# Public Finance II.

Lecture IX - **Taxation and Revenue**

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Readings:

- Gruber, J. (2005). Public finance and public policy. Macmillan.
- Congdon, W. J., Kling, J. R., & Mullainathan, S. (2011). Policy and choice: Public finance through the lens of behavioral economics. Brookings Institution Press.
- Sunstein, C. R. (2020). Behavioral science and public policy. Cambridge University Press.

# Running a government is expensive

- Correcting for market failures, providing public goods, guaranteeing social insurance, and redistributing income and sustaining antipoverty efforts—functions of government within the purview of public finance—all involve various expenditures.

- In order to spend, governments have to raise revenue. While there are other means, primarily borrowing by issuing debt, governments finance their operations mainly through taxation.

- Raising revenue through taxes on goods, income, and so on, changes the prices of nearly every economic activity that people engage in. Because taxes change the terms of such choices, taxes affect how people act and behave.

- The real consequences of taxation are largely a function of the magnitude and nature of the response to taxes. When taxes are imposed on income, do people work less? How much less? How are the impacts related to the level or rate of the tax? How are they related to its form and relationship with other elements of the tax code or broader policy?

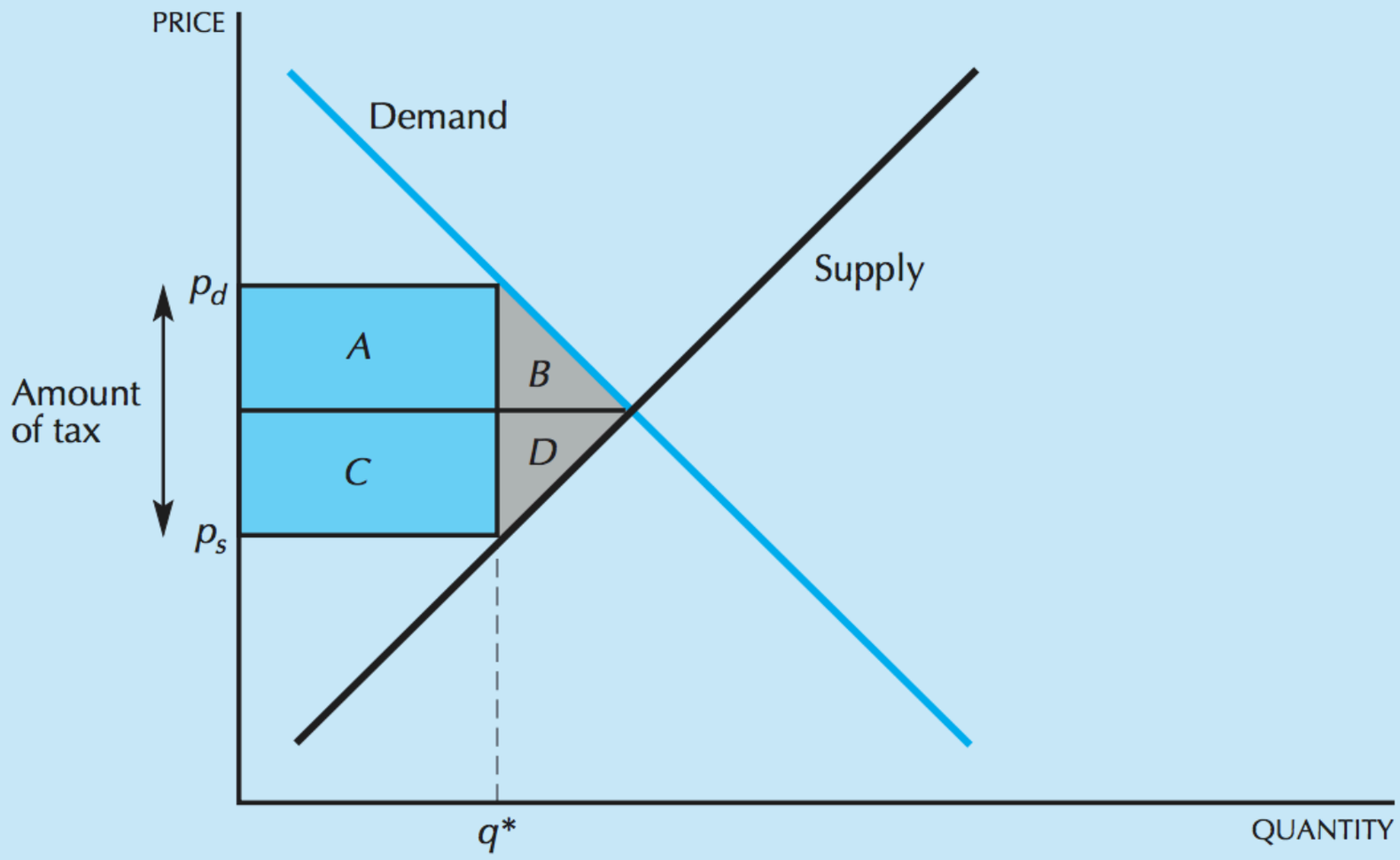
# Behavioral perspective on taxes

- Taking a behavioral perspective on the economic analysis of taxation may be important because behavioral tendencies will mediate the response to taxes.

- The key implication is that individuals will respond to taxes as they perceive them, not necessarily as they are set. As a result, the relationship between taxes and behavior may become much less straightforward than in the standard model.

- The impact of taxes on behavior might be determined in part by reference-dependence. For example, depending on how taxes are structured, they may be perceived as losses or as gains from some reference point, which might have consequences for behavior (e.g., tax bonus for people with children can be also framed as tax penalty for childless people).

- Thus a behavioral perspective can inform our understanding of tax efficiency, incidence, compliance, and avoidance.




**The deadweight loss of a tax.** The area $B + D$ measures the deadweight loss of the tax.

# Optimal Taxation

- The challenge that taxes pose for policy is that while they make beneficial expenditures possible, they also impose costs and trade-offs. At the most straightforward level, taxes redistribute welfare from those who pay taxes to those who benefit from what taxes fund.

- Taxes also create a drag on overall economic efficiency by creating wedges between the prices paid by consumers of goods and services and the prices received by suppliers. Moreover, taxes are costly to administer and enforce.

- In general, taxes depress economic activity below its efficient level, leading to a welfare cost. In addition, because different groups are differentially sensitive to price changes, welfare costs are borne differentially across groups.

- As a result, when considering how and how much to tax, society must consider both the efficiency costs of taxation—usually called the excess burden of taxation, or the deadweight loss—and the distributional and equity consequences of taxation, or what is called tax incidence.

- In the standard approach, public finance models deadweight loss and incidence as functions of elasticities, or parameterizations of the change in behavior in response to the tax.

- This approach allows statements about the efficiency costs of taxes on, for example, earned income in terms of the distortions that the taxes create in incentives to work and earn. Similarly for commodity taxes, the magnitude of the deadweight losses of those taxes is a function of the relative decrease in consumption that they cause. Likewise, the incidence of taxation can, in the standard approach, be identified in terms of the relative sensitivity of the response of affected parties to taxes.

# Tax response as a price elasticity

- The traditional approach to understanding the welfare consequences of taxation is to take the relevant price elasticities as sufficient for describing the response to a tax.

- So, for example, in the case of a commodity tax on good x, the formula for the own-price elasticity of demand, ηd , can be written as:

$$\eta_d = \frac{\partial x}{\partial p_x} \cdot \frac{p_x}{x}$$

- that is, the elasticity is the percentage change in quantity demanded for a 1 percent change in the price.

- This approach is straightforward as far as it goes, but it embeds a number of assumptions about behavior that often are left implicit. One key assumption is that individuals correctly perceive and understand the change in price due to taxes, so that their responses to taxes reveal something about their underlying preferences or the cost-benefit calculus involved in deciding whether or not to take an action.

# Tax Efficiency

- Starting from a traditional approach to understanding tax efficiency, the cost of taxation can be written as a function of elasticities. In a simple, partial equilibrium analysis, the formula for the excess burden of a tax is as follows:

$$EB = -\frac{1}{2} \cdot \frac{p \cdot q}{\frac{1}{\eta_d} - \frac{1}{\eta_s}} \cdot t^2,$$

- where t is the tax rate, ηs is the elasticity of supply, and ηd is the elasticity of demand.

- A familiar set of results can be derived from this equation. First, the excess burden increases with more elastic market participants—that is, the greater the reduction in quantities transacted due to a tax, the larger the excess burden that it creates. Second, the excess burden increases with the square of the tax rate—as a result, the efficiency costs of taxes rise quickly with tax rates. These qualitative relationships are very general, and they hold for both labor and commodity taxes.

- That yields two rules of thumb about how to design tax policies so as to minimize distortions. The first is that taxes on inelastic goods are generally preferred for the way that they generate a smaller excess burden. The second is that holding the revenue requirement constant, lower tax rates on wider tax bases lead to less excess burden than higher rates on narrower bases.

# Hidden Taxes

- Changes to efficiency results may occur because of the effects of tax salience. Some taxes can be partially hidden from those who face them, leading individuals to fail to fully react to those taxes. Sales taxes in U.S., for example, which typically are not included in prices posted to consumers, may be hidden in this sense.

- What does the lack of response mean in terms of the excess burden of the tax? It is tempting to say that the lack of response to a tax is good from the perspective of social welfare—that there is less distortion due to less elastic responses and that therefore the social cost of taxation is mitigated. But that conclusion ignores that error on the part of the individual has to be accounted for somewhere.

- When individuals fail to respond to a tax because it is not salient, in general, they move away from their private optimum. For example, if individuals spend more money for failing to perceive a tax, that money might come out of savings. In general, what happens in the next period or along other margins of adjustment is likely to be important.

# Tax Mistakes

- Other changes to the standard conclusions about tax efficiency come from the fact that individuals may construe taxes imperfectly, especially when tax schedules are complex. Tax mistakes are related to hidden taxes, but they have at least two distinguishing features.

- First, while failure to attend to taxes pushes the response in one direction only (toward underresponse), tax mistakes can in principle cause a response to be greater than or less than the response expected from perfectly optimizing individuals. Second, whereas tax salience is a relatively general, single feature, tax mistakes can take many forms.

- There is only one way to ignore a tax, but there are a lot of ways to get it wrong: miscalculating taxes, mistaking average for marginal tax rates, failing to connect taxes with the benefits that they fund, and so on. As a result of the variation in both the causes and outcomes of tax mistakes, final judgments about their welfare consequences depend on the nature of the specific error.

- Take, for example, the case of individuals responding to average income tax rates rather than marginal rates. With a progressive rate structure, average tax rates are below the marginal rate, and so in general individuals making that mistake underrespond to the true tax rate and earn more and supply more labor than they would if they correctly understood the tax schedule.

- Optimal tax policy can set tax parameters not only to minimize the excess burden of taxation but also to minimize the private welfare costs due to inattention or mistakes.

# Tax incidence

- In addition to understanding the magnitude of the social welfare costs associated with taxation, tax policy also is interested in the distribution of the burden of taxation. That is, who pays taxes? Producers or consumers? Capital or labor? Employers or workers? The central incidence result in public finance is that the distribution of the costs of taxation is a function of the relative elasticities of the demand and supply side of the relevant market. The simplest case of partial equilibrium tax incidence is given by the formula below for the case in which the statutory incidence of taxation falls on the supply side of the market:

$$\frac{dp^d}{dt} = \frac{\eta_s}{\eta_s - \eta_d},$$

- where pd is the price paid in the market by the demand side and dpd/dt is the change in that price for a one-unit change in the tax rate.

- This highlights the two key results of the standard incidence analysis: First, taxes are borne by the relatively inelastic side of the market—that is, those actors whose behavior is relatively insensitive to prices tend to pay more of the tax. Second, the economic incidence of a tax is determined by how individuals respond to the tax, not by the legal incidence of the tax. That is, from the perspective of economic welfare— setting aside administrative issues—the assignment of the legal responsibility to remit a tax is a neutral feature of tax policy.

# Commodity Taxes

- Commodity taxes are levied on the transaction of goods and services. Sales and excise taxes are the largest and most common of these types of taxes. Sales taxes typically are collected at the point of retail sale, and they often are expressed as a percent of the purchase price.

- Excise taxes, are typically imposed at the wholesale level, and they are often imposed per unit of sale. Excise taxes target narrow categories of products, such as gasoline or alcohol, and sometimes they can be larger in magnitude than sales taxes.

- From the perspective of efficiency, the goal of these taxes is to minimize the distortion that they cause, and that distortion is completely captured by the reduction in the consumption of taxed goods caused by the tax. For that reason, commodity taxes are most efficient when located on relatively inelastic goods.

- While there are potentially many behavioral dimensions to commodity taxation, the key issue is likely to be the taxes' salience and the degree to which they are hidden from individuals. In general, lowering salience tends to increase the portion of the tax paid by the group from whom it is hidden. Taxes that are included in prices to the consumer—such as by levying the tax at the wholesale level, as with excise taxes; or requiring that taxes be posted in prices, as with a value-added tax—minimize the degree to which they are hidden from consumers. Increasing the salience of taxes in this way may also work to shift the tax burden away from consumers and to producers, as consumers become more responsive to after-tax prices.

# Labor Taxes

- The signature feature of the income tax may be its complexity. It is calculated as a function of income, but the translation from earned income to taxable income involves numerous adjustments, due, for example, to exemptions and deductions. The tax itself can also be complex, due to the nonlinear rate schedule that makes the tax progressive.

- Perhaps the main goal of these taxes is to raise revenue in the most efficient manner possible, which is largely identified with designing the taxes to produce relatively small responses in labor supply and taxable earnings. In part, this is strictly about efficiency—not generating disincentives to participate in the labor market or to supply work hours. It also is partly about compliance, where the goal is to minimize effects on tax avoidance or evasion behaviors.

- Perhaps the major implication of behavioral economics for the design of efficient income taxes comes from the fact that imperfectly optimizing individuals can no longer be assumed to perceive taxes correctly. Individuals respond not to the tax rate as it is set but as they construe it.

- For example, the complexity of the tax code might make it difficult for individuals to respond to income taxes precisely. That effect could possibly help with efficiency if it causes individuals to not understand their marginal tax rates and therefore to supply more labor than they otherwise would. For that reason, tax policy design might seek to leave this feature of the tax code opaque or vague.

- However, while policymakers might be able to use behavioral responses to taxes to improve tax policy outcomes, firms and employers can take actions too. For example, while individuals might find it difficult to optimize with respect to complex income taxes, firms might set terms of employment in ways that are optimal for the typical worker. The direct manipulation of the complexity of the income tax schedule by tax authorities might then be less effective, because actions by firms can offset such effects.

# Capital Taxes

- Capital gains taxes and taxes on dividends tax wealth accumulation and income from wealth. Capital gains and dividends are taxed like income, but in some cases according to schedules that are different from those for earned income. Estate and property taxes also tax accumulated wealth.

- A good policy seeks to implement the taxes in a manner that has desirable consequences for welfare. From the perspective of efficiency, the central task of the taxes is to not discourage saving, investing, and accumulating wealth.

- Difficulties that individuals have with planning and saving even in the absence of taxes could mean that taxes on capital and wealth accumulation might magnify those difficulties and further impair saving. On the other hand, policy might be able to take advantage of the fact that the implications of tax liability are far in the future to reduce the salience of those taxes for short-sighted individuals, in ways that might mitigate the welfare consequences of the taxes.

# Tax Compliance and Avoidance

- Another margin of adjustment to taxation with potentially significant welfare consequences includes behaviors to comply with or avoid taxes. Other things being equal, an efficient tax is one that people comply with; avoidance is a form of distortion, and along with the enforcement and administrative costs associated with combating avoidance, it can reduce efficiency.

- Therefore, important trade-offs for tax policy are related not only to the behavioral response that comes from reductions in taxed activity—consuming fewer goods and services, working fewer hours, and so on—but also to the response that taxes generate in terms of compliance and avoidance behaviors. Part of what can make a tax inefficient in practice is if individuals can easily avoid the tax or if the costs of monitoring and administering the tax are high.

- In the standard model, individuals weigh the costs and benefits of complying with tax laws and regulations against the costs and benefits of avoidance and make a decision about how fully to comply with or how aggressively to avoid their tax liability. The optimal level of activity therefore depends on factors such as the probability of an audit and the magnitude of any sanctions relative to the gains. In response, policy can set fines and penalties high enough and with the right probability of enforcement to deter avoidance and balance the costs of enforcement against the benefits of improved revenue collection.

- This aspect of tax efficiency becomes somewhat more interesting in a behavioral world. In particular, the relatively high levels of tax compliance observed, specifically with respect to the income tax, often is judged to be an imperfect fit with the standard model. Given the actual, relatively modest probability of audits and the magnitude of the associated penalties, the hypothesis that individuals come at that decision in an optimal fashion or from a position of perfect self-interest can be difficult to support.

# Non-compliance

- Noncompliance represents any failure to meet tax obligations, whether it is intentional or inadvertent. For example, the “tax gap” is an aggregate non-compliance measure, which is defined as the difference between actual tax collected and the potential tax collection under full compliance with the tax code. It consists of nonfiling of tax returns, underreporting of tax, and underpayment of tax.

- Why do some people not comply with the fiscal authorities? What is the best policy to establish, maintain, or enhance compliance?

- The first economic analysis of tax compliance behavior can be traced back to the pioneering work of Allingham and Sandmo (1972). Taxpayers are assumed to be motivated only to maximize their expected utility from financial outcomes by trading off the potential costs of evasion against the costs of compliance. In this framework, a taxpayer’s evasion decision is analogous to portfolio choice between the certain tax position (honest reporting) and the risky prospect of evasion; the taxpayer is deemed a gambler playing with the tax authority under the risk of being detected.

- In this approach, the key policy parameters affecting tax evasion are the tax rate, the detection probability, and the penalty imposed on evasion. The central point is that an individual pays taxes because of the fear of detection and punishment. Thus, this approach is referred to as the economic deterrence paradigm. The standard economic model predicts that tax evasion decreases as the economic deterrence factors increase, that is, tax rate, probability of being detected, and penalty rate.

- Howecver, given actual low rates of audits and rather mild penalties in the real world, a taxpayer’s rational choice should be to evade most of his or her taxable income, yet it is observed in many countries that the aggregate level of compliance is far higher than would be predicted by the standard economic model

- A number of features of behavioral decisionmaking might contribute to higher-than-expected tax compliance. Individuals might perceive the probabilities of audits to be higher than they are, and the penalties themselves might be obscure or complex in ways that lead individuals to perceive them to be larger than they are. The loss of paying the penalty might loom large relative to the potential gains from avoidance. Such types of decisionmaking errors or nonstandard preferences might push in the direction of compliance.

# Compliance and ethics

- In reality, individuals are not only motivated by financial outcomes as they will comply with tax laws if they believe it is the right thing to do. For instance, personal norms significantly moderate the effects of penalty rate and audit probability, indicating that deterrence is only effective when taxpayers' ethics are weak. This is especially the case because people with strong personal norms show low tendencies to evade taxes in the first place. In addition, some researchers have emphasized the impact of tax ethics on compliance decisions as a result of psychological loss that would be incurred by breaking moral standards.

- On the othe hand, individuals are easily influenced by peer behavior. If taxpayers learn that evasion is prevalent among a reference group with which they identify, they would feel less guilty about noncompliance; symmetrically strong social norms against evasion may enhance compliance once taxpayers perceive a threat of social stigma.

- These results suggest that normative appeals to comply should improve tax compliance. Do such appeals work? In recent years, many academics and governemnts have tried to answer this question laboratory and field experiments.

# Laboratory experiments

- Laboratory experiments usually try to create simplified versions of real-world decisions taken by taxpayers. For example, participants may complete tasks to earn an ‘income’ that they are asked to declare to a tax authority or some other form of communal fund. Various aspects of the decision can then be manipulated: the size of any punishment, the amount of revenue returned to participants, the visibility of their behaviour and so on. The experimental setting means that these changes can be implemented cleanly and their effects measured precisely. All evasion is known.

- It is worth emphasising that laboratory experiments permit some inquiries that are impossible or highly impractical through other means. Since aspects like tax rates and penalties are often determined at a national or tax system level, there can be few opportunities to vary them orthogonally in the real world.

- Despite these advantages, concerns have grown that laboratory tax compliance experiments may have poor ‘external validity’. External validity here refers to the extent to which a laboratory experiment’s findings hold true in real-world settings. The criticism usually focuses on the artificiality of the experimental situation; the low stakes involved; the use of student participants; and the challenges of transferring laboratory interventions to the real world.

- Despite these concerns, recent studies concludes that ‘behavioral patterns of subjects in the laboratory conform to those of individuals making a similar decision in naturally occurring settings’, although the absolute level of evasion is usually lower in the laboratory. Laboratory experiments in general are suitable for testing the changes in direction of behavior, and not necessarily suitable for estimating the magnitudes of behavioral change.

# Field experiments

- Field experiments on tax compliance involve randomly allocating taxpayers to receive or not receive an intervention that aims to influence their tax behaviour in the real world.

- For example, a tax authority might collaborate with an academic to create an official letter that warns of a possible tax audit, randomly select one group of taxpayers to receive the letter and one not to, and then measure any differences in tax compliance between the two groups.

- Like laboratory experiments, field experiments also use randomization. This is important because, if successful, it produces two groups with similar characteristics (for example, age, wealth, attitudes to taxation). This similarity means that we would expect the two groups to have matching levels of tax compliance if treated the same way. Any difference in compliance between the two groups can therefore be attributed to receiving the letter, rather than any other cause.

- They therefore therefore address many of the criticisms directed at laboratory experiments while retaining many of their benefits. Randomisation continues to ensure a strong counterfactual, while the real-world setting increases the external validity of the results.

- Attention in filed experiments has mostly has focused on the influence of factors such as social norms, fairness perceptions and the provision of public goods.

# What we learned from experiments

- Given high magnitudes of tax non-compliance, governments are continuously searching for and testing not only systematic policy instruments, e.g. enforcements, but also relatively small, quick and low-cost interventions. Such interventions, even if resulting in relatively small rise in compliance rate, can bring huge additional revenues for the government budgets. One of the most prominent concepts in this area are nudges, that is “aspects of the choices architecture that alters people’s behavior in a predictable way without forbidding any options or significantly changing their economic incentives”.

- A rich variety of nudging interventions have been used in experiments, ranging from moral appeals, appeals to social norms or peer effects, public goods provision, or correcting behavioral fallacies such as procrastination or limited attention.

- Although some studies report positive effects, a recent meta-analysis of over 40 randomized controlled trials from 24 different countries (Antinyan and Asatryan, 2019) concludes that it is only deterrence nudges (interventions emphasizing traditional determinants of compliance such as audit probabilities and penalty rates) that are likely to be effective, while non-deterrence nudges (interventions focusing on elements of individual tax morale) are usually inefficient.

- Moreover, even the effect of deterrence nudges usually disappears in the longer horizon. Nevertheless, nudges can still be a quick-fix of most urgent issues.

# Summary

- Given the need for revenue to fund the various functions of government and given some understanding of the welfare consequences of taxation, the goal of tax policy is to raise sufficient revenue in ways that have desirable welfare properties.

- That includes setting the form and parameters of tax policy so as to raise taxes efficiently, in the sense that the taxes minimize the social costs due to distortions.

- It also requires implementing tax policy so that the burden of taxes is distributed in ways that correspond to social goals and preferences for equity and incidence.

- And, finally, it is a matter of designing and implementing tax policy to promote compliance, minimize distortions due to avoidance and evasion, and minimize enforcement costs.

- The standard model identifies features of tax policy that have desirable properties along the lines of efficiency, equity, and compliance. They usually are summarized in broad terms as rules of thumb for tax design. For example, taxing relatively inelastic goods or activities tends to be efficient. Similarly, establishing low tax rates on wide tax bases generally is more efficient than setting higher rates on narrower bases.

- However, in order to achieve high tax compliance, behavioral aspects need to be taken into account. Recent developments in laboratory and field experiments show, that while social norms, fairness perceptions or appeals on provision of public goods might improve tax morale, deterrence nudges (e.g., highlighting probability of audit or size of a penalty) seem to be more successful.