more willing to support tax breaks like credits or deductions, even when the cost to the government is identical. This is because tax breaks are less visible: rather than feeling like receiving a government handout, they simply feel like paying less tax. Clinton exploited this psychology by replacing planned education spending with tax credits, achieving the same result in a politically more acceptable way.

As a result, political forces tend to favor exemptions, deductions, and credits, making the tax system more complex over time.

## 1.5 Second Difficulty Of A Tax Reform: Economic Pressures Against Broadening the Tax Base 💼

The economic explanation focuses on how individuals respond to tax changes and how this can undermine tax reform.

When the government tries to broaden the tax base, for example by removing exemptions or loopholes, people may react by finding new ways to reduce their taxes. Instead of increasing the tax base, this can lead to the creation of new tax shelters, offsetting the intended effect.
**Tax shelters:** These are activities whose main purpose is to reduce taxes. They often have little real economic value but allow individuals or firms to lower their tax burden. As a result, resources are used inefficiently, not to produce value, but to avoid taxes.

This problem became clear in the mid 1980s. The tax code created many legal ways to avoid taxes, especially to encourage investment in real estate and oil. However, this distorted incentives and led to overinvestment in those sectors instead of more productive ones.

Tax shelters go directly against the goals of tax reform:

1. **Evasion facilitation:** Tax shelters make it easier for individuals to reduce or hide their taxable income.

2. **Complexity increase:** They add new rules, exceptions, and structures, making the tax code more complicated.
3. **Efficiency reduction:** They distort economic decisions and lead to inefficient allocation of resources.

Another issue is that, because of tax capitalization, eliminating tax shelters can create large transitional inequities.

**Tax capitalization:** When taxes on an asset change, the price of that asset adjusts. For example, if a tax benefit is removed, the asset becomes less attractive and its price may fall.

Because of this, removing tax shelters can create transitional inequities.
→ **Transitional inequities:** These occur when individuals who made similar choices in the past are treated differently after a reform, creating a form of horizontal inequity. People who invested under the old rules may lose when those rules change, even if the reform improves the system overall. These effects are unavoidable. Any tax reform creates winners and losers.

To reduce these negative effects, governments often use:

- **Grandfathering:** People who made decisions under the old tax rules are allowed to keep those benefits, while the new rules apply only to future decisions.

This makes reform more acceptable politically, but it also limits how much the tax system can actually be simplified or improved.

# 2. CONSUMPTION TAXES

Consumption taxation is a more radical type of tax reform that many economists support as an alternative to the current system.
Instead of taxing income → the idea is to tax what individuals actually spend.

**Taxing consumption:** This means taxing individuals based on what they consume rather than what they earn. For example, this can be done through a sales tax, where taxes are paid when goods and services are purchased. This type of taxation is already widely used. It is applied by state and local governments and is also common in many countries around the world.

## 2.1 Pros Of Consumption Taxes ✅

There are several reasons why consumption may be a better tax base than income. These advantages mainly relate to efficiency, fairness, and simplicity.

**1) Improved Capital Allocation:** One efficiency advantage of a consumption tax is that it treats all investments equally. The current income tax system gives preferential treatment to certain assets, such as retirement accounts, homeownership, and select industries, pushing investors toward tax-favored options rather than the most productive ones. This misallocates capital across the economy.
Because a consumption tax falls on spending rather than income, it removes these distortions entirely. Investors choose based on genuine productivity and not tax incentives, allowing capital to flow to its best use and improving overall economic efficiency.

→ A single rate sales tax further reduces inefficiencies, because it applies the same tax rate to all consumption and avoids distortions across different goods and activities.

**2) Fairer Treatment Of Savers And Less Distortion To Savings Decisions:** Under an income tax system, saving is effectively taxed twice. First, individuals pay taxes on their income. Then, if they save that income and earn returns (like interest), they pay taxes again on those returns.
This penalizes savers compared to non savers.

| | Homer | Marge |
|---|---|---|
| **Income Tax** | | |
| Income in period 1 | $100 | $100.00 |
| Taxes in period 1 | 50 | 50.00 |
| Consumption in period 1 | 50 | 25.61 |
| Savings in period 1 | 0 | 24.39 |
| Interest earnings in period 2 | 0 | 2.44 |
| Taxes in period 2 | 0 | 1.22 |
| Consumption in period 2 | 0 | 25.61 |
| PDV of taxes | 50 | 51.11 |
| **Consumption Tax** | | |
| Income in period 1 | $100 | $100.00 |
| Consumption in period 1 | 50 | 26.19 |
| Taxes in period 1 | 50 | 26.19 |
| Savings in period 1 | 0 | 47.62 |
| Interest earnings in period 2 | 0 | 4.76 |
| Consumption in period 2 | 0 | 26.19 |
| Taxes in period 2 | 0 | 26.19 |
| PDV of taxes | 50 | 50.00 |

The example of Homer and Marge illustrates this:

- Homer consumes all his income immediately and pays taxes only once
- Marge saves part of her income and pays taxes both on her initial income and on the returns from saving

As a result, Marge ends up paying more total taxes, even though she simply chose to save instead of consume.

This creates:

- a **horizontal equity problem**, because two individuals with similar income are taxed differently just because they made different choices
- an **efficiency problem**, because taxing savings reduces the incentive to save, which can lower investment and growth

→ A consumption tax AVOIDS THIS PROBLEM because it taxes individuals only when they spend money, not when they save it. This removes the extra tax burden on savers.

**3) Simplicity:** A consumption tax system is simpler in principle because it taxes individuals based on what they buy, rather than requiring a complex definition of income.
Income is difficult to measure accurately because it includes many components such as wages, capital income, deductions, and exemptions. In contrast, consumption is easier to observe through purchases.

## 2.2 Cons Of Consumption Taxes ❌

Despite its advantages, consumption taxation also has several drawbacks. These mainly concern fairness, practical implementation, and transition problems.

**1) Vertical Equity:** Consumption taxes reduce vertical equity. Wealthier individuals typically save a greater portion of their income, whereas lower-income individuals tend to spend nearly all of what they earn. Since consumption taxes are only triggered when money is spent, those who save more end up contributing a smaller fraction of their income in taxes. This makes consumption taxes regressive, as they impose a proportionally heavier financial burden on lower-income individuals compared to wealthier ones.

Over time, a portion of the savings accumulated by wealthier individuals will be transferred to future generations in the form of inheritances. In principle, an estate tax could address this issue by taxing inherited

wealth, thereby partially correcting the regressive nature of consumption taxes. However, estate taxes tend to face strong political opposition and present significant challenges in terms of implementation.

Another possible solution is a progressive expenditure tax, which taxes higher levels of consumption at higher rates. However, this would make the system more complex.

**2) Differences Between Savers And Non Savers:** Taxing savings can sometimes be useful to target high ability individuals, since those who are more productive tend to save more. A pure consumption tax removes this channel, which may reduce the ability of the tax system to target higher income individuals.

**3) Transition Issues:** Moving from an income tax system to a consumption tax system can create large, short term problems.

→ For example, older individuals who have already saved under the income tax system may be heavily affected. They already paid taxes on their income when they earned it, and would now also face taxes when they spend their savings. This can make them significantly worse off.

**4) Compliance:** It is often harder to measure consumption than income. Income is usually recorded through wages and financial reports, while consumption requires tracking spending, which can be more difficult to observe and enforce.

**5) Cascading:** In a consumption tax system, one firm's output is another firm's input. If taxes are applied at multiple stages without proper design, the same good can be taxed more than once.
This leads to double taxation, increasing the final price of goods and creating inefficiencies in production.

## 2.3 First Consumption Tax: VAT 🏭

A value added tax is a specific way to implement a consumption tax. It is designed to solve two main problems of consumption taxation: cascading and compliance.

**Value added tax (VAT):** A VAT taxes the increase in value at each stage of PRODUCTION. Instead of taxing the full price of a good at every stage, it only taxes the value that each firm adds.
This system is widely used around the world. An important feature of the VAT is that firms have an incentive to monitor each other. If one firm tries to underreport its sales to reduce taxes, the firm it trades with will be affected and may end up paying more tax. → This creates a built in enforcement mechanism.
To understand how VAT works, consider the production process:

- The **logger** produces wood and adds 25 in value. With a 20% VAT, they pay 5 in tax
- The **manufacturer** buys the wood and transforms it, adding 50 in value. They pay 10 in tax
- The **retailer** sells the final product and adds 25 in value. They pay 5 in tax

| Agent | Purchase Price | Sale Price | Value Added | Tax Paid (VAT = 20%) |
|---|---|---|---|---|
| Logger | $0 | $25 | $25 | $5 |
| Manufacturer | 25 | 75 | 50 | 10 |
| Retailer | 75 | 100 | 25 | 5 |
| | | | **Total tax paid:** | **$20** |

Each firm pays tax only on the value it adds, not on the full price.
In total, the government collects 20 in taxes, which corresponds to 20% of the final value of the good.

However, the VAT is NOT as simple as it may seem.

In practice, VAT systems usually have multiple tax rates instead of a single rate:

- **Lower Rates For Progressivity:** Some goods, especially basic necessities, are taxed at lower rates to reduce the burden on lower income individuals
- **Lower Rates For Political Reasons:** Governments may give tax breaks to specific sectors or groups for political support

→ Finally, even though VAT is conceptually simple, its administrative costs are similar to those of income tax systems, so it does NOT necessarily reduce the cost of the system in practice.

## 2.4 Second Consumption Tax: Expenditure Tax 💸

This is a tax on total yearly consumption rather than on individual purchases.

The key idea is based on a simple relationship:

- **Consumption = income − savings**

This means that instead of directly measuring consumption, the government can calculate it by taking income and subtracting savings. So, if individuals are allowed to deduct all their savings from their income when computing taxes, the system effectively taxes only what they spend. In this way, an expenditure tax achieves the same outcome as taxing consumption.

In practice, it works similarly to an income tax, but with a different base:

1. income tax → taxes all income
2. expenditure tax → taxes income minus savings

→ Because of this structure, it is relatively easy to make the system progressive, by applying higher tax rates to higher levels of consumption. This helps address fairness concerns.

→ However, there is an important limitation. It is difficult to track how much individuals actually consume over the year, which makes this system hard to implement.

## 2.5 Third Consumption Tax: Cash Flow Tax 🌊

Both main ways of taxing consumption (VAT and Expenditure) have important drawbacks:

1. **Taxing consumption at the point of production (like VAT):** This raises concerns about progressivity, because the same tax rate is applied to all purchases. Lower income individuals spend a larger share of their income on consumption, so they end up paying a higher proportion of their income in taxes. This makes the system regressive.
2. **Taxing consumption at the individual level (like an expenditure tax):** This is difficult to implement in practice, because it requires accurately tracking each individual's income and savings to compute their consumption.

Because of these problems, economists consider a third alternative.

→ **Cash flow tax:** This is a tax on the difference between cash income and saving. It follows the same logic as the expenditure tax, because it still aims to tax only consumption.

The difference is that it relies only on observable cash flows during the year, instead of trying to measure total savings. This makes it easier to implement in practice.

## 2.6 Consumption Taxes In Italy 🇮🇹

VAT is widely used in practice, and Italy provides a clear example of how it is implemented.

→ The standard VAT rate in Italy is 22%, and it applies to most goods and services.
However, the system is not uniform. There are several reduced rates that apply to specific goods and services:

- **4%:** applies to basic necessities such as essential food products, books, and newspapers
- **5%:** applies to some food products and health or social services
- **10%:** applies to sectors like tourism, restaurants, transport, and some utilities

In addition, some activities are completely exempt from VAT, such as financial services, education, and healthcare.

These different rates exist for both economic and political reasons. In particular, lower rates are used to reduce the tax burden on essential goods and important sectors, making the system more acceptable and more equitable.

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TEACHING DIVISION

# OUR PARTNERS

TEGAMINO'S

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