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# NUDGES, BOOSTS, AND SLUDGE: USING NEW BEHAVIORAL APPROACHES TO IMPROVE TAX COMPLIANCE

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## Abstract

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Keywords: Tax compliance, deterrence theory, behavioral economics, nudges, boosts, sludge  
JEL codes: H2, H26, D91

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## Abstract

This paper discusses current developments in tax compliance research, with a focus on three aspects. First, we summarize empirical evidence on the traditional deterrence or enforcement approach, suggesting that tax audits and fines for noncompliance are critical in taxpayers' compliance decisions. However, recent research indicates that the effects of deterrence are more nuanced than initially thought, suggesting that other interventions are needed to improve tax compliance. Second, therefore, we discuss research on behavioral approaches to increase tax compliance, starting with research that analyzes the effects of "*nudges*", or interventions that use behavioral economics to alter the ways in which the choice architecture facing individuals is communicated to them by the tax administration. As applied to tax compliance, we conclude that nudges have had mixed effects on increasing tax compliance, suggesting that the specific design and implementation of these interventions determines their effectiveness. Third, we extend our discussion to other behavioral economics interventions that have not yet been studied widely in tax compliance research. These include "*sludge*", or institutional features that complicate compliance, and "*boosts*", or initiatives that target individuals' competences and thereby help them to make better decisions. Our central argument is that all three of these behavioral interventions should be utilized in the design of tax policies. However, for these methods to effectively complement traditional deterrence approaches, tax administrations should evaluate them before implementing them in the field. Closer cooperation between administrators and academics should thus be facilitated and encouraged.

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## 1. Introduction

Ensuring that individuals pay their fair share of taxes has long been a challenge for tax agencies, and improving tax compliance continues to be a pertinent issue today. For example, the Internal Revenue Service (IRS) of the United States estimates that in recent years the amount of taxes that should be but are not paid – the so-called “tax gap” – is roughly \$500 billion annually, or nearly 1/6 of the taxes actually collected (IRS, 2022). Indeed, Charles Rettig, a former Commissioner of the IRS, has said in recent testimony that this tax gap may have grown to as much as \$1 trillion annually, an amount that exceeds 5 percent of the U.S. gross domestic product (GDP) (Rappeport, 2021). The U.S. problem is not an isolated one. According to global estimates, tax evasion may account for up to 11.5 percent of the world's total GDP (Zucman, 2017).

Given these remarkable figures, a substantial body of research investigates methods to increase compliance. Conventional collection efforts rely on the notion that audits and penalties deter tax evasion (Allingham & Sandmo, 1972), and an extensive literature has documented that financial sanctions have a strong effect on compliance (Alm, 2019; Slemrod, 2019). Non-financial, or “collateral” sanctions (Blank, 2014) such as the revocation of driving licenses and the denial of passports to tax evaders, have also been suggested as ways to improve compliance, and a recent study by Organ et al. (2022) for the U.S. estimates that limiting passport access for taxpayers with significant tax debts has a positive effect on compliance. Nevertheless, it is increasingly recognized that more enforcement does not always translate to more tax compliance (Beer et al., 2020; Kasper & Alm, 2022, 2023; Kasper & Rablen, 2023; Lancee et al., 2023). Indeed, much recent research indicates that tax compliance cannot be achieved solely through the threat of penalties and sanctions, and in some circumstances more audits may actually lead to less compliance.

As a result, various alternative approaches for increasing compliance have been proposed in research and implemented in practice. Most notably, several studies have investigated the effects of behavioral interventions, especially the effects of letters sent to taxpayers in which the tax agency tries to “nudge” taxpayers to comply. These letters allow taxpayers to keep their tax compliance decisions unchanged, but the letters also typically increase the salience of audits and fines for noncompliance, and they also sometimes appeal to social norms or moral principles as a way to increase compliance. However, a growing body of work finds somewhat mixed and inconclusive results on the effectiveness of these nudges. While enforcement threats generally tend to increase compliance, there is also work showing that some nudges have a positive effect on compliance in some situations but not in others (Alm, 2019; Slemrod, 2019).

Given the often inconclusive results for nudges, it seems worthwhile to examine whether there are lessons to be learned from the use of nudges. It also seems important to examine other

behavioral-based approaches that have the potential to increase tax compliance but that have not yet been systematically investigated as tools for improving tax compliance.

This is our purpose here. Specifically, we provide an overview of three novel approaches to regulating behavior – “nudges”, “boosts”, and “sludge” – by making reference to recent and relevant empirical research that has examined these many approaches in other fields (e.g., environmental science, finance, health) and in various institutional settings (e.g., developed/developing countries, different tax instruments, diverse empirical methodologies). We then discuss the potential of these many approaches in strengthening tax compliance. Broadly, we hope to contribute to a better understanding of the effectiveness of behavioral interventions, along with the development of a richer toolbox for administrators and practitioners to increase compliance.

We proceed as follows. In the next sections, we discuss traditional and behavioral perspectives on tax compliance, where we focus on deterrence. Subsequently, we discuss how behavioral insights are implemented in other fields to induce behavioral change. Specifically, we discuss how “nudges” can affect compliance decisions; we also discuss how “boosts”, or providing individuals with tools to make better decisions, and how reducing tax system “sludge” (or complexity) may affect behavior. We then present a set of best practices that administrators and researchers should follow when deciding between implementing nudges and boosts or reducing sludge. Subsequently, we discuss how nudges, boosts, and sludge can be used to increase tax compliance. The last sections conclude.

## **2. What Motivates Tax Compliance?**

### **2.1. Increasing Tax Compliance Through Audits and Fines**

The standard model of tax compliance (Allingham & Sandmo, 1972) is based on the economic theory of crime (Becker, 1968). The model assumes that taxpayers weigh the certain consequences of compliance against the uncertain benefits of tax evasion and choose the option that gives them the greatest expected income (or utility). The fundamental insight from this approach is that taxpayers comply with tax laws because they fear being detected and punished for non-compliance. As a result, the model predicts that increasing the frequency of audits and the severity of fines for non-compliance will enhance tax compliance.

There is in fact ample evidence that increasing the perceived risk of audit and imposing greater fines for tax evasion have positive effects on compliance (Alm, 2019; Slemrod, 2019). For instance, an early field study conducted by Slemrod et al. (2001) discovered that sending a letter to taxpayers threatening "close examination" of their tax returns leads to a minor but statistically significant increase in reported income among low- and middle-income taxpayers relative to a control group that did not receive any letter (but actually decreased reported income for high-income taxpayers).

Another study by Kleven et al. (2011) examined the effect of letters announcing either a certain audit or a 50 percent probability of audit, while a control group did not receive any letter. The study found that the audit probability had a positive impact on reported income; that is, taxpayers who anticipated a 100 percent probability of audit reported higher income than those who expected a 50 percent probability of audit, and both groups reported more income than taxpayers in the control group who did not receive a letter. Meiselman (2018) found that messages that increase the perceived probability of punishment have a positive effect on the filing compliance of delinquent taxpayers, and that increasing the salience of penalties also has a positive impact on compliance. There are also numerous studies using naturally occurring field data and data generated from laboratory experiments that provide similar results (Alm, 2019).

Overall, then, there is strong evidence that increasing the perceived risk of an audit and raising the fines for noncompliance often lead to greater tax compliance, as suggested by the standard model of tax compliance. In a comprehensive review of the empirical literature, Alm (2019) concludes that a one percentage point increase in the risk of detection generally increases compliance by 0.2 to 0.4 percentage points, while a one percentage point increase in the fine for noncompliance usually increases compliance by around 0.1 percentage points. Therefore, in line with the predictions of the standard theory, tax administrations can improve compliance by increasing either or both the fine on evaded taxes and the audit probability.

Even so, there is also much evidence that tax audits can have differential effects and even reduce tax compliance in many settings. For example, field studies show that the effect of tax audits on the post-audit tax compliance of audited taxpayers varies depending on the audit outcome. Taxpayers who were found to owe taxes tend to increase their subsequent compliance compared to a control group of unaudited taxpayers, but those who were found not to owe taxes show the opposite response (Beer et al., 2020; Gemmell & Ratto, 2012). This result may be due to ineffective audits, or audits that fail to detect a taxpayer's noncompliance, which can reduce post-audit tax compliance (Kasper & Alm, 2022a). Other studies using laboratory experiments find that randomly selected taxpayers tend to decrease their tax compliance in the subsequent reporting decision, a phenomenon known as the "bomb crater effect" (Guala & Mittone, 2005; Mittone, 2006), an effect that appears to be driven by the misperception of the risk of a subsequent audit when the audit selection is random (Kasper & Rablen, 2023).

In addition to these findings, previous research has explored the effect of collateral sanctions on tax evasion. Some scholars have suggested using non-financial sanctions to discourage noncompliance, such as publishing the names of tax delinquents or limiting access of tax evaders to official documents like passports and licenses, alongside regular financial penalties (Blank, 2014).

Although there is limited evidence on the effectiveness of these measures, some studies suggest that non-financial sanctions can increase tax compliance. For example, a study conducted in Slovenia found that firms reduced their tax debt in response to the threat of public shaming (Dwenger & Treber, 2022), while laboratory experiments conducted by Casal and Mittone (2016) and Alm et al. (2017) showed that public shaming can have a positive effect on tax compliance. Additionally, a recent study by Organ et al. (2022) found that restricting passport access for taxpayers with significant tax debt strongly increased compliance.

Taken together, these results suggest that both financial and non-financial sanctions can deter noncompliance. These results also suggest that a taxpayer's decision to comply with tax obligations may be influenced by factors beyond purely financial incentives. These findings have led to several extensions of the standard model of tax compliance.

## **2.2. Nonfinancial Determinants of Tax Compliance: The Role of Trust and Other Social Constructs**

The expected utility model of tax compliance has been criticized for its inability to provide a compelling explanation for observed levels of compliance (Alm et al., 1992). Given real-world values for audit and fine rates, the model's rational cost-benefit analysis implies that many taxpayers face minimal audit risk and small fines for noncompliance, leading them to underreport income or overclaim deductions to evade taxes. However, such behavior is not commonly observed, despite the model's predictions. This discrepancy suggests that non-financial considerations influence taxpayers' compliance decisions. What other factors are suggested by theory to explain why people pay taxes?

One strand of research stays within the basic framework of economics-of-crime model, by adding a range of potentially relevant considerations (e.g., employer withholding, labor supply decisions, alternative tax and penalty systems, systematic audit selection procedures, complexity and uncertainty, use of paid tax preparers, government services, positive rewards). These many extensions make the basic model more realistic, and withholding especially gets predictions of compliance closer to its observed levels. However, these extensions do not alter the fundamental conclusion of the economics-of-crime approach: compliance is driven entirely by financial considerations like detection and punishment. See Alm (2019) for a discussion of these extensions.

Another and more recent strand of research expands the scope of the economics-of-crime beyond purely economic considerations theory by introducing some aspects of behavior considered explicitly by other social sciences, especially psychology. These aspects change the ways in which an individual makes decisions (e.g., misperceived probabilities of audit, guilt and shame, and “rules of thumb” for decisions), and they also introduce group considerations (e.g., fairness, altruism, and social norms).

The foundation for this other strand of research is behavioral economics. The standard neoclassical economic model of human behavior is based on several main assumptions: individuals are rational, they have unlimited willpower, and they are purely self-interested. While these assumptions may be a useful starting point for the analysis of individual behavior, there is increasing evidence that they are inaccurate and unrealistic depictions of many, perhaps most, individuals. As emphasized by Congdon et al. (2011), these so-called “deviations” from neoclassical assumptions can be classified into two broad areas: imperfect individual optimization (stemming from, say, limited computation abilities or bounded self-control) and non-standard preferences (like other-regarding preferences).

In the context of tax compliance, behavioral economics has been applied in two broad (and somewhat overlapping) dimensions. One extension keeps its focus on *individual* factors stemming from imperfect optimization; the other extends the analysis to *group* considerations stemming largely from non-standard preferences. Consider each of these dimensions.

The first aspect of behavioral economics focuses on the ways in which *individual* behaviors diverge from neoclassical predictions. Many of these extensions involve some form of “frame dependence,” in which an individual’s decision depends upon how the choice is presented. Frame dependence is typically related to some cognitive limitation of the individual in perceiving decision problems and in evaluating the available options. Given these cognitive limitations, many individuals do not maximize expected utility, but instead pursue different strategies, as modeled by *non-expected utility theories*. The most well-known of these alternative theories is likely the prospect theory of Kahneman and Tversky (1979); other theories include rank-dependent expected utility theory (or anticipated utility), first-order and second-order risk aversion, regret / disappointment theory, non-additive probabilities, ambiguity theory, and hyperbolic discounting, among others. These many applications of non-expected utility theories to tax compliance are discussed in comprehensive surveys by Hashimzade et al. (2013) and Alm (2019); see also Kirchler (2007) and Torgler (2007). Relative to expected utility theory, these models change the “probability” that an individual perceives and the “objective function” that he or she pursues. In doing so, they continue to demonstrate the importance of enforcement on tax compliance. However, these models can also generate predictions that better approximate observed levels, especially if they have overweighting of probabilities. All of this comes at the cost of adding many complications to the analysis of individual behavior.

The other aspect of behavioral economics focuses more on *group* behavior, often summarized as *social interactions theories*. There is abundant evidence that individuals are influenced by the social context in which, and the process by which, decisions are made and that they are motivated not simply by self-interest but also by group notions like social (or group) norms, social capital, social customs,

appeals to patriotism or conscience, or feelings of fairness, altruism, reciprocity, empathy, sympathy, trust, guilt, shame, morality, and alienation. Regardless of the specific term that is used, all of this research concludes that one's own *individual* behavior is strongly influenced by the behavior of the *group* to which one identifies, largely via other-regarding preferences.

There are various aspects of these social interactions, but perhaps the most useful approach to social interactions emphasizes that much individual behavior can be viewed as a "psychological contract" between individuals (and between individuals and government). Central to this contract is the broad notion of a "social norm" of behavior. A social norm represents a pattern of behavior that is judged in a similar way by others and that is sustained in part by social approval or disapproval. Put differently, a social norm is a recognized, customary, and self-reinforcing pattern of behavior in which everyone participates, given the expectation that everyone else will also participate. Put still differently, a social norm is an informal rule of behavior that individuals follow for reasons largely distinct from the fear of legal penalties. Consequently, if others behave according to some socially accepted norm of behavior, then the individual will behave appropriately; if others do not so behave, then the individual will respond in kind. The presence of a social norm is also consistent with many other approaches that incorporate similar notions of social interactions, such as those that recognize some form of other-regarding preferences. Indeed, it is hard to think of any type of social interaction that is not governed in some way by a social norm.

As for specific applications of these approaches to tax compliance, again see Hashimzade et al. (2013) and Alm (2019) for surveys. These models maintain the importance of enforcement, but they also introduce many other relevant considerations that go well beyond narrow financial considerations. Notably, they are able to generate realistic predictions about the level of compliance, although at the cost of considerable complexity.

Overall, then, the many theories of tax compliance suggest that enforcement matters, including the ways in which third-party sources of information and tax withholding systems affect the enforcement capabilities of tax administrations. However, theory (especially theory based on behavioral economics) also suggests an individual does not always behave as assumed in the standard economic approach; that is, an individual may not be able to make all calculations required under expected utility theory, an individual may not be able to determine the true costs of an action, an individual may face limits on his or her self-control, and an individual may be affected by the framing of a decision. Finally, theory (again, theory based on behavioral economics) suggests that an individual is a social creature, and may be influenced by group considerations in his or her compliance behavior.

Indeed, a large body of empirical research suggests that trust, social norms, tax morale, fairness considerations, and subjective understanding of the tax system all affect compliance (Alm &



Kasper, 2023). For instance, prior studies investigate the role of social norms, or the behaviors and shared ethical beliefs attributed to other taxpayers (Wenzel, 2004), and studies using laboratory experiments find that social norms have the potential to increase tax compliance (Alm et al., 1999; Bobek et al., 2013). Social norms affect compliance by increasing the moral cost of noncompliance (Myles and Naylor, 1996; Frey and Torgler, 2007; Traxler, 2010), and they are particularly effective when one identifies with the group in question (Wenzel, 2005). Similarly, tax morale, or the intrinsic motivation to pay taxes, affects tax compliance (Alm & Torgler, 2006; Frey & Torgler, 2007; Kirchler, 2007; Torgler, 2007; Luttmer & Singhal, 2014). Rather than moral costs being increased because of information that the taxpayer has deviated from the behavior of others, here the costs result from deviating from one's own moral standard (Erard and Feinstein, 1994; Alm and Torgler, 2011). Taxpayers' trust in the tax administration also affects compliance (Kirchler, 2007). In particular, compliance levels tend to be higher and enforcement tends to be more effective when individual trust in government and the tax administration is greater (Kogler et al., 2013; Kasper et al., 2015; Batrancea et al., 2019).

In sum, these many results indicate that there are alternative approaches for improving compliance that go well beyond enforcement. These alternative approaches – nudges, boosts, and sludge – are discussed in detail in the following sections.

### **2.3. Tax System Characteristics: “Sludge” and Other Frictions**

Tax system characteristics also seem likely to affect individual compliance decisions. One characteristic of tax systems that is frequently criticized is their complexity, including such features as the length of the tax code, the number of taxes, and the readability of the tax code (Evans & Tran-Nam, 2014). Complexity in the tax system can lead to unintentional non-compliance because people may misinterpret rules or make unintentional errors (Cuccia and Carnes, 2001). Complexity might also lead some taxpayers to pay more than they should, for instance, by not claiming refunds or credits to which they are entitled (Alm et al., 1993). We discuss the role of complexity later, in the context of “sludge” and other similar frictions in the tax code.

## **3. Broadening The Scope – Using Insights From Behavioral Economics To Increase Tax Compliance**

### **3.1. Changing Taxpayer Communications To Nudge Taxpayers**

While academic work on the effects of tax system design other than audits and fines is scarce, a growing body of work investigates how tax administrations can change taxpayer communications to promote tax compliance (Antinyan & Asatyan, 2019). Similar to the “letter” method used by Slemrod et al. (2001) discussed earlier, this research extends the use of messaging well beyond audits, for example, by utilizing it in randomized controlled trials (RCTs) in which the tax administration

distributes letters with a variety of different messages to randomly selected groups of taxpayers. This approach aims to nudge taxpayers to comply by subtly changing the environment via the presentation of information that is designed to influence behavior in a specific way without restricting choice or significantly changing incentives (Thaler & Sunstein, 2008). Nudges often lever cognitive biases or heuristics to steer individuals towards choices that are in their best interest. Strictly speaking, the application of “nudges” in the context of tax compliance does not align with the original definition of nudges. While Thaler and Sunstein (2008) highlight that nudges must help decision-makers to decide in *their* best interest, these studies aim at fostering decisions that are in the best interest of *society*. However, individual and social benefits do not necessarily align because free-riding on the contributions of others and thus not paying taxes might be in the taxpayer’s best interest, while such a behavior would clearly be suboptimal for society as a whole.

Overall, prior work studying these effects suggests that changing taxpayer communication can affect tax compliance, but the evidence is mixed (Hallsworth, 2014). Several studies find no effect of behavioral interventions, such as highlighting the social norm of paying taxes or appealing to tax morale (Blumenthal et al., 2001; Torgler, 2004; Fellner et al., 2013; Pomeranz, 2015; Ortega & Scartascini, 2020), while other studies suggest that moral suasion (Hallsworth et al., 2017; Bott et al., 2020; Del Carpio, 2022) or simplification (Dwenger et al., 2016) can increase tax compliance in real-world settings. Relatedly, recent work by List et al. (2023) examines the welfare effects of nudges. In their comprehensive review of the literature on nudges and tax compliance, Antinyan and Asatryan (2019) find that deterrence nudges generally tend to increase compliance. However, compared to non-deterrence nudges, their effects on compliance are moderate. Moreover, Antinyan and Asatryan (2019) find that nudges are more effective on delinquent taxpayers (who have a history of late payments) and also more effective when they are delivered in-person (rather than by mail). Finally, they find that the long-term effects of nudges are lower in lower-income countries. Another recent study by Truzka et al. (2022) finds similar results, especially the result that deterrence interventions generally tend to be more effective than other interventions in increasing compliance.

However, it is important to note that most of these studies have investigated the effects of nudges on individual income tax compliance, and most studies have also examined evidence in developed countries. Both practices are now changing. For example, there are now several recent studies on the effects of nudges for other taxes, such as the company income tax (Biddle et al., 2018; Bergolo et al. 2023) or the value-added tax (Pomeranz, 2015). Also, researchers have had increasing access to administrative data in developing countries; see Pomeranz (2015) for Chile, Kettle et al. (2017) for Guatemala, Hoy et al. (2023) for Papua New Guinea, and Bergolo et al. (2023) for Uruguay. Much of this newer work has been undertaken by The World Bank, in partnership with governments

in its client countries and sometimes in partnership with other international organizations; for information on much of this work, see <https://www.ictd.ac/theme/tax-administration-and-compliance/> and <https://www.worldbank.org/en/topic/macroeconomics/brief/innovations-in-tax-compliance>. These studies have utilized a range of innovative field experiments that test different nudge strategies for improving tax compliance. Importantly, most all of these field studies occur at the local government level in developing countries, focusing on local property taxes in Asia (e.g., Pakistan), Latin America (e.g., Argentina, Brazil, Colombia, Costa Rica, Guatemala, Mexico, Peru, Uruguay), and Africa (e.g., Ethiopia, Ghana, Kenya, Liberia, Malawi, Rwanda, Sierra Leone, South Africa, Tanzania, Uganda). The results vary significantly by the specific type of nudge strategy, but they all rely at least in large part on providing more and better information to individuals. A common result is that these strategies often improve individuals' ability to make informed decisions, while also increasing trust in their neighbors and in their local government, and, through these channels, they also improve tax compliance. Indeed, Haushofer and Fehr (2014) argue that the available empirical evidence on the potential for nudges in improving the quality of decision-making in developing and poorer countries is likely to be particularly large.

Even so, these nudge strategies do not always work. One potential explanation for the inconsistent results on the effects of nudges found in prior work is that behavioral interventions are often not comparable across studies because researchers work independently when designing their nudges. For example, "social norm" messages have been designed very differently by different teams of researchers. Blumenthal et al. (2001) find that the phrase "*...people who file tax returns report correctly and pay voluntarily 93 percent of income taxes they owe [...], a small number of taxpayers who deliberately cheat owe the bulk of unpaid taxes*" does not affect compliance. In contrast, Hallsworth et al. (2017) find that the phrase "*...nine out of ten people in the United Kingdom remit their tax on time. You are currently in the very small minority of people who have not paid us yet*" is the most effective of several of their letters in making people pay their taxes. Similarly, Bott et al. (2020) employ a "societal benefits" treatment that uses the phrase "*[y]our tax payment contributes to the funding of publicly financed services in education, health and other important sectors of society*", and they find that this appeal almost doubles the average income reported compared to a baseline letter that did not include such an appeal.

In sum, a growing body of work investigates to what extent tax administrations can change their communication strategies to nudge taxpayers to comply. However, field studies find inconclusive results, and prior work does not investigate why behavioral interventions increase tax compliance in some settings but not in others. As prior work does not investigate the effectiveness of the many

different approaches that have been examined using common instruments and objectively measured outcomes, the reasons for these inconclusive results remain unknown.

### 3.2. Nudging Beyond “Letter Studies”

Studies investigating the effect of nudges on tax compliance focus almost exclusively on the potential of changing taxpayer communications. However, other fields have tested a variety of other behavioral approaches to support individuals in making better decisions. Such approaches are frequently taken in environmental science (e.g., to foster pro-environmental behavior), finance (e.g., to increase savings and contributions to retirement funds as well as improve investment decisions), or health (e.g., to suggest healthy diets, exercise or to inform patients of risks of certain diseases). Here we discuss how other fields have employed behavioral interventions and how these insights can be used to increase tax compliance. First, we provide an overview of nudges and their use in other fields beyond tax compliance. Second, we then discuss “boosts” and outline their applications. Finally, drawing from the insights gained from other fields, we discuss novel ideas for how to use nudges and boosts to increase tax compliance. In a later section, we extend our discussion to “sludge” and its effects on tax compliance.

A recent meta-analysis provides a comprehensive overview on the effectiveness of nudges in different domains (Mertens et al., 2022), reviewing more than 200 articles from various disciplines with regard to the effectiveness of different choice architectures. Prior meta-analyses have pointed out that developing a common nomenclature is crucial in facilitating the evaluation of hypothesized relationships (Szasz et al., 2018). Only when the behavioral sciences use the same terms to describe a specific intervention will there be a chance to reach consensus on what interventions are effective in which settings. Therefore, our discussion follows the categorization of nudges proposed by Mertens et al. (2022), who categorize behavioral interventions along three dimensions: *Decision Information*, i.e., the content and style of information presented to the decision-maker; *Decision Structure*, i.e., the way that the decision is structured (or which, where, and how options are presented); and *Decision Assistance*, i.e., if and what kind of assistance is offered to decision-makers. The study also identifies nine choice architecture intervention techniques. See Table 1 for a summary of all of these features.

<b>Intervention Category</b>	<b>Intervention Technique</b>	<b>Description</b>
<b>Decision Information</b>	Translation	Translate a choice’s attribute into more meaningful information
	Visibility	Provide relevant information
	Reference points	Give information about the individual’s position relative to a peer group’s behavior
<b>Decision Structure</b>	Defaults	Change the default option of the choice
	Option-related effort	Modify effort associated with certain choices

	Range and composition of options	Modify how categories are split to facilitate choice
	Option consequences	Modify consequences of choice to prevent present bias
<b>Decision Assistance</b>	Reminders	Increase salience of specific information to reduce information overload
	Commitment	Encourage ex-ante commitment

Table 1: Categorization Of Behavioral Interventions (Mertens et al., 2022)

Since individuals' decision-making is affected by the information that is available to them, modifying this information is likely to affect their decisions. The first set of nudges (*Decision Information nudges*) take this into consideration by altering the information given to decision-makers, for example by *translating choice attributes* into information that is more meaningful to decision-makers. Providing individuals with more meaningful information ensures that they take it into consideration, which in turn saves time and effort. For example, Ungemach et al. (2018) apply a translation nudge to increase the match between consumers' preferences and their choices, aiming to help individuals in making choices that are better aligned with their objectives. Ungemach et al. (2018) find that translating information that is relevant to the decision-maker into units that are more informative and readily available increases the quality of decisions, as measured in how well preferences and decisions are aligned.

A second intervention technique under *Decision information nudges* is to nudge desired actions by *increasing the visibility* of certain behaviors, i.e., making decisions and their consequences more salient. For instance, giving consumers information on how their choices affect their health or the environment reduces the propensity for decisions with negative externalities. Along these lines, Jessoe and Rapson (2014) investigate how showing consumers their real-time energy consumption affects consumption decisions, and they find that households react with a significant decrease in energy consumption when informed about their energy consumption in real time compared to when they are informed only at the end of the invoice period. They conclude that the visibility of consumption, rather than consumption itself, affects behavior and that well-designed visibility nudges have the potential to induce more conscientious behavior. Visibility nudges may also work via increasing the visibility of certain attributes of a choice, such as the reciprocity that a certain choice entails. For example, studies have used reciprocity statements such as "If you needed an organ, would you take one?" to test if these affect individuals' propensity to become an organ donor themselves (O'Carroll et al., 2017; Han & Wibral, 2020).

In a third intervention technique under *Decision information nudges*, it is well established that individuals adjust their behavior to what their peers are doing. Taking advantage of this mechanism, i.e., giving *reference points* that refer to peers' "good" behavior, may encourage individuals to change their behavior in order to fit in. Several studies have used this concept to steer individuals' behavior

into the desired direction (Köbis et al., 2022; Nolan, 2021). In a prominent study, Allcott (2011) investigates the role of social norms in energy consumption, using reference points to alert consumers to their level of energy consumption in comparison to their peer group's consumption. He finds that consumers within the highest decile of pre-treatment energy consumption decrease their consumption the most, while the effect on individuals in the lowest decile is very low. While these results paint a promising picture on the use of reference points, they also raise the issue of heterogeneous effects. Prior work generally highlights the importance of taking individuals' current decisions into account, suggesting that nudges should be tailored to the specific group on which the nudges are used.

Another strand of literature investigates the effects of *Decision Structure nudges*. Mertens et al. (2022) identify four interventions techniques to do this. First, *changing the default option* is a powerful way to affect individuals' choices. For example, Johnson and Goldstein (2003) point out that, in countries where citizens were added to an organ donors' list by default and had to actively opt out, the donor rate increases substantially. Second, the desirability of a choice seems to be directly affected by the effort an individual has to undergo when choosing this specific option. *Increasing the effort* (such as the physical effort or the time that needs to be invested to pursue an option) may severely affect the desirability of a choice. A popular example for such interventions is placing unhealthy food farther away from the consumer to increase the effort that needs to be undertaken to get it. Such interventions indeed lead to more consumption of healthy food options that are placed closer (Kroese et al., 2016). Third, *the composition of a choice* affects how individuals evaluate its content and its consequences. For example, smoking one package of cigarettes per day may be perceived as having less consequences on the smoker's health than smoking 7300 cigarettes per year (Read et al., 2000). Fourth, and in a similar vein, an option is to alter the way in which individuals are *informed about the consequences* of their decisions. Alerting individuals of certain consequences, whether through microincentives or other means, may attenuate their present bias or loss aversion. For example, Veldwijk et al. (2016) investigate how the presentation of the consequences of cancer affects participants' risk perceptions, and they find that the framing of the consequences, i.e., presenting a probability of surviving versus presenting a probability of dying, significantly affects participants' perceptions of risk, in line with the predictions of prospect theory. A fifth and final method of utilizing option consequences is by placing incremental incentives (or consequences) at different stages of the decision-making process, such as using "gamification" in healthcare contexts (Hare et al., 2021). For example, Mitchell et al. (2018) find that using an app that incentivizes healthy behavior (such as walking) with loyalty points has a significant effect on the increase of mean daily step counts. In this

case, the reward for step counts was used as a short-term consequence used to encourage long-term health and well-being.

The last group of nudges pertains to *Decision Assistance nudges*, in which the goal is to assist individuals in making a decision by providing either *reminders* or *commitment devices*. Reminders alert individuals of actions that they have not yet undertaken. For example, patients may be more inclined to quit smoking after a family member has died of lung cancer because this reminds them of the dangers of smoking (Hare et al., 2021). Examples that are tangible or closer to one’s own life may have a stronger effect on own behavior than information about the incidence of lung cancer among the general smoking population. Commitment devices act preventively by asking individuals to commit to certain behaviors in the future that they are less likely to undertake when asked to do so in the present. This may apply to all choices where utility is discounted exponentially or hyperbolically, implying that individuals are less likely to undertake such behavior and commit to it long-term. A popular example is the *Save More Tomorrow* program (Thaler and Benartzi, 2004), which asked a group of employees to commit to a savings plan that tied increases in salary to increases in savings. The study finds a significant and sizeable increase in savings for individuals in the *Save More Tomorrow* program compared with individuals whose savings were not tied to their income; that is, individuals are more willing to save for retirement when they are told that they will only need to save in the near future rather than now. In line with these considerations Thaler and Benartzi (2004) find that 78 percent of people who were unwilling to accept a pay-cut today were willing to join a program in which they would accept a pay cut in the near future.

### 3.3. Boosting Desired Behaviors

More recently, another behavioral approach to facilitating better decision-making has gained traction in the social sciences: “Boosting”. Boosts are behavioral policy interventions that aim to improve human decision-making in predictable ways by providing individuals with tools to make good decisions. On a broader level, boosts might include formal educational programs. On a more specific level, boosts may provide individuals with strategies to make better decisions. Boosts have been used in a number of fields, but most examples are in health care (Olejniczak, 2020). Grüne-Yanoff and Hertwig (2016) categorize boosts in three classes: boost policies that equip individual decision-makers through changing the representation of statistical information to improve competence in decisions under risk; boost policies that teach core competencies; and boost policies that provide decision-makers with efficient cognitive strategies for decisions under uncertainty. Table 2 gives an overview of these uses of boosts.

Class Of Boost	Aim	Example
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Decisions Under Risk and Risk Competence	Educating people and improving their ability to evaluate potentially manipulative information	Designing educational programs to improve the statistical literacy of people
Teaching Core Competences	Identifying key information necessary to make informed decisions and teaching individuals these core competences	Teaching people to check vital signs and to call 911 in case of an emergency
Decisions Under Uncertainty	Designing efficient cognitive strategies that individuals could use	Formulating decision trees and smart rules of thumb

Table 2: *Boosting In Practice* (Grüne-Yanoff & Hertwig, 2016)

Changing the representation of statistical information has been shown to improve the statistical reasoning of individuals (Garcia-Retamero & Hoffrage, 2013). For example, people better understand statistical information presented as natural frequencies than statistical information presented as probabilities. They also understand absolute risks better than relative risks and graphical representations better than numerical representation (Gigerenzer et al., 2007). A *nudge* approach would use this information to frame information in such a way that decision-makers make choices that suit policy makers' objectives. A *boost* approach would encourage individuals to make an informed decision themselves, both by improving the representation of information and by educating people to improve their ability to evaluate potentially manipulative information. Proponents of the boost approach focus on improving the statistical skills of lay people through educational programs. For example, Gigerenzer (2010) shows that few people have the necessary skills to understand health statistics, suggesting that shared decision-making and informed consent in this context is problematic. A boosting program would entail changing the curricula of schools in order to improve basic statistical knowledge.

The boost approach also focuses on teaching core competencies and correcting specific skills and knowledge deficits in certain decision domains. Rather than making individuals experts in a certain domain, the goal of such boost policies is to identify crucial information that people need to be able to make informed decisions that align with their objectives. For example, Van Roekel et al. (2022) suggest that risk literacy boosts can improve compliance with hygiene requirements in hospitals. In their study nurses were provided information on the risks of inadequate nurse hand hygiene in causing infection in patients. Van Roekel et al. (2022) found that both nudges and boosts were effective in increasing compliance with hygiene requirements. However, the boost effect was more sustainable than the nudge effect. Kirgios et al. (2020) provide another example of effective boosting in the health domain. Their study found that the weekly gym attendance rate of individuals could be increased by teaching people a strategy to overcome self-control problems. Boosts have also been used to help people evaluate online information. For example, Lorenz-Spreen et al. (2021) investigate how boosting can be used to improve people's competencies to detect manipulative strategies online, such



as microtargeted advertising. Microtargeted advertising exploits recipients' personal characteristics by sending them messages specifically targeted to them. The study found that prompting participants to reflect on their own personality by completing a short personality questionnaire boosted their ability to identify ads that were targeted at them.

Finally, boosts also come in the form of simple and efficient cognitive strategies that support better decisions. For example, health care workers can use decision trees to streamline decision-making in complex situations that require speedy decisions. Gigerenzer and Kurzenhauser (2005) found that health care staff can respond to a series of yes-no questions to help them deliver the best choice. Similarly, Jenny et al. (2013) investigate the use of fast, concise, and frugal decision trees by doctors in detecting depression, and found that it offered simple and accurate screening. Also using a decision tree, Fischer et al. (2002) develop a clinical prescription rule, a scoring system, and a short decision tree, all of which help doctors in the prescription of antibiotics to children. McGrew et al. (2019) showed that teaching students a small number of flexible heuristics that can be applied across a range of digital contexts improved their evaluation of digital sources. Such rules of thumb have also been studied among employees in the financial sector. Drexler et al. (2014) showed that training firms in simple rules of thumb improved firms' financial practices more than formal accounting training, and Amberger et al. (2023) found that trained tax professionals are more rationally inattentive than students in tax-related decision-making.

### **3.4. Nudges, Boosts, or Both?**

Although the difference between nudges and boosts is not always clear-cut in the literature, they can nonetheless be clearly distinguished (Wilkinson, 2013; Grüne-Yanoff & Hertwig, 2016; Grüne-Yanoff, 2018; Grüne-Yanoff et al., 2018; Congiu & Moscati, 2022). While nudges aim to affect behavior through changing the decision context, boosts aim to affect behavior by teaching people how to use decision tools to make informed decisions. Moreover, nudges target specific circumstances, while boosts have a reach beyond the particular circumstance. For example, a boost for statistical literacy will not only increase a decision-maker's capabilities in one circumstance but in any situations that require an understanding of financial matters. In contrast, a nudge that changes the wording of a message will only affect the specific situation in which the message is relevant.

To determine whether a nudge or a boost is best suited to induce the desired behavior, Hertwig (2017) suggests the following guidelines:

- *If individuals lack the cognitive ability or motivation to acquire new skills or competences, then nudging is likely to be more efficient.*
- *If policy makers are uncertain about people's goals, if there is marked heterogeneity of goals across the population, or if an individual has conflicting goals, then boosting will be the less error-prone intervention.*

- *If the working of a nudge requires it to be non-transparent or even invisible to the person being nudged, then it fails the easy-reversibility test and is paternalistic intervention.*
- *If governments do not (always) act benevolently or if they permit the private sector to create ‘toxic’ choice architectures, then boosting will provide better protection for individuals.*
- *If policy makers aim to foster generalizable and lasting behaviors, boosting seems to be more expedient, ceteris paribus.*
- *If there is substantial danger of unanticipated, unpredictable, and undesired consequences of a nudging or boosting intervention, then consider the respective alternative.*

It seems clear that boosts lend decision-makers a type of autonomy that nudges do not (Wilkinson, 2013; Grüne-Yanoff & Hertwig, 2016), even though some scholars argue that nudges (and sludges as well) differ with regard to their effects on well-being but not with regard to their effects on autonomy (Hortal & Segoviano Contreras, 2023). The nudge approach takes a libertarian paternalistic approach by assuming that individuals’ cognitive and motivational deficiencies can be used by policy makers to the benefit of these individuals themselves. This has led to a normative debate surrounding the use of nudges. Critics of nudges argue that nudge policies undermine the autonomy of decision-makers by manipulating them. Boosts, on the other hand, focus on individuals’ cognitive abilities and strategies, and they aim at equipping individuals with the skills to make the best decisions themselves. Therefore, in using boosts, there is no need to justify libertarian paternalism.

### **3.5. Tax System Design and “Sludge”**

Behavioral research has more recently identified another consideration that affects individual decisions: “Sludge”. Sunstein and Thaler (2008), Sunstein (2021), and Newall (2022) all argue that, if a decision environment is opaque, confusing, or misleading, then the environment can in fact reduce the set of options from which the decision-maker can choose, thereby making it difficult for individuals to opt out of a default option and to identify the option that improves the welfare of the decision-maker. Sunstein (2021) refers to this type of decision environment as “sludge” or “nudges for the bad”. Instead of making good decisions easier, sludge makes it more difficult for decision-makers to make decisions in their best interest. Another definition suggests that sludge has two particular characteristics: “frictions” and “bad intentions” (Goldhill, 2019). For example, people applying for a visa are often required to visit a website that does not function properly or to go through an unclear and complicated process during their visa application that might frustrate them and discourage them from completing their visa application.

In the context of tax compliance, all of this work suggests that tax system design features can cause frictions that hinder tax compliance or make people pay more (and also sometimes less) than they should. Indeed, as noted earlier, tax systems are frequently criticized for their complexity, such as the length of the tax code, the number of taxes, and the readability of the tax code (Evans & Tran-

Nam, 2014). Complexity is a striking and obvious example of sludge. This sludge can push people towards behaviors that are not in their best interest.

Perhaps surprisingly, the actual impacts of tax system complexity on taxpayer compliance are difficult to determine, and thus far academic research has not produced much evidence on these issues. Some exceptions here include research by Alm et al. (1993), Alm et al. (2010), McKee et al. (2018), and Vossler and Gilpatric (2018), all of whom find in laboratory experiments that subjects who are uncertain about their true liabilities increase their compliance when they receive information from the tax authority. Also, the Taxpayer Advocate Service (2022) in the U.S. regularly identifies aspects of the tax code that cause problems for taxpayers, including:

- Complexity of the tax code
- Processing delays
- Inadequate IRS hiring and training
- Erratic telephone and in-person service
- Difficulties in online access for taxpayers and tax professionals
- Absence of E-Filing and Free Filing
- Inadequate IRS transparency
- Poor tax return preparer oversight
- Long appeals
- Challenges for overseas taxpayers.

It seems plausible that tax administrations can increase acceptance of the tax system and strengthen taxpayer compliance by eliminating existing sludge and avoiding new sludge when implementing policy reform. However, other than the evidence from laboratory experiments noted earlier, the empirical evidence on the causal effect of sludges in the tax system on taxpayer behavior remains largely nonexistent.

#### **4. Using Insights From Nudges, Boosts, and Sludge To Improve Tax Compliance**

In this section we discuss how notions from nudges, boosts, and sludge can be used to improve tax compliance. First, using the categorization proposed by Mertens et al. (2022), we propose nudge interventions for tax compliance. Second, we then look at how boosts might be applied within a tax compliance framework, structuring our discussion along the lines of the class of boosts suggested by Grüne-Yanoff and Hertwig (2016). It is important to note that any given intervention might affect different groups of individuals in different ways. Therefore, we emphasize the need for considering the heterogenous effects for any proposed interventions. It is also important to note that these interventions may work in part by reducing tax complexity sludge, even though we emphasize the effects of these interventions via nudges and boosts. In particular, we believe that reducing the complexity of the tax code, simplifying tax filing, and improving taxpayer services all offer

opportunities to reduce sludge in the tax system. Again, however, there is little evidence on the causal effects on taxpayer compliance of addressing these issues, other than from laboratory experiments. The effects on compliance of sludge – and of reducing sludge – clearly represent a useful area for future research.

Prior work studying the effect of nudges on tax compliance has relied almost exclusively on assessing the effects of changing taxpayer communications (Alm, 2019; Slemrod, 2019; Antinyan & Asatryan, 2019). However, there are various other ways in which nudging can be used to increase compliance.

One intervention technique for nudges is to *increase the visibility of relevant information*, via several avenues. First, tax administrations should aim to simplify tax filing by reducing the complexity of tax forms and the information provided to complete them. More broadly, relevant information should be easily accessible for all taxpayers and provided in a way that is better aligned with the knowledge and capabilities of the average taxpayer. Second, tax authorities or governments may consider drawing taxpayers' attention toward where their tax money is put to use. This increases the visibility of the state's effort to convert tax money into public goods and reminds individuals of what their tax money provides to society. Third, tax authorities may try to evoke a feeling of reciprocity among taxpayers. Increasing the visibility of what the government is providing in the form of public goods or drawing taxpayers' attention to what fellow taxpayers are contributing to the public goods may increase taxpayers' feeling of reciprocity and increase their willingness to pay their taxes. Such campaigns could work on either the individual level or the aggregate level. On the individual level, an example might be sending taxpayers letters. On the aggregate level, policy makers could highlight the trade-off between taxpayment and public goods in public campaigns, especially when the introduction of new public goods is discussed. Moreover, a "public goods clock" could be established, working similarly as the "public debt clock" provided in such cities as New York and Berlin. Such a clock might display how much tax revenue has been collected to date and how far along the state treasuries are to reaching their budget requirements for the current fiscal year. Knowledge about these variables may raise tax morale and a collective sense of responsibility for the public budget.

In a similar vein, *translation* may increase taxpayers' recognition of their contribution to the public goods. Interventions that are based on translation are usefully targeted toward individual taxpayers. Such interventions could entail expressing taxpayers' contributions as a public good. For example, after having turned in their annual income tax declaration, taxpayers could be informed about what their tax payments helped to finance, and they could be informed that, due to their tax payments, a playground could be remodeled. These translations could evoke in taxpayers a sense of

contributing to the community by clearly displaying the share of a public good that they helped to finance.

Research on tax evasion has already seen some applications of displaying *social norm information* or *information about reference points* to increase tax compliance (Lefebvre et al. 2015; Antinyan & Asatryan, 2019; Burgstaller & Pfeil, 2022; Besley et al., 2023). Most studies present peers' average compliance rates (empirical/descriptive norms) as a reference point for taxpayers. The results of this research suggest that giving information about social norms does not increase tax compliance in all taxpayers by the same degree but rather that the effectiveness of social norms depends on the compliance levels of the taxpayers. For example, the effectiveness of nudges for late-paying taxpayers is higher than for the average taxpayer (Antinyan & Asatryan, 2019). This is especially important since alerting individuals to a reference point may also backfire (De Neve et al., 2021) and thus decrease compliance among the most-compliant taxpayers. Therefore, to increase the likelihood of timely filing, taxpayers with a history of late filing could be approached with information about their peers' filing behavior, such as the share of taxpayers that file well before the filing deadline.

Regarding *decision structure* nudges, default nudges could be used in a number of areas related to tax compliance. For example, a substantial number of taxpayers, especially those who are self-employed, do not file taxes regularly (Alm et al., 2016). Those who have not filed consistently for a number of years may view not filing as the default. Changing this default, by providing automatic substitutes for returns based on third-party or prior tax return information, might strongly affect the commitment of non-filers. More broadly, tax administrations could facilitate filing by offering pre-filled tax returns that list income and expenses from the prior tax year, so that taxpayers would not have to start preparing their return "from scratch". Changing the default option could also be used as a tool to reduce collaborative tax evasion. When taxpayers perceive high levels of non-compliance to be the norm, changing this default could increase tax compliance (Erard, 2018; Enste, 2019; OECD, 2021). For example, a norm-nudge could inform taxpayers about descriptive norms, such as the compliance levels in other domains or in other countries.

A different set of nudges may alert decision-makers to the *consequences* of the different choice options of their tax compliance decisions; these could also be emphasized on an individual level. When considering undeclared work, for example, suppliers of such work may be unaware of their losses from retirement savings. In capital-based retirement systems, workers who do not pay into their pensions scheme forego not only their contributions but also the interest rate on it; in pay-as-you-go pension schemes, they do not gain pension entitlement for the time worked undeclared. Making such a consequence more salient to suppliers may discourage them from providing undeclared services. In this case, a consequence-nudge may be combined with a loss-framing-nudge to have a

greater effect. To this end, individuals may be reminded that a lack of contribution would result in deteriorating infrastructure and social services.

Decision-assistance-nudges such as *reminders* or *commitments* may also help individuals to better understand their tax obligations. Reminding taxpayers not only of the relevant deadlines but also of their responsibility to the public good can be achieved in different ways. For example, studies have shown that public figures have a large influence on individuals, especially when such figures are celebrities, and they are perceived as possessing extraordinary abilities (Parmelee & Bichard, 2012; Moraes et al., 2019). This relationship may be explored from a tax compliance perspective, for instance by running public marketing campaigns with well-known individuals who are perceived as role models.

Finally, policy makers and researchers who implement nudges and evaluate their effectiveness should be aware of how they measure decision quality. Ungemach et al. (2018) test alignment of attitudes and decisions to infer whether individuals choose in a way that fits their preferences. This way of measuring the quality of a decision requires less normative predispositions, allows the assessment of subjective decision quality, and should thus be reflected in the evaluation of nudges.

To determine how to apply boosts in increasing tax compliance, we refer back to Hertwig's (2017) rules described in Section 3.4. According to Hertwig (2017), boosts should be applied when there is heterogeneity in individuals' goals or when the government does not act benevolently. Behaviors that are usually nudged or boosted include, for example, environmentally friendly consumption or specific eating habits. Tax compliance is different because not complying with the tax law is illegal and so is not simply a behavior deemed "bad" by an external observer. However, even the most skeptical taxpayer would most likely not advocate for a complete abolishment of the entire tax system, and, with the exception of a few countries considered dictatorships, it is difficult to envision a government that actively acts against its citizens. Therefore, the necessity of using boosts (instead of nudges) to increase tax compliance appears unwarranted, following these arguments.

However, filing taxes is a more complicated process than behaviors usually encouraged through nudging or boosting. Boosts may assist in increasing the knowledge of the tax code in general and the specifics of handling the filing process in particular. Such boosts may in turn reduce non-compliance that results from poor understanding of the tax code and its administrative processes, and therefore boosts may contribute to the establishment of tax compliance in the long term. This approach is reflected in the fifth rule of using boosts put forward by Hertwig (2017). However, such educational measures to increase tax compliance have received very limited attention in the literature. For example, Alm and Torgler (2011) propose a "service" paradigm in tax administration (in addition to "enforcement" and "trust" paradigms) in which the tax authority educates taxpayers and provides services to help them comply with tax laws. This approach is aimed at taxpayers who are

willing to pay taxes but have trouble complying with tax laws. Increasing the quality of taxpayer services reduces compliance costs and might thereby increase tax compliance. As noted earlier, while several studies have argued that providing administrative services that make it easier for individuals to pay taxes improves compliance (Alm et al., 1993; Alm et al., 2010; McKee et al., 2018; Vossler & Gilpatric, 2018), empirical evidence on this issue remains limited. As boosts have the main goal of educating individuals and enabling them to make informed decisions, boost interventions seem to be a promising tool in implementing a service-orientated approach by tax authorities; such interventions are also of course consistent with reducing tax system sludge.

*Educational programs* to improve the financial, fiscal, and tax related knowledge of taxpayers appear to be a particularly important approach to increasing compliance. The knowledge that taxpayers have about the tax system affects compliance, yet taxpayers do often not know what they should pay in taxes (Alm & Kasper, 2022). For example, a better understanding of the tax code likely affects how individuals perceive the tax authority and increases the perceived fairness of their actions. Indeed, Feld and Frey (2007) show that taxpayers are more likely to pay their fair share of taxes if they believe that they are being treated in a fair and legitimate way. This psychological tax contract between taxpayers and tax authorities encourages tax compliance. Similarly, taxpayers are more likely to comply when they trust the tax authority (Kirchler et al., 2008).

Therefore, boost – and sludge-reducing – interventions aimed at improving taxpayers' understanding of the tax system might be a particularly promising approach. Individuals who have the knowledge, skills, and confidence to make responsible tax decisions are considered as tax literate (Godbout et al., 2017), and tax literacy has been found to be related to individuals' compliance decisions (Cvrlje, 2015; Nichita et al., 2019). Tax compliance might thus be boosted by including information about the fiscal system, the tax system, and the role taxes play in society in school curricula and educational programs. For example, prior work finds that financial education programs have positive effects on financial knowledge and downstream financial behaviors (Kaiser et al., 2022). Future research should investigate the effectiveness of similar programs on tax literacy.

*Teaching individuals core competencies* for filling in tax returns may also improve compliance. Many taxpayers find navigating the tax system difficult (Pham et al., 2020; Alm et al., 2023), which contributes to unintentional noncompliance. The vast use of paid tax preparers indicates that many taxpayers find it difficult to comply with their filing requirements on their own. Teaching individuals core competencies, such as filing a tax return and overcoming self-control problems that lead to procrastination, might thus also boost tax compliance.

In addition to these key competencies, tax authorities can make use of *decision trees* to facilitate filing. The effectiveness of fast, concise, and frugal decision trees in complex decisions has

been documented for health practitioners. Applying this approach to tax compliance, such decision trees could help taxpayers determine their taxable income and thus boost tax compliance. For example, taxpayers could receive a list of yes-no questions before filing their tax return in an online system to determine which forms they need to complete, which sources of income they need to indicate, and which exemptions and credits they may use. Tax return software that is designed to facilitate tax filing already incorporates such decision trees, and tax agencies should aim to provide similar programs.

In sum, behavioral insights have generated a variety of measures that can help tax administrations increase compliance. The implementation of these measures should be guided by political demands, administrative capacities, and country-specific experiences. In particular, we believe that joint efforts between policy makers, administrators, and researchers are best suited to identify and to implement behaviorally informed administrative strategies to increase compliance.

## **5. Conclusions**

Prior work in the behavioral sciences provides valuable insights into determinants of compliance and regulatory approaches that are not reflected in the standard economic theory. Broadly speaking, this line of research suggests that governments and tax authorities can affect taxpayers' compliance decisions in several fundamentally different ways.

First, governments and tax administrations may implement specific changes in the environment in which taxpayers file their returns to facilitate compliance. These nudge interventions typically do not require taxpayers to learn new skills or to exert substantial amounts of mental effort. As nudges follow the concept of libertarian paternalism, nudging is sometimes criticized for restricting individual autonomy. This argument is particularly relevant with regard to tax compliance because, per their definition, nudges are a valid policy instrument only when they lead to the desired outcome as judged by the decision-maker. Behavioral interventions, such as letters nudging taxpayers towards more compliance, typically aim to achieve an outcome that is desirable from a societal, but not necessarily from an individual, perspective. This obvious inconsistency has rarely been addressed in prior work. Nevertheless, we see great potential in nudges that simplify tax reporting decisions, provide better taxpayer services such as presenting tax-related information in a more intuitive way, or change default options to facilitate compliance.

Second, governments and tax authorities may invest in citizens' education to improve their fiscal literacy to increase tax compliance. This boosting approach requires a more long-term investment and a higher degree of mental effort and engagement of the decision-maker; it is also consistent with a sludge-reducing approach. Due to their more long-term effects, boosts might not be



as cost-effective than several choice-specific nudge interventions. However, boosting may help improve economic education more broadly and might therefore foster tax morale. The effects of boosts might thus extend well beyond the effects of nudges. For instance, boosts that enhance individuals' tax morale might not only increase tax compliance but might also reduce the propensity to avoid taxes (Kemme et al. 2020). To the best of our knowledge, the effect of behavioral interventions on tax avoidance (versus tax evasion) has not been investigated in prior work. Boosting fiscal literacy might have the additional benefit of facilitating voting decisions that align more closely with individuals' true preferences and thus result in tax systems that more closely reflect citizens' preferences. In sum, boosts might increase willingness to pay taxes outside the narrow decision framework that is affected by nudges. Boosts might also improve compliance by reducing sludge.

Finally, boosts to increase tax compliance (or to reduce sludge) should complement but not replace nudges. Neither nudges nor boosts nor sludge should be expected by themselves to close the compliance gap. Instead, it is important to remember that taxpayers' compliance decisions are made within an institutional framework, and policy reform should first and foremost aim to establish effective, transparent, and fair tax systems. However, prior work suggests that all three behavioral approaches offer valuable additions to the toolbox of measures that tax administrations employ to build better tax systems and promote tax compliance. To effectively implement these insights in practice, it is critical that tax administrations be open to the idea of partnering with researchers to systematically evaluate the potential of novel behavioral approaches to increase tax compliance. This way, successful administrative strategies can be scaled up and implemented permanently and effectively, based on actual field evidence.

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