Using "responsive regulation" to reduce tax base erosion

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Abstract

How can governments get individuals and firms to pay taxes, especially given increasing tax base erosion via tax evasion, tax avoidance, and money laundering? In this paper we discuss the many different perspectives to explain why people pay – and do not pay – their taxes, especially perspectives based on "responsive regulation," and we use then these perspectives to suggest policies that governments may use to improve tax collections. We first describe an approach that is based on a *single individual* pursuing a *single motivation* by choosing a *single method* (tax evasion) and operating in a *single country*. This perspective has generated important insights, but it nonetheless has significant limitations. As a result, we then argue that this perspective must be expanded to include *additional actors in the field*, all pursuing *additional motivations*. We also expand our discussion to include *additional methods* of tax base erosion like tax avoidance and money laundering, as well as *additional countries*. We argue that explaining behavior and then devising appropriate policies requires incorporating all of these additional considerations. We also discuss the likely impact of technological innovations both on the ability of governments to collect taxes and on the ability of private agents to reduce their taxes. An important contribution of our paper is that we simulate the effects of all of these expansions to the basic model using a novel agent-based model that is fully grounded in theory and calibrated for 33 European economics. We use this model to simulate the impacts over time of various reforms, especially reforms that implement international information-sharing programs, by comparing tax base erosion in the absence of these reforms to erosion in their presence. Our simulation results demonstrate the importance of using a fully specified theoretical model that goes well beyond the standard economics of crime approach when considering the effects of government policy innovations. We conclude with recommendations that can in principle reduce tax base erosion via evasion, avoidance, and money laundering in the current multi-dimensional environment as derived from the responsive regulation framework. However, these recommendations require a firm commitment from governments to their tax administrations, and these recommendations also cannot be introduced unilaterally by a single country but require international cooperation, especially via information sharing across borders.

Keywords: money laundering, "slippery slope" framework, tax avoidance, tax base erosion, tax evasion.

1. Introduction

How can governments get individuals and firms to pay taxes? Devising appropriate policies must start with, and be responsive to, an understanding of individual and firm motivations and needs, their understanding of their

obligations, and their behavior. Indeed, Ayres and Braithwaite (1992) argue in their theory of "responsive regulation" that the dynamic sequencing of strategies to ensure compliance by all citizens, including disengaged citizens, requires that enforcement and persuasion policies be applied appropriately. Such responsive regulation fuels trust in the government and in its power to ensure compliance.[1]

However, the traditional approach to tax compliance has instead typically taken a "command-and-control" perspective. This traditional approach assumes that taxpayers are rational, outcome-oriented, self-controlled, selfish, and egoistic individuals who maximize utility without concern for others. This "economics-of-crime" perspective pioneered by Allingham and Sandmo (1972) concludes that individuals do not make tax payments voluntarily but only when they are subject to legal coercion. Indeed, many government strategies to get taxpayers to pay their taxes seem based on this approach. However, the almost exclusive focus on audits and fines as determinants of tax evasion behavior is troubling, given that the success promised in theory by enforcement remains elusive for most governments around the world.

In large part this lack of success arises because the decision to pay taxes is a complex one, far more complicated than the traditional economics-of-crime approach. The traditional approach is based on a perspective that assumes a *single individual* pursuing a *single motivation* by choosing a *single method* (tax evasion), and operating in a *single country* in which tax evasion occurs. However, the world has changed enormously since the development of the economics-of-crime approach. Further, taxpayers differ with regard to their motivational postures to comply or not to comply, ranging from commitment and capitulation to resistance, disengagement, and game-playing (Braithwaite 2009). An individual does not make decisions in a social vacuum, and there are *additional actors in the field* who influence an individual's choices, like other taxpayers, tax accountants, the tax authorities, and the government, all of whom are pursuing *additional motivations*. There are also *additional methods* beyond tax evasion that have emerged by which taxpayers can reduce their taxes. These strategies include legal methods such as tax avoidance via "aggressive tax practices (ATP)," or tax avoidance transactions that comply with the letter but abuse the spirit of the law. The strategies developed and utilized in "money laundering" (or the process of disguising the unlawful source of criminally derived proceeds to make them appear legal) may also facilitate and even encourage tax evasion, especially since money launderers often use financial secrecy regimes that benefit those who want to hide assets from the tax authorities via tax evasion. Finally, compliance decisions are made in a global economy with *additional countries* each of which has its own tax system (as well as its own actors in the field), and taxpayers are able to take advantage of these different tax regimes in making their decisions.

As argued by Unger and Rixen (2020) and other papers in this special issue, taxation as a regulatory tool has traditionally been understood as determined by *national* considerations, as applied in an *hierarchical* (or top-down) fashion, as reflected in *direct* governance by these nation states, and as determined via *public* governance. Increasingly, however, these foundations of taxation are being questioned. Taxation is now often determined as a result of *international* agreements (e.g. treaties between nations, direct intervention and/or intermediation by international agencies). The implementation of tax law often reflects *cooperative* considerations across the relevant actors in the field (e.g. an individual's tax payments may be influenced by the decisions of others). There is often an *indirect* element that is present in taxation (e.g. the widespread presence of third-party information and source withholding). Finally, taxation now often involves *private* agents (e.g. the use by many taxpayers of tax practitioners).

These new developments require developing new approaches based on responsive regulation to explain tax base erosion, approaches that recognize the multi-agent, multi-motivation, multi-method, and multi-country aspects of taxpayer behavior, along with the international, cooperative, indirect, and private aspects of taxpayer behavior. They also require using these new approaches to devise new tools to limit tax base erosion.

In this paper we discuss these developments. We first describe the economics-of-crime approach in detail, an approach that is based on a *single individual* pursing a *single motivation* by choosing a *single method*, and operating in a *single country*. We then expand this simple perspective to include *additional actors in the field*, all of whom have *additional motivations*. We also expand our discussion in stages to include *additional methods* of tax base erosion, like tax avoidance and money laundering, all occurring in multiple and *additional countries*. We argue that explaining taxpayer behavior and then devising appropriate policies to control this behavior requires incorporating these many additional dimensions of tax base erosion. We also discuss the likely impact of

technological innovations on the ability both of government to combat tax base erosion and of private agents to reduce their taxes.

An important contribution of our paper is that we are able to simulate the effects of all of these expansions to the basic model using a novel agent-based model (ABM) that is fully grounded in theory and calibrated using empirical data. This allows us to simulate changes in tax base erosion for 33 European economies that evolve over time in response to policy innovations. We use this model to examine the impacts over time of various reforms, especially reforms that implement international information-sharing programs, by comparing tax base erosion in the absence of these reforms to erosion in their presence. The simulation results demonstrate the importance of using a fully specified theoretical model that goes well beyond the standard economics of crime approach when simulating the effects of government policy innovations. The results also demonstrate that policy innovations do not always have expected effects on tax base erosion.

We conclude with recommendations derived from the responsive regulation framework that can in principle reduce tax base erosion via evasion, avoidance, and money laundering in the current complex environment. However, these recommendations require a firm budgetary commitment from governments to their tax administrations, and these recommendations cannot be introduced unilaterally by a single country but require international cooperation, especially via information sharing across borders.[2]

2. Starting the analysis: The economics-of-crime approach

We start with the simplest perspective on tax base erosion, which is based on the economics-of-crime approach of Allingham and Sandmo (1972) and which assumes that a *single individual* has a *single motivation* (e.g. maximizing expected utility) and a *single method* of reducing taxes (e.g. tax evasion) paid to a *single country*. This approach views the problem as an individual decision under risk, in which a taxpayer decides either to declare taxes honestly or to choose the risky option of engaging in tax fraud. If no tax audit takes place, individuals choosing to evade have a higher income than if they report honestly. However, with some probability of audit these individuals will be caught, at which point all undeclared taxes are discovered and the undeclared taxes plus a fine must be paid. The main conclusion from this analysis is that detection via audits and punishment via fines have a significant deterrent effect on tax evasion.

Much subsequent empirical work has attempted to determine the effects of these economic variables, using surveys, field data, controlled field experiments, and laboratory experiments.[3] These many studies demonstrate that identifying the effects of economic variables on compliance remains a difficult task, even for variables like audit and fine rates where the theory is clear cut; that is, while the deterrent effects of audits and penalties have often been found, their impacts are often less than expected. For example, Guala and Mittone (2005), Kastlunger *et al.* (2009), and Mittone *et al.* (2017) show that after audits taxpayers may consider themselves safe from a subsequent audit and thus become less compliant. Audits and penalties may also be perceived by individuals as signaling a lack of trust, thereby contributing to mistrust on the part of the taxpayer. Such decision making can also lead to crowding out the intrinsic motivation to cooperate and undermining the spontaneous willingness to comply (Frey 1997a, 1997b). Beer *et al.* (2020) find a strong deterrent effect on taxpayers in case of an audit and an adjustment, but they also find that audits that ended without an adjustment led to reduced subsequent compliance. Relatedly, Kirchler and Muehlbacher (2008) find that punishments that are seen as disproportionate and inappropriate lead to negative attitudes about the authorities in general and taxes in particular. Hu and Ben-Ner (2020) report that that anticipated punishment leads to less lying but that honest people who are falsely punished become likely to lie in the future. All of these considerations suggest that audits have mixed specific deterrent and long-lasting effects and that factors beyond narrow economic considerations influence individual behavior.

More generally, the perspective of tax evasion as a decision under risk is clearly focused only on the individual taxpayer who has a single method of reducing taxes paid to a single national government, and the tax authority is seen as highly authoritarian and hierarchical, using its direct coercive powers to prevent the individual from cheating. However, this perspective is needlessly restrictive, and its one-size-fits-all strategy has been shown to be highly ineffective (Ayres & Braithwaite 1992). There has been considerable research that has broadened this perspective in many dimensions, as we discuss next.

3. Expanding the analysis (1): Additional "actors in the field"

An individual does not make a tax evasion decision in isolation. Instead, each individual decision is affected by other "actors in the field" (Alm *et al.* 2012). The actors in the tax arena include *other taxpayers*, elected government officials (or *government*), appointed *tax authorities* (e.g. the tax administration), and *tax accountants* (e.g. individuals who are paid to assist taxpayers in the preparation of their taxes). As discussed later, these actors in the field also include similar agents in other countries.

The authority to tax lies in the hands of the *government*. The executive and the legislature draft and enact the relevant legislation. However, legislation in many modern states suffers from an excessive burden of rules and exceptions and also from language that is difficult for the public to understand. This creates room for the subjective interpretation of duties, and often makes decisions over the actual taxes owed into something of a negotiation, while at the same time obscuring the sense of right and wrong even for a conscientious citizen.

Tax authorities are responsible for enforcement of the laws, acting as mandated by the government and as the agents who maintain direct contact with taxpayers. The authorities offer services, implement controls, and impose punishments. Tax authorities often view taxpayers in dichotomous ways, either as selfish and non-cooperative maximizers who must be monitored or as sovereign citizens who have a clear understanding of the advantages and responsibilities of taxation for ensuring the general welfare.

Tax accountants help taxpayers navigate the complexities of tax preparation. They make decisions according to their own incentives and their own conceptions of the law, the tax authorities, and the taxpayers. It is often assumed that the goal of taxpayers is to find tax accountants who will exhaust all available means to reduce tax liabilities, a description that fits many taxpayers. However, Sakurai and Braithwaite (2003) have established that there are also many taxpayers who simply expect tax accountants to fill out tax declarations correctly and who wish mainly to diminish their concern about enforcement by paying their taxes properly. Tax practitioners' ethical standards and quality of services provided have been extensively discussed by Frecknall-Hughes and colleagues (e.g. Doyle *et al.* 2014; Frecknall-Hughes & Kirchler 2015; Frecknall-Hughes *et al.* 2017).

Finally, an individual taxpayer is affected by all *other taxpayers* and their own conceptions about the government, authorities, tax accountants, and other taxpayers. The behavior of all taxpayers is therefore dependent on each individual's understanding of tax law, their own values, personal norms, other personality characteristics, and situational factors. All taxpayers represent a diverse group. As noted earlier, taxpayers have traditionally been seen as rational, outcome-oriented, self-controlled, selfish, and egoistic individuals who strive to maximize their own gains. More recently, it has become recognized that taxpayers are considerably more complex. As summarized by Alm *et al.* (2012, 2019), many studies demonstrate that the willingness to pay taxes increases with a greater awareness of tax laws and an improving clarity about the rules. Studies have also shown that social norms are strong regulatives of behavior, that citizens generally have a pronounced sense of justice, and that they respond accordingly to the violation of the principles of justice. Further, these studies demonstrate that the motivations for cooperation versus evasion vary among taxpayers: A large part of the population acknowledges the necessity and the advantages of taxes, but this sense of community responsibility is clearly not shared by all. Moreover, depending on the authority's perception of taxpayers and its professionalism in applying differential strategies, taxpayers may accept enforcement as a means to protect them for being exploited by free riders, or they may perceive enforcement as arbitrary coercion that elicits anger and fear (Olsen *et al.* 2018; Enachescu *et al.* 2019). As discussed next, different strategies are needed to address this "full house" of actors (Alm 2012, 2019).

4. Expanding the analysis (2): Adding motivations to pay taxes

The view that tax evasion can be viewed like any other criminal behavior as an individual decision under risk has evolved into new perspectives that incorporate additional motivations for why people pay taxes. We first discuss each of these different perspectives, and we then attempt to integrate them into a single unified framework.

4.1. Paying taxes as a "social contribution dilemma"

The image of individuals as purely rational, outcome-oriented, self-controlled, selfish, and egoistic individuals is a sobering, even a depressing, one. Taxpayers often acknowledge that their contributions are used for the

community welfare, and they understand that taxes need to be paid. However, they may sometimes doubt that tax revenues are spent efficiently for the public good, and they may also suspect that some individuals do not pay taxes.

In short, taxes raise a "social contribution dilemma" (Dawes 1980), in which individual gain runs contrary to the collective good. An individual can benefit by acting selfishly; however, if other individuals behave in a similar way, both the individual and the collective are harmed because the public good is not provided.

This "free-rider problem" has been extensively investigated in laboratory experiments, where subjects are given startup capital from which they can contribute a freely chosen portion to a collective good. Under what conditions do individuals cooperate in these public contribution scenarios? The main issue here is whether the other players can be trusted. If it is possible to make cooperation a binding social commitment, then others can be trusted, and their cooperation is assured. In small groups where the players can communicate with one another, set the rules of the game, and make defection public information, the readiness to cooperate increases. Parallels between experimental results and real-world situations can be seen from regionally limited areas with direct democracy, as demonstrated in Switzerland by Frey (1994) and Feld and Matsusaka (2003) and for Russia by Rothstein (2000).

Despite these insights, social dilemma research still largely assumes that individuals are rational and selfish, striving to maximize their own gains, even though taxpayer interactions with other taxpayers via the group are now recognized by much of this research. However, other types of interactions are not considered, and the behavior of the other actors in the field is largely kept behind the veil.

4.2. Paying taxes as a result of taxpayer heterogeneity

It has become increasingly clear that taxpayers cannot all be lumped together into a single homogeneous group. People exhibit a remarkable diversity in their motivations to comply and their behaviors. This diversity must be taken into account by regulators (Braithwaite 2005, 2008). There are individuals who always cheat and those who always comply, some who behave as if they view the compliance decision entirely as a decision made under risk, others who seem to misperceive the true probability of audit, individuals who respond in different ways to changes in their tax burden, some who are at times cooperative and at other times free-riders, and many who seem to be influenced by the social context in which decisions are made.

As noted earlier, this diversity in motivations and behaviors is due to many factors. People have varied personal values, including notions of morality. They sometimes prove generous when there are calls for donations for the socially disadvantaged or for those affected by catastrophes, they often have a decided sense of community, and they may behave honestly in some settings and not in other settings.

Also, individuals differ in their opportunity to cheat. The self-employed in particular are considered to be a high-risk group. While employees of firms usually have their taxes directly deducted from their salary by their employer and thus have little opportunity to cheat, the self-employed are required to pay many of their own taxes.

Relatedly, those who must make an explicit and conscious decision to make payments may see their taxes as a loss, and there is much evidence that individuals react to the perception of a loss by taking risks in the hope of making up that loss, as originally suggested by Kahneman and Tversky (1979). Kirchler et al. (2005) have shown that taxes are seen as a loss when out-of-pocket payments are made. The tendency to evade payment of taxes is large, especially when a payment in arrears is required. In contrast, when the prepayments are higher than the actual required tax payment, the willingness to take risks changes to an aversion to risk, and individuals become more compliant. Even so, Kirchler et al. (2005) find that the perception that all self-employed are unwilling to pay their taxes is misleading. This perception might apply to the self-employed in their younger years, but their tendency towards tax evasion lessens with increasing work experience, perhaps because of a change in values as they age or because of mental accounting.

Braithwaite (2009) concludes from these types of observations that taxpayers differ strongly in their motivations to comply with tax law. She distinguishes five motivational postures. She terms two positive motivational postures "commitment" and "capitulation," both of which combine views that express a responsibility to behave in the interest of society. Her remaining three postures express a negative motivation. "Resistant taxpayers" doubt

the good intentions of the tax authorities and the government, and they fight for their rights and against their tax burden. "Disengaged taxpayers" are characterized by a similar attitude, but they have already abandoned the struggle for their own rights and see no point in cooperating with the authorities. "Game players" are individuals who do not respect the law as such, but see the law as something that can be used strategically to reduce one's own taxes via gray areas in legislation.

For the most part, Braithwaite (2009) attributes a positive attitude to most taxpayers, who feel morally committed to contribute to society. Because she believes that positive motivational postures dominate in society, she argues that these postures should not be destroyed by harsh controls and severe sanctions. She thus argues for a differential approach to regulation on the part of the authorities, in which taxpayers should be treated according to their motivations and in which violations of the law should be sanctioned accordingly. Only when individuals repeatedly violate the law should the tax authorities resort to severe audits and penalties.

This differential approach therefore focuses on distinctions among and across taxpayers. Age, gender, personal values, morality, honesty, motivational tendencies, situational differences, and the opportunity to cheat all emerge as important factors in explaining compliance. Taxpayers are not seen as an average or a representative agent with a single dominating motivation for behavior, but rather they are distinguished – or segmented – into various types, all of which require different approaches on the part of tax authorities (Ayres & Braithwaite 1992; Braithwaite 2005, 2008; Wurth & Braithwaite 2017). In this responsive regulation approach, the authority of the tax authorities is not questioned, but even so a service orientation of the tax authorities is demanded and differential approaches to taxpayers are imperative, measures that recognize and respond to taxpayers' individual characteristics, motivations, and situational circumstances.

4.3. Paying taxes as a "psychological contract"

Individuals react to negative stimuli such as controls and sanctions, but they also have what might be termed a "social norm" of behavior that affects their decisions (Elster 1989). This perspective places social interactions at the center of attempts to explain behavior.

Although difficult to define precisely, a social norm can be distinguished by the feature that it is process-oriented, unlike the outcome-orientation of individual rationality. A social norm therefore 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. Consequently, if others behave according to some socially accepted mode 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 a range of other approaches, including those that rely upon social customs, intrinsic motivation, tax morale, appeals to patriotism or conscience, or feelings of altruism, morality, guilt, and alienation. This factor suggests that individuals will comply as long as they believe that compliance is the social norm (however defined); conversely, if noncompliance becomes pervasive, then the social norm of compliance disappears. More broadly, a social norm suggests that the nature of one's social interactions with others affects one's own compliance decision.

The notion of a social norm of compliance that becomes a personal norm is closely related to other concepts. Schmölders (1960) describes "intrinsic motivation" as the "attitude of a group or the whole population of taxpayers regarding the question of accomplishment or neglect of their tax duties." In turn, he defines "tax morale" as something that is anchored in citizens' tax mentality and in their consciousness as citizens. Relatedly, Frey (1997a, 1997b) defines tax morale as the "intrinsic motivation to pay one's taxes." Orviska and Hudson (2002) link tax morale to the concept of "civic duty": citizens with high levels of civic duty are collaborative even if the system allows noncompliance, and their behavior is not regulated externally by audits and sanctions but internally by their concern for and loyalty to society. In a related way, Feld and Frey (2007) and Oats and Onu (2015) argue that tax compliance can be enhanced by maintaining a cooperative relationship between government, the tax authorities, and taxpayers. In such a setting, taxpayers do not see themselves as subjects but as partners in cooperation, and politicians and tax authorities are entrusted with the task of managing the budget and responding to the needs of the population.

All of these notions lead Feld and Frey (2007) to borrow the Rousseau (1995) construct of a "psychological contract" between employees and management in organizations and to apply this notion to tax compliance,

arguing that there exist expectations and commitments between government, tax authorities, and taxpayers that go beyond legal regulations and that establish a norm of "reciprocity" between the parties. By focusing on this reciprocity of commitments between the various actors, Feld and Frey (2007) argue that the frequent authoritarian hierarchical structure can be reduced and negative taxpayer reactions to pressure can be avoided.

The notion of a psychological contract implies that citizens entrust their money to a tax authority to invest it sensibly and productively, on the basis of the decisions of the responsible politicians. Taxpayers expect that the tax authorities and the government will not violate the trust placed in them, and in return the authorities expect that citizens will behave honestly. This psychological contract regulates a mutually respectful approach between the partners, characterized by loyalty and emotional ties. Any disappointment of expectations represents a violation of the contract, the erosion of mutual trust, the destruction of a willingness to cooperate, and the termination of cooperation. When taxpayers trust the authorities, cooperation can be expected of them; if they mistrust the authorities, cooperation can at best be obtained by force.

With the postulation of a psychological contract between all of the actors, attention shifts from taxpayers acting alone and in a direct and hierarchical relationship with the government to the cooperative and indirect relationship between government, the tax authorities, and all taxpayers. Taxpayers are seen as cooperative partners who have a sense of community and recognize the value of cooperation. All the same, taxpayers will react with mistrust to any signals of mistrust, as represented by controls and sanctions. Instead of the hierarchical structure between authorities and taxpayers implied by "tax compliance," we now instead speak of "tax cooperation." In this tradition partners are equal in status whose cooperation is not formally regulated but determined instead by the psychological contract.

### 4.4. Combining approaches to explain and control tax evasion

How can these various and varied perspectives be combined into a single framework, one that can then be applied to devise strategies to control tax evasion? This is obviously a difficult task with no firm answer at this point. Even so, there are some promising approaches.

In what has been called the "slippery slope framework" (Kirchler 2007; Kirchler *et al.* 2008), it is possible to consider the relationship between authorities and citizens, and also to see the climate of interaction, as significant in determining whether cooperation takes place voluntarily or needs to be obtained using force. As emphasized earlier, all actors and their relationships need to be taken into account. Government and the tax authorities are no longer seen as superior and hierarchical agencies that use enforcement to ensure legal compliance in general and tax honesty in particular, but rather are seen as acting in the service of citizens for the well-being of the community. Importance is now granted to shaping interactions so as to promote mutual trust and cooperation.

The slippery slope framework can be represented graphically, as in Figure 1. A distinction is made between two kinds of tax honesty: "voluntary cooperation" and "enforced compliance." Voluntary cooperation depends primarily on trust in the government and its authorities. If cooperation does not take place voluntarily, tax honesty can be secured by force to the extent that the government authorities have power to exert pressure on the offender. State power is understood to include all measures that serve the purpose of deterrence, and includes above all the audit frequency and the severity of negative sanctions. There is also voluntary tax honesty, which rises with increasing trust in the authorities. In such a setting, the tax system is felt to be just, taxpayers believe that they are treated fairly, and cooperation is the social norm in the state.

The slippery slope framework assumes that tax payments are influenced by *trust in authorities* (or the belief that the authorities will act fairly and justly) and *power of authorities* (defined as the tax authorities' capacity to detect and punish tax crimes). If both trust and power are at their minimum levels, then tax payments will be low, and taxpayers will act selfishly by maximizing their own gains through tax evasion (as in the standard view of taxpayer behavior as a decision under risk). When trust in authorities increases, tax payments will also increase. Furthermore, if power of authorities increases, then tax payments will increase as well. Authorities can achieve high levels of compliance either via enforced tax compliance or via voluntary cooperation.

Recent research has generated increasing empirical support for the slippery slope framework. For example, Wahl *et al.* (2010) tested empirically whether tax payments are high in cases of trustworthy authorities, as well as in cases of high deterrence and fines, using hypothetical scenarios in which participants were imagined to live in
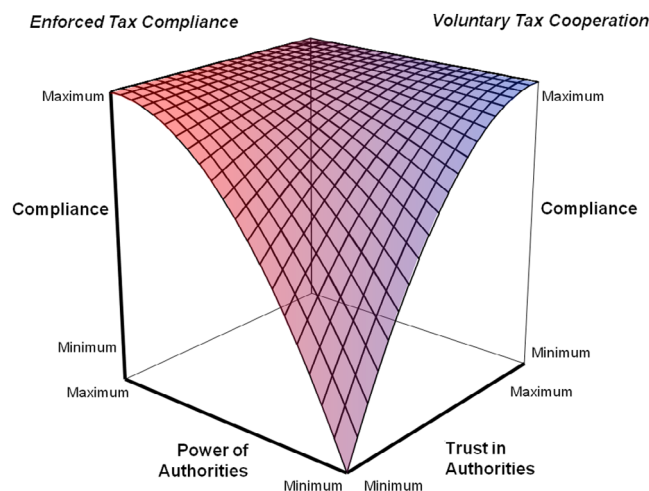
Figure 1 "Slippery slope" framework. *Source*: Kirchler (2007).

a fictitious country in which tax authorities were either powerful or not and trustworthy or not. They found that participants contributed more if authorities were described as trustworthy rather than untrustworthy and if authorities were described as powerful rather than weak. Tax payments were highest when trust and power were high and lowest when trust and power were low. Voluntary compliance was highest when authorities were trustworthy and powerful, while enforced compliance was lowest when authorities were untrustworthy and weak. Enforced compliance also increased when power increased and trust decreased. In more recent cross-country studies, Kogler *et al.* (2013), Kastlunger *et al.* (2013), and Hofmann *et al.* (2014, 2017) found generally similar results. Indeed, in a massive empirical study that tested the slippery slope framework in 44 developed and developing countries, Batrancea *et al.* (2019) found strong evidence that both trust and power increase tax compliance, that trust increases voluntary compliance and power increases enforced compliance, and that power enhances voluntary compliance only if citizens trust authorities.

Even so, these studies often find substantial variation across countries on the relative importance of trust and power. While both dimensions generally increase intended compliance levels, in some countries the relative importance of trust seems to be higher, while in other countries power seems to be more important. A re-analysis of the data in Batrancea *et al.* (2019) is depicted in Figure 2, where the *x*-axis shows the difference between the regression coefficients of trust and power and the *y*-axis shows the specific country. A positive value for the difference in coefficients indicates that trust has a stronger effect in the respective country (in relative terms), while a negative value denotes a stronger impact of power on intentions to pay taxes. The resulting pattern suggests that increasing power in wealthy countries might improve compliance to a stronger degree, while in less wealthy countries trust in the authorities could be more relevant, perhaps because in wealthier countries trust in authorities is high already while in less wealthy countries trust seems to be lower and power may be perceived as arbitrary.

Some aspects of the slippery slope framework remain unresolved. Power-enhancing and trust-building measures seem likely to affect each other, and therefore they may have complex interactions and dynamics over time. However, the nature of the interplay is far from clear. On the one hand, it has been argued in the more general context of law enforcement that the exertion of power may evoke suspicion and mistrust in the group upon which the measures are imposed, resulting in a vicious circle: mistrust of one party provokes mistrust of the other party, which justifies and deepens the mistrust of the first (Nooteboom 2002; Farrell & Knight 2003; Castelfranchi & Falcone 2010). On the other hand, it can also be argued that power affects trust positively. Bachmann (2001) proposes that de-personalized forms of power (i.e., the power of a system) such as the law can be perceived as a necessary precondition for trust. In a similar vein, Mulder *et al.* (2009) argue that the law and its enforcement define the norms to be followed. Further, if sanctioning systems are perceived as a means to enforce societal norms, trust would also increase due to authorities' power (Mulder *et al.* 2006).
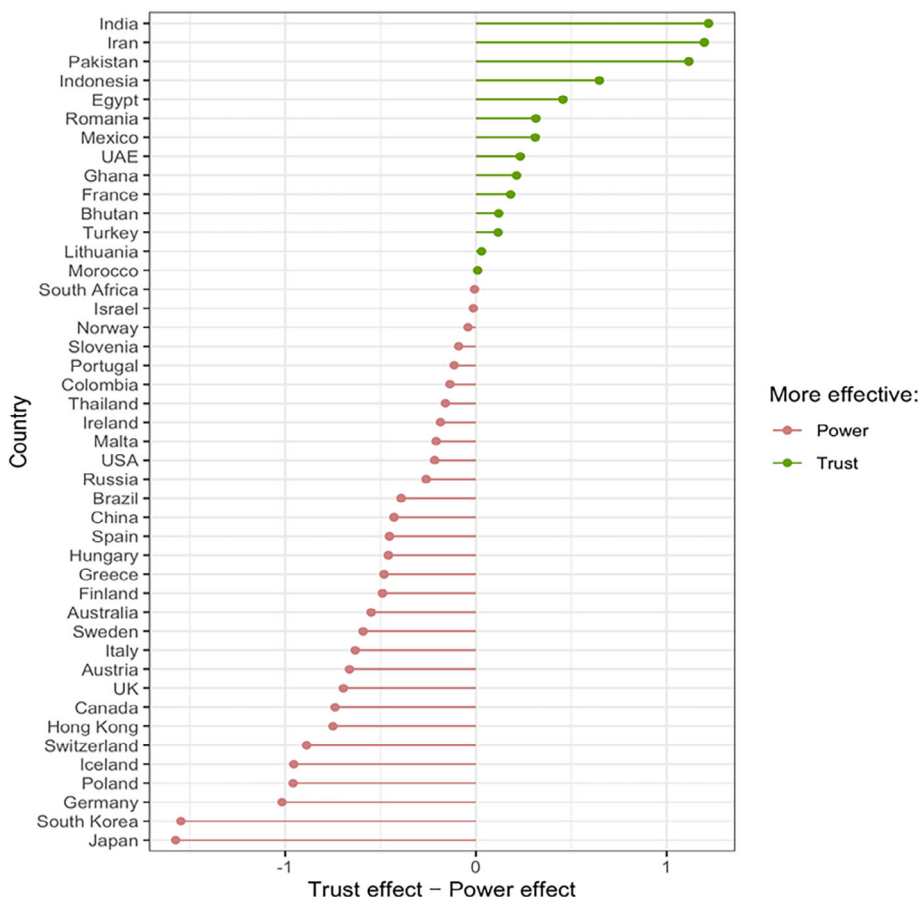
Figure 2 Difference between regression coefficients of trust and power in 44 countries. *Source*: Re-analysis of data and results of Batrancea *et al.* (2019).

Regarding the effect of trust on power, several studies have found that trust reduces the costs of control (Cummings & Bromiley 1996; Nooteboom 2002) and that citizens who trust the authorities comply with rules without enforcement (Gulati 1995; Costa *et al.* 2001; Dekker 2004; Inkpen & Currall 2004). These studies have also found that, if one party is trusted, then the other party will help this party fulfill its aims, thereby increasing its power (Tyler 2003). Trust therefore seems to promote agreement on the necessity and legitimacy of control mechanisms (Inkpen & Currall 2004), and without trust authorities are not recognized as such (Castelfranchi & Falcone 2010).

Power- and trust-building measures involve complex dynamics, and more research is needed to understand their effects. What seems important, however, is to distinguish between different qualities of power and different qualities of trust. Regarding power, the most prominent taxonomy stems from French and Raven (1959), who differentiate five bases of power, especially "legitimate power" and "coercive power." While legitimate power is connected with positive evaluations of authorities' power and positive attitudes towards authorities, coercive power describes tax authorities' ability to enforce a law regardless of its acceptance. It is likely that different qualities of power have different effects on trust. However, few of the discussions on the relation of power and trust make these distinctions. For example, Korczynski (2000) argues that trust will be undermined if power is used to coerce cooperation, while power exerted by an authority that is seen as legitimate can increase the quality of trust. Similarly, Das and Teng (1998) argue that in organizations formal control mechanisms (e.g. a strict evaluation of performance) undermine trust, whereas social control mechanisms (e.g. an emphasis on organizational values, norms, and cultures) enhance trust. Choudhury (2008) argues that power and control decrease trust when controls include out-dated rules, while the opposite is true when the exertion of power is rule-based and authorities monitor actions in a fair manner. As long as the power of authorities is perceived as legitimate, it seems likely to

9

have a positive effect on citizens' trust. In contrast, coercive power seems likely to have negative effect on trust (Leonidou *et al.* 2008).

Different qualities of trust are also distinguished in the literature (Lewis & Weigert 1985; Tyler 2003). Most conceptualizations separate a form of trust resulting from automatic and affective processes, from another form based on a rational assessment of the predictability and competence of others and their trustworthiness.

In the context of tax behavior, the interplay of legitimate and coercive power and trust and elicited emotions has been demonstrated by Kirchler (2020). It can be assumed that taxpayers who perceive the authorities as legitimate and professional do not experience negative emotions, but instead feel neutral or positive and are willing to spontaneously comply. However, coercive power can be a double-edged sword. When taxpayers perceive that the tax authorities wield legitimate power, they develop trust. For example, when the tax authorities engage in coercive measures precisely targeted to tax evaders, feelings of satisfaction and fairness should be evoked. However, if coercive power is perceived as directed randomly at anyone and everyone, people may perceive the authorities as untrustworthy and their behavior as illegitimate, and they are likely to react with either anger or fear. Feelings of anger are especially likely to be evoked when honest taxpayers are audited and thus perceive themselves as being treated like criminals. Anger has been shown to provoke retaliation behavior (Bougie, Pieters, & Zeelenberg 2003), and is likely to lead to tax evasion. Moreover, angry taxpayers may well consider the pros and cons of cooperation and evasion and choose their most profitable option. When they feel fear, taxpayers are more likely to respond with enforced compliance.

In summary, it appears that trust, legitimate power, and well-targeted coercive power lead to spontaneous cooperation, whereas randomly wielded coercive power leads to either anger or fear. In both of the latter cases, taxpayers act strategically, and they decide which alternative to choose. However, there is still a lack of empirical evidence on these effects.

Overall, the slippery slope framework is largely consistent with several other approaches. McBarnet (2004) suggests that people may choose to comply willingly (what she terms "committed compliance"), they may choose to comply unwillingly ("capitulative compliance"), they may take full advantage of the law in minimizing their taxes ("creative compliance"), or they may choose noncompliance. Torgler (2007) argues that taxpayers should be classified into four types: a "social taxpayer" (or one influenced by social norms and other social factors), an "intrinsic taxpayer" (or one motivated by a feeling of obligation), an "honest taxpayer" (or one who is always honest regardless of any incentive to cheat), and a "tax evader" (or one is motivated entirely by the expected value of the evasion gamble). As noted earlier, Braithwaite (2009) argues that individuals differ in their motivations to comply with tax law, and she identifies both positive ("deference") and negative (or "defiance") motivations. In a similar way, the Internal Revenue Service (2010) has suggested several "motivational postures" for individuals: "Pathologically Honest" (the individual is committed to report honestly regardless of any incentives to cheat); "Conflicted" (the individual is motivated by social norms or moral constraints); "Fearful" (the individual may not file or may even overpay taxes); "Surprised" (the individual faces an unexpected balance due); "Careless/Negligent/Procrastinator" (the individual delays paying taxes); "Strategic" (the individual is the classic *homo economicus*); and "Pathologically Defiant/Distrustful" (the individual is committed to repudiating his or her tax responsibilities even in the face of significant deterrence). Further, the same taxpayer may easily fall into different segments in different contexts and/or different times), and there are likely to be similar segments for firms as well.

Perhaps the approach that is closest to the slippery slope framework was suggested by Alm and Torgler (2011), who argue that the different perspectives on tax evasion suggest three "paradigms" for tax administration that emerge from these various perspectives. These paradigms start with a government compliance strategy based on detection and punishment. However, these paradigms also go well-beyond one that emphasizes only enforcement to include a range of additional policies for which there is now emerging much theoretical and empirical support.

Under a first paradigm – what Alm and Torgler (2011) term the traditional "enforcement paradigm" – the emphasis is exclusively on repression of illegal behavior through frequent audits and stiff penalties. This has been the conventional paradigm of tax administrations throughout history, and it fits well the standard perspective of tax evasion as an individual decision under risk, as well as the perspective that taxation represents a national, hierarchical, direct, and public approach to governance. Research also suggests a second paradigm, one that acknowledges the role of enforcement but also recognizes the role of tax administration as a facilitator and a

provider of services to taxpayer-citizens, in order to assist taxpayers in every step of their filing returns and paying taxes. This "service paradigm" for tax administration fits squarely with the perspective that emphasizes the role of government-provided services as a consideration in the individual tax compliance decision. Indeed, the most recent literature on tax administration reform has emphasized this new paradigm for tax administration, as a facilitator and a provider of services to taxpayer-citizens, and many recent administrative reforms around the world have embraced this new paradigm with great success. Finally, a third paradigm is also suggested by recent work, especially the emerging work that sees the taxpayer as a member of a larger group, as a social creature whose behavior depends upon his or her own moral values (and those of others) and also upon his or her perception of the quality, credibility, and reliability of the government and of the tax administration. Alm and Torgler (2011) call this a "trust paradigm." It is most obviously consistent with the slippery slope framework, as well as with the role of various behavioral economics factors like social norms in the compliance decision. It is based on the notion that individuals are more likely to respond either to enforcement or to services if they believe that the government generally and the tax administration specifically are honest, and if they believe that other individuals are similarly motivated; that is, trust in the authorities – and in other individuals – can have a positive impact on compliance. Indeed, the service and trust paradigms are clearly consistent with perspectives that shift taxation toward a cooperative, indirect, and private approach to governance.

Under the Alm and Torgler (2011) approach, designing strategies to control tax evasion fall into three main categories, each consistent with one of the three paradigms – as well as with trust versus power dynamics, individual compliance strategies, taxpayer types, and motivational postures: increase the likelihood and the threat of punishment, improve the provision of tax services, and change the tax culture. In short, there should be a "full house" of strategies to address the "full house" of motivations and behaviors.

There are of course still other approaches. The common factor in all of these approaches is that policies must respond appropriately to taxpayers' motivational postures and behaviors by using education and persuasion strategies, warning letters, sanctions, and (in the extreme) criminal prosecution, as defined by the "Enforcement Pyramid" of Ayres and Braithwaite (1992).

5. Expanding the analysis (3): Adding tax avoidance and money laundering in an international setting

There is much that is useful in each of these approaches. However, as emphasized earlier, each is still based on a perspective that assumes explicitly a single method of reducing taxes (e.g. tax evasion). Importantly, they also assume implicitly a single country (e.g. a national setting) in which the tax evasion occurs. However, the world has changed in the years since the development of these approaches. There are now many additional strategies beyond tax evasion that have emerged by which taxpayers can reduce their taxes. These strategies include legal methods such as tax avoidance via ATPs. The strategies developed and utilized by money launderers may also facilitate and even encourage tax evasion, especially since money launderers often use financial secrecy regimes that benefit those who want to hide assets from the tax authorities via tax evasion. Additional strategies have also emerged in large part because taxpayers are able to take advantage of different tax regimes in different countries; that is, taxpayers are increasingly operating in a global economy, and this reality requires an explicitly international, inter-country, or trans-governmental perspective.[4]

To analyze these new developments, we need new approaches to explain taxpayers' attempts to reduce their tax payments, whether via legal or illegal methods, approaches that recognize the multi-dimensional and multi-country aspects of taxpayer behavior. We also need to use these new approaches to devise tools to limit taxpayers' efforts to reduce their tax payments. We discuss these issues next.

5.1. Tax avoidance and ATPs
Tax evasion is the failure to pay legally due taxes. In contrast, tax avoidance is the reduction of tax obligations by legal means, by income splitting (e.g. across taxpayers), by postponement of taxes (e.g. capital gains realizations), and by tax arbitrage across income that faces different tax treatment (e.g. realized versus unrealized incomes). An especially important form of tax avoidance is sometimes called "aggressive tax practices" (ATP). An ATP is a tax

avoidance transaction that complies with the letter but abuses the spirit of the law. It typically involves a sophisticated transaction that includes many steps and uses complex mechanisms. An ATP also has a limited economic justification, and its true rationale consists mainly of reducing taxes by exploiting shortcomings, weaknesses, or ambiguities in the tax law via the movement of funds, the construction of fictitious "shell" companies, and the use of financial instruments or entities that are treated differently in different tax jurisdictions. There is little doubt that ATPs often (if not always) shade into tax evasion, even though in principle ATPs are legal. Although measurement of the magnitude of tax avoidance, especially ATPs, is plagued by many of the same issues that make measurement of tax evasion difficult, the limited evidence indicates that ATPs represent a large and growing problem for the public finances of countries around the world, with some estimates suggesting that roughly 8 percent of the global financial wealth (or nearly USD 8 trillion) is hidden in offshore tax havens, with perhaps 80 percent of this hidden wealth never taxed at all (Zucman 2015).[5]

Indeed, ATPs most commonly occur by the use of tax havens.[6] The standard ATP tax haven practices involve profit shifting to lower tax jurisdictions via a range of methods that include treaty shopping, transfer pricing, debt shifting, the strategic location of intellectual property, tax deferral, and (increasingly) corporate inversions. Unlike the many approaches to tax evasion, there is little formal modeling of the ATP choices. Even so, the main motivation for the use of ATPs is of course to reduce taxes.

Of special note, the use of ATPs is mainly possible in a world with multiple jurisdictions, all of which differ in the specifics of their tax systems and many of which do not share information with other jurisdictions. Individuals and firms are therefore able to take advantage of these many differences across countries in the design and use of ATPs. The difficulties of information sharing in a multi-country setting are especially crucial in allowing the use of ATPs.

How can tax avoidance practices be controlled by tax administrations? It is tempting to apply the slippery slope framework, and perhaps the three paradigms for tax administration, as developed for the control of tax evasion, to the control of tax avoidance. Indeed, there may well be some role for the trust and service paradigms. For example, Alm and McClellan (2012) find that the notion of "tax morale" first developed for individuals also applies to firms, and Alm et al. (2019) find that many of the drivers of individual tax evasion are similar to those for firms as well.

However, given that the agents likely to be most responsible for ATPs are wealthy individuals and large firms, it seems likely that the main policy tool for government must emerge by the use of government power via its enforcement paradigm, as emphasized by Rixen (2013), Emmenegger (2017), and Hakelberg and Schaub (2018).

5.2. Money laundering

Money laundering is another strategy for reducing taxes that is facilitated in a multi-country environment.[7] Money laundering is the process of disguising the unlawful source of criminally derived proceeds to make them appear legal; more colloquially, it is the process by which "dirty" money becomes "clean" money.[8]

The sources of funds used in money laundering schemes may come from a wide range of activities, including (say) illegal arms sales, smuggling, the activities of organized crime, embezzlement, insider trading, bribery, extortion and blackmail, computer fraud schemes, corruption (both "petty" and "grand" corruption), and virtually any similar type of activity.

There are typically three steps that are involved in any money laundering operation. In the first step, sometimes termed *placement*, illegal (or "dirty") funds are secretly introduced into the legal financial system by such means as breaking large cash amounts into smaller amounts, by using cash-intensive businesses, by over- and under-valuing invoices, by using shell companies to move funds, by channeling funds through casinos, and the like. In the second step (*layering*), these funds are then moved from institution to institution, sometimes by bulk cash smuggling but more often by wire transfers. The third step (*integration*) involves moving the now "clean" money back into the financial system via additional transactions of similar types. Note again that, although money laundering has certainly been utilized in a single jurisdiction, it is also facilitated by a world with multiple jurisdictions in which the transfer of information across jurisdictions is limited.

As for the control of money laundering practices by governments, it is again tempting to apply the same tools as for tax evasion and tax avoidance. However, money laundering is clearly and mainly a criminal activity, and it

seems unlikely that, say, the appeal to social norms or the provision of services will have any impact of reducing its use. As with ATPs, the main policy tool for government must again utilize government power via its power (or its enforcement paradigm), as suggested by many of the papers in Unger and van der Linde (2015), even while also requiring international cooperation between national governments, intermediaries, and private agents.

5.3. Recent public policies toward tax avoidance and money laundering

Indeed, the broad thrust of recently enacted multi-national policies seems entirely consistent with the use of power by government in the slippery slope framework and the application of the enforcement paradigm. These policies are largely intended to improve the flow of information to cross-country tax authorities via international information sharing programs such as Country-by-Country Reporting (CbCR) and Automatic Exchange of Information (AEoI). For example, Council Directive 2016/881/EU requires multinational companies in the European Union with total consolidated revenue of 750 million Euro or more to file a country-by-country report that includes information for every tax jurisdiction in which the multinational does business on the amount of revenue, the profit before income tax, the income tax paid and accrued, the number of employees, the stated capital, the retained earnings, and the tangible assets. This information must be automatically exchanged (or communicated) to any other member state in which the multinational is subject to taxation. The intention is that this information exchange should allow governments to better control profit shifting by these companies. The AEoI is a similar initiative directed at individual tax evasion behavior via Directive 2014/107/EU, which is aimed at providing information on the financial positions of foreign residents to their resident country.

These policies have now been incorporated in various international agreements. For example, the Financial Action Task Force on Money Laundering (FAFT) has made 40 recommendations that relate mainly to improving national cooperation and coordination, defining money laundering offenses and penalties, defining terrorist financing offenses and sanctions, increasing transparency, improving regulations, and establishing a framework for improving prevention of money laundering, including policies designed to address financial institution secrecy laws, customer record keeping, money and wire transfers, and reporting of suspicious transactions (https://www.fatf-gafi.org/). Similarly, OECD's *Ten Global Principles* for fighting tax crime include such policies as ensuring that tax offences are criminalized, providing adequate investigative powers to government, allowing government to freeze, seize, and confiscate assets, making tax crimes a predicate offence for money laundering, and establishing an effective framework for domestic and international cooperation (https://www.unglobalcompact.org/what-is-gc/mission/principles). The G20/OECD Base Erosion and Profit Shifting (BEPS) Project also calls for such actions as strengthening controlled foreign company rules, preventing treaty abuse, preventing the artificial avoidance of permanent establishment status, assuring that transfer pricing outcomes are in line with value creation, establishing methods to collect and analyze data on BEPS and the actions to address it, requiring that taxpayers disclose their aggressive tax planning arrangements, and improving multilateral policy coordination (http://www.oecd.org/tax/beps/). To date, both the application of these agreements and their impact have been uneven.[9]

In their entirety, these initiatives are designed to improve international policy coordination, to increase transparency and reporting, and to establish clear sanctions. These recommendations are consistent with the slippery slope framework and its application of power to enforced compliance. They are also consistent with the other approaches to tax evasion, especially with the enforcement paradigm of tax administration. Indeed, as argued by Gerbrands and Unger (2020), an irony of these recent developments is that, despite the many insights generated by the changing perspectives of taxation as requiring an international, cooperative, indirect, and private approach to governance, any improvements in tax collections in this emerging world likely require a return to an emphasis by government on enforcement tools, given especially the effects of the international setting on the coercive versus the persuasive powers of the state. Even so, these initiatives require international cooperation across multiple indirect intermediaries and private agents to achieve any success.[10]

6. Expanding the analysis (4): Incorporating the effects of changing technology[11]

The basic issue in the ability of tax administration to enforce the tax laws is *getting information*. For much of the 20th century, tax administrations did not have full and useful information. For example, many transactions were in cash so that there was no "paper trail." Many types of transactions were not reported via third-party information. Many types of income were not subject to source withholding. Many types of tax shelters were shrouded in secrecy. Many assets were hidden in offshore accounts by the use of tax havens. Many multinationals were able to shift profits to low-tax jurisdictions via transfer prices that were largely hidden from the tax authorities. As a result, tax evasion, tax avoidance, and money laundering existed, persisted, and flourished in many places.

Changing technology dramatically and fundamentally affects this landscape. Most of these technological changes start with "digitization," or the transformation of information storage into digital formats (e.g. a series of binary numbers) for use by computers. Computers have opened the doors to information retrieval and storage, information transmission, and information analysis. Indeed, with the integration of digitization into most all aspects of everyday life, often termed "digitalization," there have been numerous additional technological innovations, creating what Gordon (2016) has referred to as the "Third Industrial Revolution."

Specifically, briefly, and not exhaustively, these technological innovations include the increasing use of or growth in: electronic "cash," electronic commerce, blockchain technology, supply chains, peer-to-peer (P2P) networks, monopolization, apps, and the disclosure of personal information, biometrics, "big data," and "deep learning." As discussed in detail by Alm *et al.* (2020) and Alm (2020), each of these developments emerges in large part from digitization and each justifies an in-depth analysis. We mention them mainly to make the point that digitization offers the potential for government to generate better information (e.g. more information, more timely information, and more precise information), better analysis of this information, and better designed systems and policies based on this information and its analysis, especially when combined with CbCR and AEoI. Digitization also offers the potential for abuse of this information by private agents. How will these changes in technology affect the ability of government to collect taxes, and of private agents to avoid or evade their taxes?

From the standpoint of government tax administration, it seems clear to us that these technological changes will vastly improve the ability of government to collect taxes, mainly by increasing the ability of government to track and then to analyze any and all transactions that leave some kind of "electronic trail." For example, there has clearly been a decreasing use of cash and an increasing use of digital currencies. Further, these innovations will increase the ability of government to retrieve information (e.g. the so-called "Panama Papers"); to transmit this information across jurisdictional borders via linked cross-agency governmental databases, linked international data bases, and transparency agreements like the many initiatives discussed earlier; and to analyze this information (often with artificial intelligence algorithms). Finally, these innovations will allow government to expand greatly the use of tax administration improvements like electronic filing, third-party information returns, and presumptive taxes; to track transactions via P2P networks and even perhaps blockchains and supply chains; and to monitor workers in large enterprises subject to third-party information and source withholding systems. All of these innovations will allow government to reduce the ability of individuals and firms to evade or avoid their tax obligations.

Increasingly, then, certain forms of tax evasion, tax avoidance, and money laundering will become much more difficult for individuals and firms, as government becomes more effective in its use of coercive power and enforcement. In particular, compliance will almost certainly increase for individuals with income mainly from wages, interest, dividends, and even capital gains, because all of these forms of income will be subject to increased monitoring and enhanced scrutiny. Put differently, individuals who engage in transactions that leave an electronic trail and who are subject to source withholding and/or third-party information reporting will find it virtually impossible to evade or avoid their taxes or to engage in money laundering. These agents represent the vast bulk of taxpayers, both in developed and in developing countries.

Of course, technological innovations are not confined to the government, but are also available to all other actors in the field. The same technologies for information retrieval, transmission, and analysis that are available to government are also accessible to private individuals and firms. This means that the ability of private agents to hide their incomes and assets from tax administrations will be enhanced by strategies such as profit-shifting via transfer pricing, locating intangible assets in low-tax jurisdictions, intra-group debt-shifting, treaty shopping,

corporate inversions, and tax deferral, all of which are made easier by technological innovations. Technology will also make it easier for individuals and firms to utilize global supply chains both for locating income in tax havens and for engaging in money laundering. Blockchains also are seen as making money laundering easier, although it is increasingly believed that the supposed anonymity of blockchains may be somewhat overstated. Finally, the growing use of P2P transactions, many of which involve "independent contractors" and the "informal sector," may in fact make it easier to hide these transactions from the tax authorities. Again, all of these activities are abetted by the same technologies for information retrieval, transmission, and analysis that are available to government agencies. As a result, it seems likely that certain forms of tax evasion, tax avoidance, and money laundering by certain types of agents will actually become easier and more prevalent. Almost certainly, these activities will become easier for multinationals, high-income individuals, and independent contractors.

7. Analyzing the effects of these "expansions" with an ABM

Analyzing the effects of any of these "expansions" to the basic model quickly runs into the issue of tractability. Each adds significantly to the complexity of the analysis, and all make it impossible to derive unambiguous analytical results. In the face of this difficulty, an attractive approach is to use simulation analysis. In this section, we report the results of a novel ABM that is able to incorporate all of these expansions to the basic model, which is calibrated to empirical observations on tax evasion and avoidance and then solved numerically. The solutions are used to simulate the dynamic changes in tax base erosion for 33 European countries that occur in response to policy innovations from CbCR and AEoI.[12]

An ABM is a computational model that can be used to simulate the actions and interactions of agents (either individuals or groups) in order to assess the effects of policy innovations on agents' behaviors and also on the system as a whole. These models are based on optimizing heterogeneous agents all interacting in a fully specified stochastic microeconomic model that also allows macroeconomic (or system-wide) changes to emerge from these interactions. In our specific case of tax base erosion, the ABM allows us to introduce all of the various expansions discussed earlier: many optimizing agents of many types, operating in many countries and pursuing many motivations in making their many decisions. Given its inherent complexity, an ABM must be solved numerically.

7.1. Theoretical foundations of the ABM

The theoretical model used in the ABM starts with the mathematical formalization of the slippery slope framework in Prinz *et al.* (2014), in which an agent's compliance decision is based both on voluntary cooperation via the agent's trust in the authorities (e.g. the role of social norms and tax morale) and also on enforced compliance via the agent's perception of the power of the authorities (e.g. audits and penalties). To this basic formalization, we add multiple additional factors, as discussed at length earlier: many agents (both individuals and businesses), many types of agent motivations, many types of agent responses (e.g. tax evasion, tax avoidance), and many countries. Adding the international perspective restructures the original factors of the slippery slope framework into a *domestic* dimension (the combination of trust and power as domestically perceived) and a *relative* dimension (the perception of the "home" country relative to a "foreign" country). We also assume that the network in which an agent acts is a local network that differs for each agent depending on his or her "neighbors," instead of a complete network representing the whole society.[13] See Gerbrands (2020) for a complete discussion.

7.2. Calibration

The ABM compares a "home" (or source) country to a "foreign" (or target) country. Each country is characterized by specific country characteristics, including measures of: the rule of law, trust in government, tax morale, financial secrecy, AEoI implementation, CbCR implementation, corporate tax haven level, withholding tax rate, individual and corporate tax rates and brackets, the number of employees in the tax authority, the number of employees in the audit division of the tax authority, country population, country Gini coefficient, income per capita, audit rate, penalty rate, among other variables. Standard sources are used to generate these measures, as detailed in Gerbrands (2020). These measures are defined for 33 European countries, including each of the 27 EU member-states and some additional European countries (UK, Iceland, Liechtenstein, Norway, Switzerland).

7.3. Operation

The ABM then works using the following simulation steps:

1. In any period, all agents (individuals and corporations) in a country observe their environment, including the perceived domestic and relative power of the state, the features of the tax system, the financial secrecy and tax haven levels, their local neighborhood, and their tax morale.

2. Based on this information, agents determine their intent to comply, evade, or avoid taxes within the country. Based on their intention to comply, all agents calculate their benefits and costs of complying, evading, or avoiding taxes.

3. To simulate the dynamic environment of a society, agents move in social space, changing their local environment by losing and creating connections with other agents, with similar agents tending to attract each other.

4. Based on the audit rate, the tax authority (also represented by an agent type) then selects zero or more agents in their respective neighborhoods for an audit. Note that any audit detects evasion if it took place, after which penalties are imposed. Note also that tax avoidance is not illegal and therefore is not prosecuted.

5. Agents learn from their auditing experience and reveal their experiences with their neighborhood, leading to changing perceptions of state powers, tax morale, and the like.

When the first simulation period ends, a new period begins in which the same steps are followed and repeated.

The model is calibrated using data from FISCALIS (2018), a Danish investigation that provided information on Danish tax evasion in 2012, in combination with an arbitrary selection of a known tax haven (Ireland). The calibration is then validated for two other countries, using an estimated tax gap for the United Kingdom with Luxembourg as the selected tax haven. The ABM is implemented in the NetLogo software (Wilensky 1999). Each possible scenario is executed six times, resulting in over sixty thousand simulations of which the average results are used for further analysis. The simulation uses the first 10 periods (or years) as an initialization period, starting in 1994 and then ending in 2034. We focus our discussion on the results for the last 30 years of each simulation. For a complete discussion of all results, see Gerbrands (2020).

7.4. Results

We simulate several scenarios. The "Baseline" scenario is one in which both the AEoI and the CbCR policies are in place for the source and the target country as implemented in reality. We compare this Baseline scenario to a "Nothing" (or no policy) scenario, a counterfactual scenario that shows what would have happened if neither of these policies had been implemented for both the source and target. Figure 3 shows the two scenarios, which
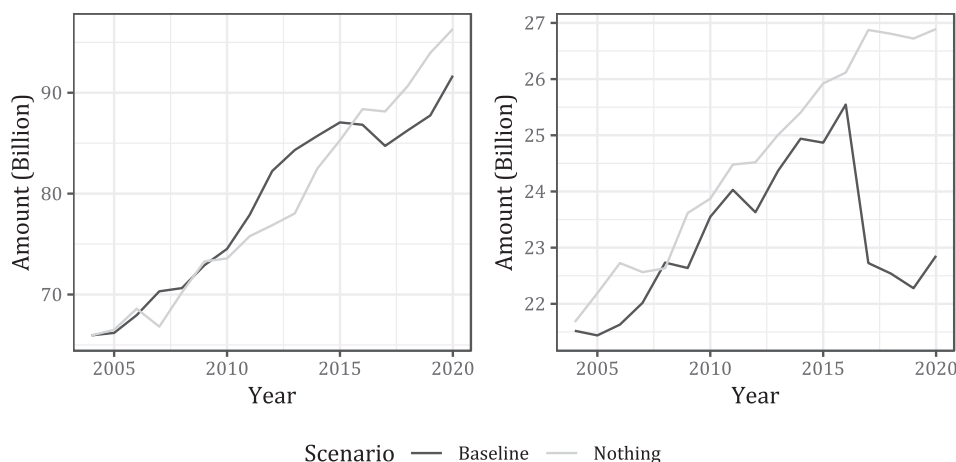
Figure 3   Source and target country avoidance and evasion for baseline versus nothing scenarios.

indicate the effectiveness of the AEoI and CbCR policies. Tax avoidance seems to be little affected by the policies. In contrast, tax evasion is significantly reduced by the policies.

The results in Figure 3 suggest that the implementation of CbCR seems ineffective in reducing tax avoidance (left panel), while implementing AEoI to fight tax evasion seems quite effective (right panel). To examine this in more detail, we simulate what would happen if we fully implemented one policy across all countries while leaving the other policy unchanged across all countries. The "CbCR Full" scenario examines the effects of fully implementing for all countries only CbCR while not implementing AEoI; the "AEoI Full" scenario examines the effects of fully implementing AEoI for all countries while not implementing CbCR. We also examine a "Cancel Both" scenario in which both policies are dropped, and a "Both Full" scenario in which both policies are fully implemented. These results are shown in Figure 4, with the results for avoidance and evasion aggregated for all European countries.

Figure 4 shows that CbCR has a strong effect on both tax avoidance (left panel) and tax evasion (right panel) but only temporarily, which seems to be caused by a large drop in tax morale (see Fig. 5). The implementation of AEoI seems to affect tax evasion, but the effect of AEoI on tax avoidance remains unclear, likely because the policy is aimed at revealing those assets hidden abroad that are typically associated with tax evasion. Cancelling all policy actions as of 2019 increases the evasion and avoidance, indicating that eliminating these policy reforms would worsen tax base erosion.
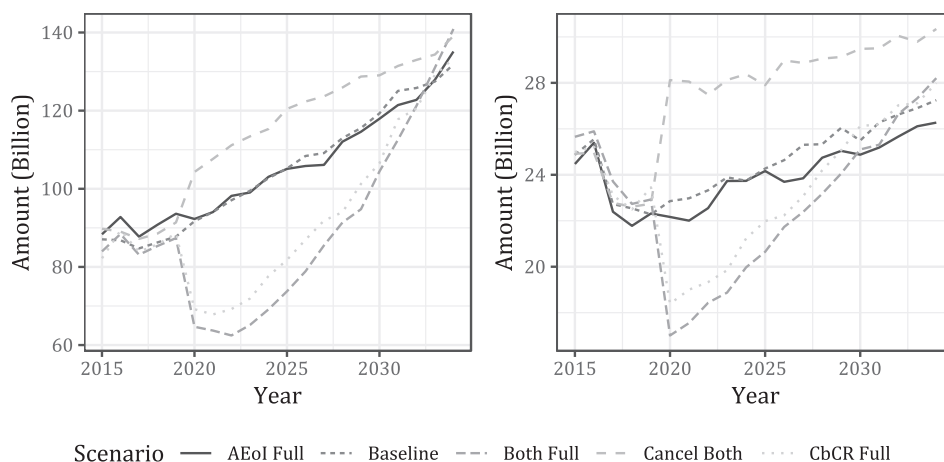

Figure 4   Total European avoidance and evasion under various scenarios.
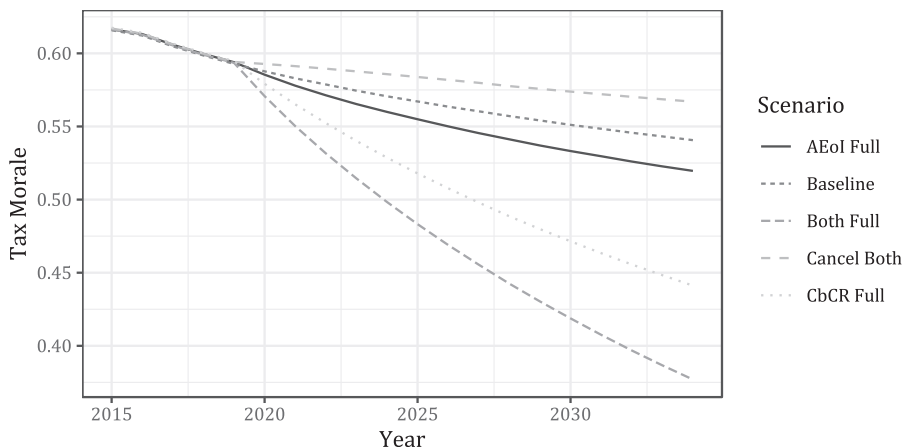

Figure 5   Effects on tax morale under various scenarios.

Our ABM also allows us to calculate the total revenue gains and losses for all European countries from these policies. We estimate that the current level of tax base erosion is €104.9 billion, which rises in our simulations by 29.5 percent to €135.8 billion 10 years later. Dropping both CbCR and AEoI policies leads to a revenue loss of 39.9 percent, or an annual loss of €43.2 billion. Any other scenario (e.g. AEoI Full, CbCR Full, or Both Full) results in lower total losses in 2029 compared to the baseline scenario.

Overall, the AEoI policy seems the most promising in reducing long-term tax evasion, but the policy seems unable to curb evasion and avoidance fully, likely because this policy leads to a decline in tax morale.[14] We suspect that European countries will have to accept some increase in tax base erosion in order to achieve a fairer distribution of tax revenues.

8. Conclusions

Returning to the question at the start of our paper, how can government get individuals and firms to pay taxes? We believe that theory and evidence suggest many policies that can improve the ability of government to collect taxes, many of which involve the selective application of the power of government to enforce the tax laws and most of which are based intimately on the theory of responsive regulation of Ayres and Braithwaite (1992). We also believe that recent and broad technology trends point to the ability of government to improve its collection of taxes from the vast majority of taxpayers, at least if governments in individual nations are able to cooperate with governments in other nations and also with indirect intermediaries and private agents. However, these same technologies are available to individuals and firms in the private sector, and they point there toward greater challenges for all governments in the collection of taxes, at least for some types of activities and some types of agents. The results from our ABM model clearly indicate the potential revenue gains from these types of international information-sharing agreements, along with the limitations of these policies.

Even so, we conclude on an optimistic, if qualified, point. Despite the sometimes conflicting and offsetting trends, the overall and dominant trend will, we believe, be toward the ability of government to access better information, to conduct better analysis of this information, and to design better systems and policies, all of which will increase its ability to collect taxes. However, we add two important qualifications. First, government agencies must be given the resources to access, analyze, and utilize this information. Second, government agencies across countries must establish the necessary policy coordination and information exchanges to utilize these new technologies, with other governments, with indirect intermediaries, and with private agents. Both of these conditions may in fact be realized. Even so, if recent history is any guide, neither of these conditions is ensured.

Endnotes

[1] For applications and evaluations of a variety of responsive regulation strategies, see the March 2013 special issue of *Regulation & Governance*, "Twenty Years of Responsive Regulation: An Appreciation and Appraisal," including the assessment by Parker (2013). See also Braithwaite (2005, 2008).

[2] The measurement of these various activities is enormously challenging, for obvious reasons. Due to space restrictions, we do not discuss measurement issues in this paper. See Slemrod and Weber (2012) for a discussion of the many approaches to, and difficulties in, measurement.

[3] See Alm *et al*. (2019) and Slemrod (2019) for recent comprehensive surveys of this empirical work.

[4] For insightful discussions of the international context and its impacts on taxation, see Genschel (2002), Rixen (2008), Genschel and Rixen (2015), and Murphy (2020).

[5] See Alm (2014) for a recent analysis of ATPs and Vlcek (2019) for a general discussion of tax avoidance schemes in an international setting.

[6] See Rixen (2013), Emmenegger (2017), and Hakelberg and Schaub (2018) for recent analyses of the role of international taxation in the exploitation of tax havens.

[7] However, note that money laundering may sometimes result in more tax compliance, if criminals are inclined to pay taxes in order to legitimize their illicit proceeds (Unger & Busuioc 2007).

[8] See Sharman (2011) and Rawlings (2017) for analyses of the ways in which money laundering operates and the tools by which it may be controlled. See also Unger and van der Linde (2015) for a collection of studies on money laundering.

[9]   See also OECD (2013). For recent empirical analyses, see Johannesen (2014), Beer *et al.* (2019), and Jansky *et al.* (2020).

[10] For further analyses and discussions, see Christensen and Seabrooke (2020), Ferwerda *et al.* (2020), Hakelberg and Rixen (2020), and Killian *et al.* (2020).

[11] See Picciotto (2020) for a recent analysis of the many impacts of technology on international taxation and compliance.

[12] This analysis is based on the ABM developed in detail by Gerbrands (2020). For a recent example of another application of this model, see Gerbrands and Unger (2020).

[13] For example, an agent's intent to comply with respect to tax evasion (c_e) is defined as:

$$c_e = \max\left[1 - p_d^{-\alpha} \cdot p_r^{-\beta} \cdot s^\eta, 0\right]$$

The power of the authorities affects the agent's intent to comply with the weights of α and β, both of which are a function of the tax morale and by the compliance behavior of the agent's neighbors (s^η). These psychological, emotional, and/or moral components of behavior are based on a rational decision-making process, in which each agent determines the payoff for evasion that depends on the risks of being detected and punished versus the benefits of reduced taxes. For avoidance, replace c_e with c_a, and replace α and β with δ and ε respectively, where the costs of avoidance are the costs involved in setting up avoidance schemes and the shame of being publicly exposed, and the benefits are reduced taxes.

[14] Although CbCR has short term effects that are very large in our model, its long-term effects are adverse due to its negative impact on tax morale. If this impact on tax morale can be corrected, CbCR may be a better policy than AEoI both in the short and the long term.

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