Tulane Economics Working Paper Series

What Motivates Tax Compliance

James Alm
Tulane University
jalm@tulane.edu

Working Paper 1903
April 2019

Abstract

In this paper, I review and assess what we have learned about what motivates individuals to pay - or to not pay - their legally due tax liabilities. I focus on three specific questions. First, what does theory say about what motivates tax compliance? Second, what does the evidence show? Third, how can government use these insights to improve compliance? I conclude with some suggestions - and some predictions - for future research.

Keywords: Tax evasion; behavioural economics; controlled field experiments; laboratory experiments.
JEL codes: H2; H26; D03; C9.

WHAT MOTIVATES TAX COMPLIANCE?

James Alm *

ABSTRACT. In this paper, I review and assess what we have learned about what motivates individuals to pay – or to not pay – their legally due tax liabilities. I focus on three specific questions. First, what does theory say about what motivates tax compliance? Second, what does the evidence show? Third, how can government use these insights to improve compliance? I conclude with some suggestions – and some predictions – for future research.

KEYWORDS. Tax evasion; behavioural economics; controlled field experiments; laboratory experiments.

JEL CLASSIFICATIONS. H2; H26; D03; C9.

---

* Department of Economics, Tulane University, 6823 St. Charles Avenue, 208 Tilton Hall, New Orleans, LA 70118-5698 (telephone +1 504 862 8344; fax +1 504 865 5869; email jalm@tulane.edu). I am grateful for many helpful comments from the editor Iris Claus, three anonymous referees, and numerous seminar participants including especially Matt Benge, David Bruner, Norman Gemmell, Philipp Genschel, Benedikt Herrmann, Matthias Kasper, Michael Keen, Erich Kirchler, Michael McKee, Jerome Olsen, Stefano Pisano, and Sven Steinmo.

1. INTRODUCTION

Although it is often said that the only things certain in life are death and taxes, taxes at least are far from inevitable, and individuals take a variety of actions to reduce their tax liabilities. Some are legal "tax avoidance" activities, such as income splitting, postponement of taxes, and tax arbitrage across income that faces different tax treatment. "Tax evasion" consists of illegal and intentional actions taken by individuals to reduce their legally due tax obligations. Individuals can evade income taxes by underreporting incomes; by overstating deductions, exemptions, or credits; by failing to file appropriate tax returns; or even by engaging in barter. In this paper, I review and assess that we have learned about what motivates individuals to pay – or to not pay – their legally due tax liabilities in the years since Allingham and Sandmo (1972) and Srinivasan (1973) first applied the economics-of-crime model of Becker (1968) to the analysis of tax evasion.

Most often tax evasion actions are viewed through the lens of the individual income tax. However, these types of action can clearly be taken in other taxes. For example, in the corporate income tax firms can underreport income, overstate deductions, or fail to file tax returns, just as individuals do in the individual income tax.[1] Similarly, sales taxes present numerous opportunities for evasion.[2] Individuals can attempt to evade a jurisdiction's sales taxes on specific commodities by purchasing them in other neighbouring areas and then consuming them in the relevant jurisdiction without paying the required use tax, and individuals can simply evade taxes on intangible services. A broad-based retail sales tax is certain to include significant exemptions

[1] To be sure, there are some theoretical studies of firm tax evasion (e.g., Marelli and Martina, 1988; Crocker and Slemrod, 2005; Chen and Chu, 2005; Goerke and Runkel, 2006). There is also a limited empirical literature on firm evasion. See Rice (1992), Kamdar (1997), Joulfaian (2000), and Nur-tegin (2008).

[2] See Murray (1994) and Alm, Blackwell, and McKee (2004) for empirical analyses of sales tax evasion. There is also relevant work on evasion of internet-related sales taxes (e.g., Alm and Melnik, 2010, 2012).

(e.g., food, health, education, services), thereby creating individual and firm incentives for evasion. For a value-added tax, firms can present fraudulent invoices that allow them to understate their tax liabilities, or they can simply fail to register (especially if their value-added is high, as with service providers); individuals may even seek to register as firms to disguise their own personal consumption as purchased inputs.[3] Property taxes can be evaded by undervaluation of true property values.[4] Non-remittance of legally due taxes in a timely way is an obvious method of evasion for most any tax.[5] The increasing globalization of economic activities presents an almost infinite array of evasion opportunities both to individuals and to firms (e.g., border shopping, transfer pricing, smuggling). There is widespread, if somewhat imprecise, evidence that these many avenues for tax evasion are frequently used in most all countries, especially in developing countries.[6]

Tax evasion is important for many reasons, and indeed its existence is central to some of the most fundamental issues in public economics. The most obvious is that it reduces tax collections, thereby affecting taxes that compliant taxpayers face and public services that citizens receive. Beyond these revenue losses, evasion creates misallocations in resource use when individuals alter their behaviour to cheat on their taxes, such as in their choices of hours to work, occupations to enter, and investments to undertake. Its presence requires that government expend

[3] See Keen and Smith (2006), Keen (2007), Keen and Lockwood (2010), and Semerad and Bartunkova (2016) for some recent examples.
[4] There is some recent work on property tax delinquency (e.g., Alm, Hodge, Sands, and Skidmore, 2015; Alm Hawley, Lee, and Miller, 2016). The literature on property tax fraud is more anecdotal. For example, see http://www.nytimes.com/2012/08/02/nyregion/property-tax-evasion-in-city-is-widespread-report-suggests.html. There are similar press reports in most countries around the world.
[5] This form of tax evasion is defined and quantified by the U.S. Internal Revenue Service (IRS) as the "underpayment tax gap". See https://www.ire.gov/uac/the-tax-gap .
[6] See Schneider and Enste (2002) for a detailed discussion of methods and estimates of the size of the so-called "shadow economy". For more recent estimates of the size of the shadow economy, see Schneider (2016a). For a critical assessment of these methods, see Feige (2016), as well as the response by Schneider (2016b).

resources to detect noncompliance, to measure its magnitude, and to penalize its practitioners. Noncompliance alters the distribution of income in arbitrary, unpredictable, and unfair ways. Evasion may contribute to feelings of unjust treatment and disrespect for the law. It affects the accuracy of macroeconomic statistics. More broadly, it is not possible to understand the true impacts of taxation without considering tax evasion.

So what motivates individuals (and firms) to evade their taxes? Asked somewhat differently, what motivates them to pay their legally due tax liabilities, thereby complying with the laws and regulations that govern the payment of taxes? I examine this broad question by looking at three specific questions:

1) What does theory say about what motivates tax compliance?
2) What does the evidence – from naturally occurring field data, field experiments, and laboratory experiments – show?
3) How can government use these insights to improve compliance?

In the following sections, I examine each question. I conclude with some suggestions – and some predictions – for future research. There are of course several excellent surveys of the tax compliance literature, of various vintages.[7] What I hope to add to these surveys is an up-to-date and current discussion of this ever-expanding work, as well as my own perspective on what we have learned (e.g., "known knowns"), what we have not learned (e.g., "known unknowns"), and what we need to do to narrow this gap. I attempt to be as comprehensive as I can in discussing the theoretical and empirical literatures, but I acknowledge at the start that I am certain to omit some

[7] See: Cowell (1990), Pyle (1991), Andreoni, Erard, and Feinstein (1998), Alm (1999), Richardson and Sawyer (2001), Slemrod and Yitzhaki (2002), Kirchler (2007), Slemrod (2007), Torgler (2007), Alm (2012), Sandmo (2012), Slemrod and Weber (2012), and Hashimzade, Myles, and Tran-Nam (2013). Also, see Torgler (2002) and Mascagni (2018) for reviews that focus upon the use of experiments on tax compliance, including laboratory and field experiments.

relevant papers, in part because this area of research is expanding so rapidly that aiming at it is somewhat like shooting at a moving target. I apologize in advance for any oversights.

2. INSIGHTS FROM THEORETICAL RESEARCH

2.1. The Economics-of-crime Model of Tax Compliance

The basic theoretical model used in nearly all research on tax compliance starts with the work of Becker (1968) and his economics-of-crime model, as first applied to tax compliance by Allingham and Sandmo (1972) and Srinivasan (1973). Here a rational individual is viewed as maximizing the expected utility of the tax evasion gamble (or lottery), weighing the benefits of successful cheating against the risky prospect of detection and punishment. The standard conclusion from this approach is that an individual pays taxes because he or she is afraid of getting caught and penalized if he or she does not report all income. This approach therefore gives the plausible and productive result that compliance depends upon audit and fine rates. Indeed, the central point of this approach is that an individual pays taxes because – and only because – of this fear of detection and punishment.

To illustrate this expected utility approach more precisely, consider a simple version of the standard model. An individual is assumed to receive a fixed amount of income I, and must choose how much of this income to report to the tax authorities and how much to underreport. The individual pays taxes at rate t on every dollar R of income that is reported, while no taxes are paid on underreported income. However, the individual may be audited with a fixed probability p; if audited, then all underreported income is discovered, and the individual must pay a penalty at rate

f on each dollar that he was supposed to pay in taxes but did not pay. The individual's income I_C if caught underreporting equals

$$I_C=I-tR-f[t(I-R)], \quad (1)$$

or income less taxes paid on reported income less penalties on unreported taxes. If underreporting is not caught, income I_N is

$$I_N=I-tR, \quad (2)$$

or income less taxes paid on reported income. The individual is assumed to choose declared income to maximize expected utility, defined as

$$EU(I)=pU(I_C)+(1-p)U(I_N), \quad (3)$$

where *E* is the expectation operator and utility *U(I)* is a function only of income. This optimization generates a standard first-order condition for an interior solution; given concavity of the utility function, the second-order condition is satisfied. Comparative statics results are easily derived. For example, it is straightforward to show that an increase in either the probability of detection *p* or the penalty rate *f* unambiguously increases reported income.

This economics-of-crime approach therefore gives the sensible result that compliance depends upon enforcement. Indeed, it is essential to recognize that this approach concludes that an individual pays taxes because – and *only* because – of the economic consequences of detection and punishment. This is an important insight, with the obvious implication that the government can encourage greater tax compliance by increasing audit and penalty rates.

However, there are problems with the standard expected utility approach to tax compliance: some of its main predictions are not strongly supported by the evidence.

One prediction of the standard theory is that a higher tax rate increases compliance, at least under plausible assumptions about how an individual is penalized on detected evasion and

how the individual evaluates risk (Yitzhaki, 1974). Although the theoretical reasoning is sound, this result seems quite at odds with basic intuition. Indeed, as discussed later, empirical evidence largely (if not universally) finds that compliance falls with higher tax rates.

More problematic is another prediction – indeed, an assumption – of the standard theory: compliance is driven entirely by financial considerations, especially those generated by the level of enforcement. However, it is clear to many observers that compliance cannot be explained only by the benefit-cost calculus of amoral individuals.[8] The percentage of individual income tax returns that are subject to a thorough tax audit is generally quite small in most countries, almost always well less than 1 percent of all returns. Even in a country like the United States, the Internal Revenue Service (IRS) reported an overall audit rate in 2015 of only 0.8 percent (Internal Revenue Service, 2016b). Similarly, the penalty on even fraudulent evasion seldom exceeds much more than the amount of unpaid taxes, these penalties are infrequently imposed, and civil penalties on non-fraudulent evasion are even smaller. A purely economic analysis of the evasion gamble suggests that most rational individuals should either underreport income not subject to third-party information (including employer source-withholding), or should over-claim deductions not subject to independent verification because it is unlikely that such cheating will be caught and penalized. However, even in the least compliant countries evasion seldom rises to levels predicted by a purely economic analysis, and in fact there are often substantial numbers of individuals in most countries who apparently pay all (or most) of their taxes all (or most) of the time, regardless of the financial incentives they face from the enforcement regime.

[8] This observation has been made by Graetz and Wilde (1985), Elffers (1991), Andreoni, Erard, and Feinstein (1998), Torgler (2006), and Kirchler (2007), among many others. For a somewhat contrary view, see Slemrod (2007).

One instructive way of illustrating this dilemma is to assume that the utility function of the individual takes the form $I_i^{1-e}/(1-e)$, where the subscript i refers to the state of the world ($i=C,N$) and e is a measure of the individual's constant relative risk aversion. Using the definitions of I_C and I_N in equations (1) and (2), the expected utility maximization generated by the solution to equation (3) can be solved for the optimum amount of reported income R^*.[9] Now suppose that R^* is calculated for specific, realistic values of the various parameters. For example, if $t=0.4$, $f=2$, $p=0.02$, and $e=1$, then the individual will optimally report no income. Very large values for relative risk aversion are required to generate compliance consistent with actual country experience. When $e=3$, reported income is only 14 percent of true income; when $e=5$, it is still only 44 percent; when $e=10$, it is 71 percent; and e must exceed 30 for compliance to exceed 90 percent. Even if the probability of detection is as (unrealistically) high as 30 percent (with $t=0.4$ and $f=2$), relative risk aversion must exceed 7 to generate compliance over 90 percent. However, existing field evidence on the coefficient of relative risk aversion using a variety of approaches suggests that e ranges between 1 and 2, and may even be as low as 0 (Friend and Blume, 1975; Hansen and Singleton, 1983; Hall, 1988; Chetty, 2006; Gandelman and Hernandez-Murillo, 2013). Risk aversion must be abnormally large for behaviour to be even roughly comparable to actual observed choices, even in many developing countries with low levels of compliance.

[9] To illustrate this result, the individual's optimization from equation (3) requires that R^* be chosen to maximize

$$EU(I) = p[I-tR^*-ft(I-R^*)]^{1-\varepsilon}/(1-\varepsilon) + (1-p)[I-tR^*]^{1-\varepsilon}/(1-\varepsilon),$$

where the definitions of I_C and I_N have been substituted into the specific functional form for utility. The first-order condition for utility maximization is then

$$\partial EU(I)/\partial R^* = 0 = p[I-tR^*-ft(I-R^*)]^{-\varepsilon}(-t+ft) + (1-p)[I-tR^*]^{-\varepsilon}(-t),$$

which with cancellation of t can be rearranged to get

$$p(f-1)/(1-p) = [(I-tR^*)/(I-tR^*-ft(I-R^*)]^{\varepsilon}.$$

Taking the $1/\varepsilon$ root of both sides of this equation and defining $A=[p(f-1)/(1-p)]^{1/\varepsilon}$, the solution for R^* is

$$R^* = [I(A-1+ft)/(t(A-1+f))].$$

Admittedly, there are reasons why this simplistic analysis somewhat overstates the problem with the standard expected utility approach.[10] Consider the United States as an example. First, a standard feature of many individual income tax systems is that a third-party (e.g., the individual's employer) reports the relevant part of an individual's taxable income to the tax authority (and often also withholds income taxes on this reported taxable income). This third-party information increases significantly the chances that an individual who underreports income on a filed return will be detected, especially in its combination with employer source-withholding.[11] Second, the "official" IRS audit rate somewhat understates "actual" IRS audit policy. In fact, the IRS conducts a range of audits, and for many types of audits the actual rates are quite high. Third and relatedly, while overall audit rates are quite low, among certain income and occupation classes they are more frequent. Fourth, the IRS conducts a wide range of audit-type activities, including line matching and requests for information, and these activities are much

[10] I am grateful to an anonymous referee for emphasizing these considerations.

[11] For example, the IRS calculated for 2006 the Net Misreporting Percentage (NMP) for different sources of income, where the NMP measures unreported (or "misreported") income as a fraction of estimated "true" income. As indicated in the table below, the NMP for income that is subject to third-party information return matching (as well as to employer withholding), such as wages and salaries, is virtually zero. In contrast, the NMP for income not subject to third-party matching (e.g., nonfarm proprietor income, other income, rent and royalties, farm income, Form 4797 income, adjustments) generally exceeds 50 percent. Similar results are found for other years. See Internal Revenue Service (2006, 2012, 2016).

Type of Income	**Net Misreporting Percentage (%)**	**Percentage of Tax Gap (%)**
Subject to substantial information reporting and withholding (wages and salaries)	1	5.3
Subject to substantial information reporting (pensions and annuities, unemployment compensation, dividends, interest, Social Security benefits)	8	5.8
Subject to some information reporting (deductions, exemptions, partnerships and S corporation income, capital gains, alimony income)	11	30.9
Subject to little or no information reporting (nonfarm proprietor income, other income, rents and royalties, farm income, Form 4797 income, adjustments)	56	58.0

more frequent.[12] Finally, it is individual *perceptions* of audit rates that influence behaviour, rather than *actual* audit rates, and individuals typically misperceive actual audit rates; indeed, it is common for individuals to believe that the audit rates that they face are substantially higher than the audit rates that actually apply to them (Aitken and Bonneville, 1980; Yankelovich, Skelly, and White, Inc., 1984; Webley et al., 1991; Kirchler, 2007).

Even so, there is little doubt that in many settings the chances of detection and punishment are slight. Especially in circumstances in which third-party sources of information and employer source-withholding are limited, the chances that an individual who does not report truthfully will be caught and penalized are quite limited. In addition, as discussed later, there is considerable evidence that the individual's decision goes well beyond a simple amoral benefit-cost calculation based solely on narrowly defined financial considerations.

On balance, then, the basic model of individual compliance behaviour implies that rational individuals should report little income, especially when third-party information and employer source-withholding are imperfect. However, although compliance varies significantly across countries and is often quite low, compliance seldom falls to a level predicted by the standard economic theory of compliance. Indeed, the puzzle of tax compliance behaviour is why people pay taxes, not why they evade them. This observation suggests that the compliance decision must be affected by other factors or be affected in ways not captured by the standard approach.

In sum, the standard theoretical model of tax compliance has generated many important, plausible, and relevant insights. Even so, the approach has some well-recognized deficiencies:

[12] For example, in 2015 only 1.2 million individual returns (or less than 1 percent of the 147 million individual returns filed) were actually audited. However, in that year the IRS sent 1.6 million "math error notices" and received from third parties nearly 3 billion "information returns", which are used to verify items reported on individual income tax returns. See Internal Revenue Service (2016b).

Standard expected utility theory concludes that enforcement is the single key factor that motivates compliance. However, some predictions from theory are counterintuitive (especially the predicted level of compliance and some predicted comparative static responses).

In large part because of these (and other) concerns, there have been numerous efforts to extend the basic economics-of-crime model of tax compliance. These efforts can be usefully classified in several ways, as discussed next.

2.2. Extensions to the Economics-of-crime Model: Staying within Expected Utility Theory

A first type of extension stays within the basic expected utility framework of the economics-of-crime model, and simply adds a range of considerations that make the model more realistic. These considerations include adding such factors as: employer withholding (Kleven et al., 2012; Alm, Clark, and Leibel, 2016); an individual labor supply decision (Pencavel, 1979; Cowell, 1981), including the choice of sector in which to work or the type of job to pursue (Cowell, 1985; Pestieau and Possen, 1991); multiple individual strategies for reporting (e.g., simultaneous tax avoidance and tax evasion decisions) (Cross and Shaw, 1982; Alm, 1988a; Martinez-Vazquez and Rider, 2005); alternative penalty, tax, and tax withholding functions (Pencavel, 1979; Yaniv, 1988); complexity and the associated uncertainty about the relevant fiscal parameters (Alm, 1988b; Beck and Jung, 1989a; Scotchmer and Slemrod, 1989; Cronshaw and Alm, 1995; Snow and Warren, 2005; Alm, 2014a); the use of paid preparers to assist in tax calculations (Klepper and Nagin, 1989b; Scotchmer, 1989; Reinganum and Wilde, 1991; Erard, 1993); the receipt of government services financed by tax payments (Cowell and Gordon,

1988)[13]; positive (individual) rewards for honesty (e.g., eligibility for a lottery if found to be compliant) (Falkinger and Walther, 1991); endogenous audit selection rules that utilize information from tax returns to determine strategically whom to audit (Landsberger and Meilijson, 1982; Rickard, Russell, and Howroyd, 1982; Greenberg, 1984; Reinganum and Wilde, 1985, 1986; Graetz, Reinganum, and Wilde, 1986; Beck and Jung, 1989b; Kuchumova, 2017); and the like.[14]

These extensions considerably complicate the theoretical analyses, and generally render clear-cut analytical results impossible. Indeed, to date, no single theory has been able to incorporate more than a few of these factors in a meaningful way. These extensions also retain the basic – and limiting – results of the simple expected utility model: an individual focuses *exclusively* on the financial incentives of the evasion gamble, paying taxes *solely* because of the fear of detection and punishment; and an individual responds to a higher tax rate by increasing compliance.

> ***These extensions complicate considerably the comparative statics of the tax compliance choice, and withholding especially gets predictions closer to observations. Even so, they leave enforcement as the main factor that motivates compliance, and they also do not change the compliance-tax rate response.***

2.3. Extensions to the Economics-of-crime Model: Expanding to Behavioural Economics

A second type of extension has expanded the expected utility model by introducing some aspects of behaviour considered explicitly by other social sciences. Many of these aspects can be

[13] There is also a large literature on the voluntary provision of public goods that is related to compliance research. See, for example, Axelrod (1984), Ledyard (1995), and Andreoni and Payne (2013) for comprehensive surveys.
[14] As only one example, Kleven et al. (2012) and Alm, Clark, and Leibel (2016) incorporate employer withholding by partitioning true income I between what is subject to third-party reporting (I_{TPR}) and what must be self-reported (I_{SR}), with a significantly higher audit rate for I_{TPR} than for I_{SR}.

discussed under the rubric of "behavioural economics". As discussed in detail by Rabin (1998), Camerer and Lowenstein (2004), McCaffery and Slemrod (2006), Angner and Loewenstein (2010), and Congdon, Kling, and Mullainathan (2011), among others, behavioural economics can be broadly defined as an approach that uses methods and evidence from other sciences (especially psychology) to inform the analysis of individual and group decision making.[15]

The standard neoclassical economic model of human behaviour 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 behaviour, there is increasing evidence that they are inaccurate and unrealistic depictions of many, perhaps most, individuals. Indeed, there is growing acceptance that, contrary to the standard neoclassical approach:

- individuals face limits on their ability to compute (e.g., "bounded rationality", "mental accounting");
- they systematically misperceive, or do not perceive at all, the true costs of actions (e.g., "fiscal illusion", "saliency", "overweighting" of probabilities);
- they face limits on their "self-control" (e.g., "hyperbolic discounting", Christmas savings clubs, automatic enrollment programs);
- they are affected by the ways in which choices are "framed" (e.g., "reference points", gains versus losses, "loss aversion", "risk-seeking behaviour", "status quo bias");
- they are influenced by the social context in which (e.g., diversity), and the process by which (e.g., voting rules), decisions are made; and
- they are motivated not simply by narrowly defined, individually based financial considerations, but also by notions whose origins stem more from group considerations, such as fairness, altruism, reciprocity, empathy, sympathy, trust, guilt, shame, morality, alienation, patriotism, social customs, social norms, "tax morale", and many other objectives.

As emphasized by Congdon, Kling, and Mullainathan (2011), these so-called "deviations" can be classified into three broad areas: imperfect optimization (stemming from, say, limited

[15] For more "popular" discussions, see Ariely (2008), Thaler and Sunstein (2008), and Kahneman (2011).

computation abilities or misperceptions), bounded self-control (as demonstrated by hyperbolic discounting), and non-standard preferences (like other-regarding preferences).

In short, individuals are not always the rational, outcome-oriented, self-controlled, selfish, and egoistic consumers envisioned by much of the standard theory. Behavioural economics uses these deviations from the standard assumptions as the starting point for a more realistic view of how individuals make choices. There are of course various criticisms of behavioural economics, such as the absence of a single unified theory of behaviour, the difficulty of making judgments about the social welfare implications of policies, its focus on individual behaviour versus aggregate (or market) behaviour, and the paternalistic implications of many behavioural insights.[16] Even so, there is increasing acceptance that behavioural economics can help improve our understanding of individual and group behaviours.

Behavioural economics has been applied in two broad (and somewhat overlapping) dimensions. One extension keeps its focus on *individual* factors; the other extends the analysis to *group* considerations.

Focusing on the Individual: Frame Dependence and Non-expected Utility Theory. A first strand of behavioural economics deals mainly with *individual* behaviour. Many of the individual behaviours that diverge from neoclassical predictions 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 psychological predisposition or some cognitive limitation of the individual.

One factor here is that individuals apparently adapt to an unchanged environment and perceive stimuli relative to this environment. Many individuals react much differently to gains

[16] See especially Glaeser (2004, 2006).

than to equal-but-opposite valued losses. Individuals may therefore act on the basis of a "value function" (rather than the utility function in economic models). The value function is assumed to depend upon changes in income from some "reference point", rather than the level of income itself. The value function is also assumed to be steeper for losses than for gains because a loss in income is disliked much more than an equal gain, and it is concave for gains ("loss aversion") but convex for losses ("risk seeking"), so that an individual may exhibit risk-averse behaviour when confronted with risky but positive gambles, while the same individual may become a risk-lover when faced with gambles that involve (net) possible losses.

Individuals also often misperceive the true costs and benefits of their actions. The standard model of individual behaviour assumes that individuals are fully aware of these costs and benefits. However, there is much evidence that individuals are often unaware or at least inattentive to some types of incentives. In such cases, observed behaviour will clearly differ from behaviour predicted by standard models of individual optimization. Such inconsistencies seem likely in the case of taxes, given the complexity, opaqueness, and informational asymmetries of tax systems.

Still another factor is that people do not engage in exponential discounting but instead engage in discounting that is better described by a quasi-hyperbolic functional form. In particular, there is an immediacy effect that causes the discount rate to be very high when a person has to choose between a cost/benefit immediately evaluated against a cost/benefit in the future.

A related notion is that individuals may not be able to make all of the computations implied by standard optimization given, say, limits on time or cognitive abilities. In the face of these limitations, they may instead apply "heuristics" or "rules of thumb" that allow them to

"satisfice" rather than to fully optimize. Perhaps the most complete development of this modeling strategy is the "bounded rationality" of Simon (1955).

A final aspect is that individuals are motivated by a wide range of factors, including self-interest (narrowly defined) but also by notions that arise more from group considerations, such as fairness, altruism, reciprocity, empathy, sympathy, trust, guilt, shame, morality, alienation, patriotism, social norms, social customs, social capital, tax morale, intrinsic motivation, and many other objectives. These motivations (e.g., guilt) are often modeled by introducing additional elements in the individual's objective function (e.g., by adding a non-pecuniary or psychic cost associated with evading one's own tax liability). These elements are discussed later.

Also important is individual behaviour under uncertainty, and there are now various formalizations of "non-expected utility theory" that have been applied to individual choices. One factor that emerges from these efforts is the way in which individuals perceive probabilities. There is overwhelming evidence that individuals "overweight" the low probabilities that they face in some situations, like tax compliance; that is, even when fully informed, individuals systematically act as if the audit probability that they face is much higher than its actual level. More generally, individuals may act on the basis of "subjective probabilities".

There are numerous examples of these non-expected utility theories, including (but not limited to): prospect theory (Kahneman and Tversky, 1979); rank-dependent expected utility theory (or anticipated utility) (Quiggin, 1982); first order and second order risk aversion (Segal and Spivak, 1990); regret and disappointment theory (Loomes and Sugden, 1982, 1987); non-additive probabilities (Schmeidler, 1989); and ambiguity theory (Ellsberg, 1961); and hyperbolic discounting (Laibson, 1997, 1998), to mention only a few such approaches. Specific applications of these non-expected utility theories to tax compliance include Bernasconi (1998), Yaniv (1999),

Bernasconi and Zanardi (2004), Arcand and Graziosi (2005), Snow and Warren (2005), Dhami and al-Nowaihi (2007), Eide, von Simson, and Strom (2011), and Alm and Torgler (2012).[17] 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 considerably complicate the analysis of the individual decision, but they can also generate predictions that better approximate observed levels, especially if they have overweighting of probabilities.[18]

These non-expected utility theory models change the "probability" and the "objective function" of the individual's compliance choice. In doing so, they considerably complicate the analysis, but they can generate predicted levels of compliance that better approximate observed levels, especially if they have subjective (or overweighting of) probabilities. However, they do not typically change the comparative statics results as long as the payoff to evasion is still based on the tax rate.

Focusing on the Group: Social Interactions Theory. A second strand of behavioural economics that is relevant to tax compliance focuses more on *group* behaviour, which I classify as the "social interactions theory" strand.

[17] For a comprehensive survey of these many approaches as applied to tax compliance, see Hashimzade, Myles, and Tran-Nam (2013).

[18] For example, Alm and Torgler (2012) add a term $\gamma t(I-R)$ to income in the two states of the world, redefining income in equations (1) and (2) as $I_C=I-tR-f[t(I-R)]-\gamma t(I-R)$ and as $I_N=I-tR-\gamma t(I-R)$, with expected utility still defined by equation (3). The individual now is assumed to suffer a psychological loss in expected income proportional to unreported taxes, with the coefficient γ measuring as a fraction of income how much the individual would pay to avoid the loss associated with each dollar of unreported taxes. Clearly, γ is likely to be sensitive to the ethics of tax compliance: the stronger is the ethical norm to pay one's taxes fully, the more deviant the behavior of a non-compliant individual becomes and the more loss the individual feels. It is straightforward to show that reported income is higher in this setting than in the basic economics-of-crime model. In a different approach, Alm and Torgler (2012) incorporate loss aversion (or more extreme forms of risk aversion, such as rank dependent expected utility). They assume that individuals are described by a rank dependent expected utility model, and they modify the basic maximization problem of equation (3) to one in which an individual maximizes $EU(I)=[g\ p\ U(I_C)+(1-g)\ (1-p)\ U(I_N)]$, where g serves to overweight the probability of the "bad" outcome (or detection and punishment). This formulation can also be shown to generate higher levels of compliance than the standard model. Finally, Alm and Torgler (2012) reformulate the basic model using prospect theory. First, they replace the utility function with a "value function" $v(.)$, where value is assumed to depend upon changes in income from some reference point, the value function is assumed to be steeper for losses than for gains, and the value function is assumed to be concave for gains (risk aversion) but convex for losses (risk seeking). Second, Alm and Torgler (2012) replace the probability with a "weighting function" $\pi(p)$ that depends positively upon the probability but that overweights low probabilities and underweights high ones. This formulation can also be shown to generate higher levels of compliance than the standard model.

There is abundant evidence that individuals are influenced by the social context in which, and the process by which, decisions are made. There is also much evidence that they are motivated by notions that arise from group considerations, such as fairness, altruism, reciprocity, empathy, sympathy, trust, guilt, shame, morality, alienation, patriotism, social norms, social customs, the "bandwagon effect", conformity, social capital, social networks, "tax morale", intrinsic motivation, obedience to authority, and many other objectives, all of which depend in some way upon the individual's interactions with a larger group. Regardless of the specific term that is used, all of this research concludes that one's own *individual* behaviour is strongly influenced by the behaviour of the *group* to which one identifies.

In the area of tax compliance, there are various aspects of these social interactions, as discussed in detail by Alm et al. (2012) and Alm (2014b). The most straightforward aspect recognizes the obvious fact that individuals are not the same, and so that they cannot be perceived as a single homogeneous group. Some individuals may be motivated only by financial outcomes, but others may have different preferences, including nonfinancial considerations like guilt, altruism, fairness, or reciprocity. Further, the process by which a different outcome is attained often matters. In short, people exhibit great diversity in their behaviour, and this "full house" of behaviours must be recognized.

Another aspect might be termed a "social contribution dilemma" (or a "free-rider problem"), where personal gains work against the collective good (Dawes, 1980). By acting selfishly, an individual can benefit. However, if most individuals similarly decide to maximize their own individual profit, then everyone is harmed because the public goods are not provided. The crucial issue here is how to influence the willingness to cooperate.

A last and closely related approach to social interactions emphasizes that much individual behaviour can be broadly viewed as a "psychological contract" between individuals (and also between individuals and government). Central to this contract is the broad notion of a "social norm" of behaviour (Elster, 1989). A social norm represents a pattern of behaviour 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 behaviour in which an individual participates, given the expectation that everyone else will also participate. Put still differently, a social norm is an informal rule of behaviour that individuals follow for reasons largely distinct from the fear of legal penalties. Consequently, if others behave according to some socially accepted norm of behaviour, 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 or in some degree by a social norm.

There are many suggested rationales for the existence of social norms. Efficiency is often proposed; that is, a social norm may help to maximize social welfare (Akerlof, 1980; Acemoglu and Jackson, 2017), to prevent market failures (Coleman, 1990), or to reduce social costs (Homans, 1961); a social norm may also evolve as a Nash equilibrium of a coordination game or as a cooperative equilibrium of a prisoner's dilemma game (Ullmann-Margalit, 1977; Young, 1998). However, although social norms typically reduce transactions costs, many social norms may in fact be highly inefficient (e.g., discrimination, etiquette, retribution). They may also generate clear winners and losers. Regardless, it seems unlikely that a social norm evolves randomly. Further, social norms seem likely to be enforced by different mechanisms. Those social

norms that enhance efficiency may be maintained by a pure coordination motive. Other social norms may be sustained by the threat of social disapproval. Relatedly, enforcement may occur through internalizing social norms of proper conduct via, say, shame or guilt.

Overall, the existence of a social norm suggests that the nature of one's social interactions with others affects one's own behaviour. Prominent examples of theories that include these social interactions include the fairness model of Rabin (1993), "ERC" (or equity, reciprocity, and completion) of Bolton and Ockenfels (2000), "inequality aversion" of Fehr and Schmidt (1999), "reciprocal altruism" of Cox, Friedman, and Sadiraj (2008), among others. These models all introduce some elements of interdependent, or other-regarding, preferences.

As for specific applications of these approaches to tax compliance, Gordon (1989), Erard and Feinstein (1994), Eisenhauer (2008), and Alm and Torgler (2012) add psychic costs to the individual's utility function, where these psychic costs depend upon both the extent of the individual's evasion and the ways in which the individual believes he or she is seen by others. In related approaches, Myles and Naylor (1996), Kim (2003), Fortin, Lacroix, and Villeval (2007), and Traxler (2010) introduce in the individual's decision reputational effects via social customs and social interactions, and demonstrate that these effects can generate multiple equilibria, some with high compliance and others with low compliance. Cowell and Gordon (1988) recognize that taxes are used to finance public goods, and their model incorporates this interdependence between individuals in the individual compliance decision. Bordignon (1993) further considers the effects of how the individual perceives his or her tax payments relative to the receipt of public goods. In both cases, these interdependencies affect the individual's compliance decision.[19]

[19] Again, see note 18 for examples of these types of models from Alm and Torgler (2012). In addition, Alm and Torgler (2012) show that it is straightforward to introduce a public good in the standard portfolio model in order to

There are other similar approaches. Schmölders (1960) argues that individuals have an "intrinsic motivation" to cooperate. Frey (1997) suggests that compliance depends upon an individual's "tax morale". Torgler (2003b) 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). 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. Kirchler, Hoelzl, and Wahl (2008) explore the interaction between enforcement effort ("power") and facilitation ("trust") on the part of the tax authority via a "slippery slope" framework. 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. There are of course still other approaches.[20]

These social interaction models can generate the "correct" comparative statics responses (mainly because they break the link between evasion and the tax rate in payoffs), and they can also give predicted levels of compliance than come much closer to observed levels. However, these gains come at the cost of considerable complexity.

---

incorporate some group considerations, by adding to income in both states of the world a term that represents the monetary value of the public good financed by total group taxes. For each individual *i*, this term equals $[mst(\sum_{j \neq i} R_j + R_i)]$, where total group taxes (or $\sum_{j \neq i} R_j + R_i$) equal the amount paid by individual *i* (or R_i) plus the amount paid by all other *j* members of the group other than individual *i* (or $\sum_{j \neq i} R_j$), *m* is a *group surplus multiplier* that is applied to the group's total taxes in order to capture the consumers' surplus derived from a public good, and *s* is the share of individual *i* in the resulting public good. It is readily shown that individual *i* is more likely to pay taxes the higher is *m*, the higher is *s*, and the higher is $(\sum_{j \neq i} R_j)$.

[20] Again, see Hashimzade, Myles, and Tran-Nam (2013) for a discussion of these approaches.

2.4. Summary: Insights from Theoretical Research

The theoretical analysis of tax compliance behaviour suggests, I believe, several main insights:

> ***First, enforcement matters – but many other factors also matter. An especially important factor is the presence of third-party sources of information, as well as tax withholding systems.***
>
> ***Second, 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.***
>
> ***Third, an individual is a social creature, and may be influenced by group considerations.***

Overall, then, theory suggests that enforcement matters. However, theory also suggests that there are limits to the effects of greater enforcement on compliance and that there are other factors that motivate tax compliance, including factors that move beyond the individual to the group.

Of course, it is possible to construct a "theory" that incorporates virtually any consideration, no matter how unrealistic. However, theory is meant to be unrealistic. This lack of realism does not mean that theory has no uses. Writing down a theoretical model forces one to be precise about what factors one believes to be important in explaining behaviour, and then to see whether the implications of the theory follow logically. Indeed, theory is essential in explaining what motivates tax compliance. It is no exaggeration to say that everyone has a "theory" that informs their thinking, even if it is not a well-articulated one, and economists have particular skills in developing – and testing – these theories.

Still, theoretical work on individual compliance decisions is both too complex and too simple. It is too complex because it is only in the simpler models that clear-cut analytical results can be generated on the compliance impact of basic policy parameters. When more complex dimensions of individual behaviour are introduced, the theoretical results generally become ambiguous. Paradoxically, the theoretical models of individual choice are also too simple. There are numerous factors that seem likely to affect individual compliance decisions, but theoretical models can include only a few.

Indeed, it is essential to remember that there is no such thing as a single theory that is universally applicable, in large part because the assumptions that underlie any theory are necessarily restrictive, applying in some settings and not in others. Instead, as economists we must remember that our theories are simply metaphors, meant to represent a specific situation and not meant to represent all situations. They are certainly not meant to represent "the" truth but only "a" truth. The ability to "choose wisely" among these myriad theories is what makes a good economist, at least one who can contribute usefully to public policy discussions.

Regardless, theory is necessarily speculative. It is therefore necessary to examine the evidence.

3. INSIGHTS FROM EMPIRICAL RESEARCH

3.1. A Brief Digression on Data and Methods in Empirical Research[21]

Empirical research on tax compliance is notoriously difficult. Hard and useful evidence on tax compliance is very hard to find, for obvious reasons, and indeed the fundamental difficulty in

[21] See Slemrod and Weber (2012) and Torgler (2016) for a critical review of these approaches.

analyzing empirically what motivates tax compliance is the lack of reliable information on taxpayer compliance. After all, tax evasion is illegal, and individuals have strong incentives to conceal their cheating, given financial and other penalties that are imposed on individuals who are found cheating on their taxes. Even so, research has been increasingly creative in finding data to examine evasion using naturally occurring field data, controlled field experiments, and laboratory experiments. Further, research has also been creative in finding new methods. Both aspects are briefly considered.

Data. The most accurate source of information on individual compliance is based on *direct* measurement of evasion via actual audits of individual returns, as with the Taxpayer Compliance Measurement Program (TCMP) or the National Research Program (NRP) of the U.S. Internal Revenue Service (IRS). Here detailed line-by-line audits of individual tax returns by IRS auditors yield an IRS estimate of the taxpayer's "true" income, which when compared to actual reported items allow the IRS to calculate measures of income tax evasion (e.g. the "tax gap"). Few other countries have systematic audit-based programs, largely due to their expense, and even the TCPM/NRP data are not conducted every year. Another direct approach is based on survey evidence, in which individuals are asked about their evasion behaviour, especially their attitudes (e.g., World Values Survey, available online at http://www.worldvaluessurvey.org/wvs.jsp).[22] Still another direct approach uses tax amnesty data, in which declarations of income by amnesty participants are used as an exact measure of evasion.[23]

More *indirect* methods look for traces of evasion behaviour that are left in various indicators (e.g., currency, electricity consumption, labor force participation) that can be measured,

[22] See Kirchler and Wahl (2010) for a critical review of survey approaches, along with suggestions for improvements in survey methods. Also, see Meyer, Mok, and Sullivan (2015) for a discussion of emerging problems in survey use.
[23] For a still useful discussion of tax amnesties, see Malik and Schwab (1991).

so that evasion is not measured directly but rather indirectly via these measureable traces.[24] Some researchers have used measures of reported income from individual tax returns as a proxy for evasion, on the assumption that one's total income must be divided between (observable) reported income and (unobservable) unreported or evaded income (Dubin, Graetz, and Wilde, 1990; Gruber and Saez, 2002). Some have used consumption-based (Pissarides and Weber, 1989; Gorodnichenko, Martinez-Vazquez, and Peter, 2009) or tax deduction-based (Feldman and Slemrod, 2007) measures as an indicator of tax evasion. Some have also used survey-based approaches in which particular occupations are examined to determine individual motivations to participate in the shadow economy (Lemieux, Fortin, and Frechette, 1994; De Paula and Scheinkman, 2011). There are also examples of even more novel approaches. Researchers have used luminosity as measured from outer space to measure "true" economic activity, which can then be compared to official income accounts to measure evasion (Henderson, Storeygard, and Weil, 2012). Still others have collected their own compliance data from original sources, such as information on discarded cigarette packs to measure the degree to which smokers in a single jurisdiction (e.g., New York City) evaded the jurisdiction's cigarette taxes (Chernick and Merriman, 2013), information on commuter tax allowances to estimate fraudulent claims for these allowances (Paetzold and Winner, 2016), information on border differentials in TV license fees to estimate evasion of these fees (Berger et al., 2016), or information on internet purchases to estimate evasion of sales taxes (Alm and Melnik, 2010).

Somewhere between direct and indirect methods lies the use of *administrative data*, which refers to information collected primarily for administrative purposes. These data are collected by government departments and other organizations for the purposes of registration, transactions, and

[24] See especially Schneider and Enste (2002) for many examples of these indirect approaches.

record keeping. Unlike archival data that are based on samples, administrative data often apply to the entire relevant population. These data do not typically have direct measures of tax evasion, but they may be linked to direct (e.g., tax audit) information. See Kleven et al. (2011) and Pomeranz (2015) for important recent applications.[25]

However, researchers have become increasingly skeptical about the ability of most all forms of naturally occurring field data to achieve identification of the causal effects of policies (Angrist and Pischke, 2010). The quality of the data is also a particular concern (Slemrod and Weber, 2012; Torgler, 2016b). For example, TCMP/NRP data have some well-recognized deficiencies, even aside from their expense: the audits do not detect all underreported income, nonfilers are not often captured, honest errors are not identified, and final audit adjustments are not included. Survey data often have much useful sociodemographic and taxpayer attitudinal information, but the reliability of their data on tax evasion is highly suspect because individuals may not remember their reporting decisions, they may not respond truthfully or at all, or the respondents may not be representative of all taxpayers. Amnesty data may also not be representative of all taxpayers because of selection issues; that is, only some individuals opt to participate in an amnesty. The many indirect approaches also exhibit significant problems. For example, the various "tax gap" estimates attribute any difference between predicted and actual transactions to the shadow economy.

In part because of concerns with naturally occurring field data, researchers have increasingly employed controlled field experiments (or randomized controlled trials, RCTs). In a "typical" controlled field experiment, a treatment sample of individuals receives a message (e.g., a letter or an electronic notification) telling them some policy-relevant information (e.g., "your tax

[25] See Slemrod (2016) for a discussion of the potentials – and the pitfalls – of administrative data in tax research.

return will be closely examined", "most people pay their taxes", "paying taxes helps others", "taxes provide for public services"). A control sample of individuals receives a neutral message. The impact of the policy innovation is then examined by a simple comparison of the treatment group compliance with the control group compliance. To date most controlled field experiments have used this "message" approach, although other approaches are starting to be employed.[26]

Researchers have also turned to laboratory experiments in compliance research.[27] The basic design of most compliance experiments is similar. Human subjects (generally students) in a controlled laboratory are told that they should feel free to make as much income as possible. At the beginning of each round of the experiment, each subject is given (or earns) income and must decide how much income to report. Taxes are paid at some rate on all reported, but not on underreported, income. However, underreporting is discovered with some probability, and the subject must then pay a fine on unpaid taxes. This process is repeated for a given number of rounds. At the completion of the experiment, each subject is paid an amount that depends upon his or her performance during the experiment. Into this microeconomic system, various policy changes can be introduced one at a time, such as changes in audit probabilities or audit rules, in penalty rates, in tax rates, in public good provision, and in any other relevant institutions. To date, laboratory experiments have examined virtually all factors that have been suggested as determinants of what motivates tax compliance.

Controlled field experiments have a number of advantages. The most obvious is their ability to identify causal factors in the compliance decision; that is, they have a high degree of "internal validity". They also generate their own observable data on individual choices, they can

[26] See Hallsworth (2014) for a critical discussion of controlled field experiments.
[27] See Torgler (2002), Alm and Jacobson (2007), and Mascagni (2018) for critical discussions of laboratory experiments. For earlier discussions, see Smith (1982) and Roth (1987).

be replicated, and they use "real people". Even so, they seldom generate direct measures of evasion. Further, they can be expensive. There are also significant limits to the causal factors that can be examined. For example, it is hard to imagine a revenue authority that would allow actual audit probabilities (or fine rates or tax rates) to differ across taxpayers. Finally, to date controlled field experiments have been one-time interventions, so the persistence of their effects is unknown. Similarly, laboratory experiments seem particularly well-suited for the study of some aspects of the taxpayer reporting decision. In particular, they generate direct measures of evasion under different settings in which there is control over extraneous influences, they are relatively inexpensive, they can be easily replicated, and they have a high degree of internal validity. However, laboratory experiments are sometimes viewed with suspicion. The most common criticism is that the student subjects typically used in experiments may not be representative of taxpayers. As a result, there is a concern that experimental results on policy innovations that rely upon student subjects cannot generalize to the population; that is, the "external validity" of laboratory experiments is sometimes questioned.[28]

Methods. Given the existence of these various types of data, standard empirical methods are then applied. Recent empirical approaches have also taken advantage of various types of nonlinearities in policy design (Saez, 2010; Kleven and Waseem, 2013). One example of such nonlinearities is the presence of "kinks" in tax (or benefit) schedules, in which, say, the marginal tax rate changes discretely at the kink as income increases. Because an individual with income immediately below the kink faces one tax rate while an individual immediately above the kink

[28] See Levitt and List (2007) for a general critique of laboratory experiments. For robust responses to this critique, see Falk and Heckman (2009), Camerer (2015), Frechette (2015), Harrison, Lau, and Rutström (2015), Kagel (2015), and Kessler and Vesterlund (2015). Also, see Alm, Bloomquist, and McKee (2015) for specific evidence on the external validity of tax compliance experiments, who find that student and non-student behaviours are similar; see Choo, Fonseca, and Myles (2016) for an alternative view on student versus non-student behaviours.

faces a different tax rate, there is an incentive for otherwise identical individuals to bunch on one side of the kink or the other, which allows behavioural responses to the tax rate to be cleanly identified. Another type of nonlinearity is "regression discontinuity", in which there is again a discrete threshold at which a policy treatment is applied and for which there is again an incentive for otherwise identical individuals to bunch. Both approaches have been increasingly applied in empirical analyses.

Summary. Regardless of the specific source of data or the specific empirical methodology, I believe that it is important to remember that there are problems with all tax evasion data and all methodologies. Even so, these data and these methods have provided many important insights, as discussed next.

3.2. Summary: Insights from Empirical Research

Overall, the various strands of empirical evidence indicate clearly that individuals respond predictably, if not always significantly, to a wide array of policies. More specifically:

1) ***Audits – both the level and the type of audit – matter, and matter a lot.*** There is much evidence that suggests that more audits increase compliance, with an estimated reported income-audit rate elasticity that generally falls between 0.2 and 0.4.[29] Audits also typically

[29] The impact of audits on compliance has been extensively studied, more than most any other policy intervention. For some empirical work on the effects of audits using naturally occurring field data, including studies of individuals and of firms, see: Witte and Woodbury (1985), Dubin and Wilde (1988), Alm, Bahl, and Murray (1990, 1993), Dubin, Graetz, and Wilde (1990), Feinstein (1991), Erard (1992), Dubin (2007), Alm and Yunus (2009), Johannessen (2014), Advani, Elming, and Shaw (2015), DeBacker et al. (2015), Alm, Clark, and Leibel (2016), Mendoza, Wielhouwer, and Kirchler (2017), and Almunia and Lopez-Rodriguez (2018). For some empirical work using controlled field experiments, including studies of individuals and of firms, see: Slemrod, Blumenthal, and Christian (2001), Iyer, Reckers, and Sanders (2010), Kleven et al. (2011), Fellner, Sausgruber, and Traxler (2013), Gangl et al. (2014), Castro and Scartascini (2015), Pomeranz (2015), Dwenger et al. (2016), Jacobsen and Piovesan (2016), and

have a "spillover" effect, or an increase in compliance independent of revenues generated directly from the audits themselves, whose magnitude varies from 4 to 12 (e.g., "general deterrence"). (Audits also have a greater deterrent impact than fines, despite their theoretical equivalence, at least in an expected value sense.) Even so, the reported income-audit rate elasticity is small and varies across studies. Also, telling individuals that they will be subject to "more scrutiny" via a message often has some impact on compliance, even if of small size and of unknown duration. Further, both laboratory experiments and field data have generally found that the impact of increased audits is non-linear, so that the deterrent effect seems to diminish (and may even be reversed) with higher audit rates. Relative to a random audit selection rule, strategic audit selection (especially a "cutoff rule") is far more effective in increasing compliance than random audit selection, although some random selection seems necessary for audit schemes to work. Of some note, there is often some compliance even with no audits. As noted below, there is also some evidence that higher audit rates can sometimes backfire, leading to lower post-audit compliance.

2) ***Perceptions of audit rates affect compliance; that is, cognitive considerations matter.*** In particular, individuals appear to substantially misperceive audit rates, typically overweighting a (low) probability of audit (Alm, McClelland, and Schulze, 1992; Kinsey, 1992). Also, post-audit behaviour of audited taxpayers (e.g., "specific deterrence") is mixed. As noted above,

---

Doerrenberg and Schmitz (2017). For some empirical work using laboratory experiments, see: Friedland, Maital, and Rutenberg (1978), Spicer and Hero (1985), Baldry (1987), Webley (1987), Beck, Davis, and Jung (1991), Alm, Jackson, and McKee (1992a, 1992b), Alm, McClelland, and Schulze (1992), and Alm, Cronshaw, and McKee (1993), Alm and McKee (2004, 2006), Alm, Cherry, Jones, and McKee (2010, 2012), Andrighetto et al. (2016), Zhang et al. (2016), Alm, Bloomquist, and McKee (2017), and Alm et al. (2017a); also, see Blackwell (2010) for a meta-analysis of laboratory experiments. For a simulation-based approach using agent-based models, see: Korobow, Johnson, and Axtell (2007), Bloomquist (2011), and Hashimzade, Myles, and Rablen (2016).

there is some evidence that an audited individual may actually reduce his or her post-audit compliance, sometimes termed a "bomb-crater effect". This effect is generally found in laboratory experiments in which tax compliance of audited taxpayers falls immediately after an audit (Mittone, 2006; Maciejovsky, Kirchler, and Schwarzenberger, 2007; Kastlunger et al., 2009), before recovering somewhat in succeeding rounds. However, with some exceptions (Mendoza, Wielhouwer, and Kirchler, 2017), field data generally find little or no evidence of a bomb-crater effect (Erard, 1992; Advani, Elming, and Shaw, 2015). One explanation for the bomb-crater effect is that deterrence may "crowd out" an individual's "intrinsic motivation" to pay taxes (Sheffrin and Triest, 1992; Frey, 1997; Gneezy and Rustichini, 2000), and a similar finding has been found for corporate taxpayers (DeBacker et al., 2015). Another explanation is that individuals may update their subjective audit probabilities following an audit (Mittone, Panebianco, and Santoro, 2017). However, some recent work emphasizes that one must distinguish between the effects of audits on taxpayers found to be compliant and those found to be noncompliant (Gemmell and Ratto, 2012; Beer et al., 2017): audited taxpayers who are found to have additional tax liabilities tend to increase their compliance following an audit, while audits tend to reduce compliance for audited taxpayers with no additional assessment following an audit. There is also some work that finds that delayed feedback on tax audits is more effective in improving compliance than immediate feedback, possibly because delay leads individuals to overweight audit probabilities (Kogler, Mittone, and Kirchler, 2016).

3) ***Fines, whether financial or non-financial, affect compliance, but their deterrent effects are small.*** Due largely to difficulties of generating independent variation in fine rates, most evidence on the impact comes from laboratory experiments (Friedland, Maital, and Rutenberg,

1978; Beck, Davis, and Jung, 1991; Alm, Jackson, and McKee, 1992a, 1992b; Alm, McClelland, and Schulze, 1992). Laboratory experiments typically find that a higher fine rate leads to marginally more compliance, with an estimated reported income-fine rate elasticity less than 0.1.[30] Of some note, there is now much evidence that non-financial penalties (e.g., public disclosure) may also act as a deterrent (Bosco and Mittone, 1997; Fortin, Lacroix, and Villeval, 2007; Coricelli et al., 2010; Hasegawa et al., 2013; Bø, Slemrod, and Thoresen, 2015; Casagrande et al., 2015; Lefebvre et al., 2015; Perez-Truglia and Troiano, 2015; Battiston and Gamba, 2016; Casal and Mittone, 2016; Alm, Bernasconi, Laury, Lee, and Wallace, 2017).

4) ***Positive inducements, whether to individuals or to groups, improve compliance.*** Laboratory experiments consistently find that rewards to *individuals* increase compliance, including programs in which an individual who reports more income receives more government benefits (e.g., social insurance benefits) (Alm, Cherry, Jones, and McKee, 2012) or an individual who is found to be honest becomes eligible for rewards (e.g., a lottery) (Alm, Jackson, and McKee, 1992a; Feld, Frey, and Torgler, 2006; Bazart and Pickhardt, 2011). Laboratory experiments also find that an increase in payoffs to *groups*, such as public goods financed by tax payments, improves compliance (Becker, Buchner, and Sleeking, 1987: Alm, McClelland, and Schulze, 1992; Alm, Jackson, and McKee, 1992a, 1992b; Alm, McClelland, and Schulze, 1999; Fochmann and Kroll, 2016). Field experiments have also demonstrated the potential of positive inducements for compliance. For example, Torgler (2003a) finds that individual and group rewards improve tax compliance of individuals in a small village in Costa Rica. Similarly,

[30] However, see Alm, Bahl, and Murray (1990) for evidence on the deterrent effect of fines using naturally occurring field data for Jamaica.

Koessler et al. (2016) find that individuals in Swiss cantons pay more taxes when there is linkage between timely payment of taxes and a reward, at least if the reward is non-financial (e.g., a weekend stay at a "wellness" facility), and Dwenger et al. (2016) also find that positive rewards for compliance (e.g., social recognition, lottery eligibility) increase compliance with a local church tax in Germany. More recently, the "Global Tax Program" of the World Bank has begun pursuing a number of so-far-unpublished field studies that link taxpayer compliance of local taxes with greater participation in governance institutions (e.g., civic engagement) and/or with some form of financial or non-financial reward (e.g., improved local government services), with promising but still quite preliminary results.

5) ***Tax rates affect compliance, but the effects are nuanced.*** For example, the *level* of tax rates matters in an individual's compliance decision, with an increase in tax rates generally (though not always) reducing reported income (Clotfelter, 1983; Slemrod, 1985; Alm, Jackson, and McKee, 1992b). However, Feinstein (1991) uses individual TCMP data, and finds no significant impact of tax rates on reporting, and Alm, Sanchez, and de Juan (1995) find that reporting actually increases with higher tax rates in their experimental study. In addition, one's tax rate *relative* to others' (e.g., "fiscal inequity") matters; that is, if an individual believes that his or her tax rate is "too high" relative to others, then the individual will tend to comply less (Spicer and Becker, 1980; Alm, McClelland, and Schulze, 1999).

6) ***The social and institutional environment in which individuals live affects compliance.*** The overall setting in which an individual lives, works, and functions has important effects on individual compliance, effects that go well beyond the ways by which the environment affects

behavioural incentives. The importance of this overall social and institutional environment as one explanation for what motivates tax compliance has been consistently demonstrated by empirical findings of differences in compliance behaviour in countries with similar fiscal systems (e.g., tax rates, audit rates, fine rates) but different social and institutional environments (Alm, Sanchez, and de Juan, 1995; Cummings et al., 2009; Andrighetto et al., 2016; Zhang et al., 2016). One compelling explanation for these differences in compliance behaviour is that there seems to be a "social norm" of compliance, in which one's compliance depends upon various factors that reflect and capture the many aspects of one's environment. Further, these social norms seem to be affected by the institutions that face individuals and by individuals' attitudes toward these institutions. For example, individuals who have a negative attitude toward government tend to comply less, both in the laboratory (Webley et al., 1991) and in the naturally-occurring world (Pommerehne and Weck-Hannemann, 1996). Further, "trust" in institutions affects the viability of government policies by affecting these social norms: when individual trust in government is greater, enforcement tends to be more effective in deterring noncompliance (Guala and Mittone, 2010; Wahl, Kastlunger, and Kirchler, 2010; Kastlunger et al., 2013; Kogler et al., 2013; Karakostas and Zizzo, 2016). Social norms are also affected by group heterogeneity, with greater heterogeneity (race, religion) often reducing tax compliance via its effects on "social capital" (Alm, Clark, and Leibel, 2016). More broadly, attitudes toward tax evasion (e.g., "tax morale") are influenced by the social environment in which they live, as reflected in their trust in government, their trust in institutions, and the attitudes of their neighbours, and these measures of tax morale seem to have real effects (Alm and Torgler, 2006).[31]

[31] See especially the many papers on tax morale by Benno Torgler, as discussed in detail in Torgler (2007).

7) ***Individual participation in the choice of institutions affects compliance; that is, process (versus outcome) is an essential determinant of compliance.*** A related and important finding is that individual participation in the choice of institutions – the *process* as distinct from the *outcome* – has real effects, independent of the actual levels of tax, audit, and fine rates. For example, subjects in laboratory experiments pay more when they choose the use of their taxes by voting than when the identical use is imposed upon them, their compliance is greater when the vote indicates a clear group consensus, and their compliance is significantly and dramatically lowered by the imposition without taxpayer choice of an unpopular program, even an unpopular program with no financial benefits to individuals (Alm, Jackson, and McKee, 1993; Alm, McClelland, and Schulze, 1999; Feld and Tyran, 2002; Wahl, Muehlbacher, and Kirchler, 2010; Casal et al., 2016). There is also some emerging work on how different forms of communication between the tax authorities and the taxpayers may sometimes increase the social norm of compliance (Onu and Oats, 2016). Even so, the attempt to increase compliance in controlled field experiments by an appeal to social norms has generally been found to have a mixed impact on compliance, with some controlled field experiments finding no impact (Blumenthal, Christian, and Slemrod, 2001; Torgler, 2004; Fellner, Sausgruber, and Traxler, 2013; Castro and Scartascini, 2015; Pomeranz, 2015) and others finding a positive and significant if small effect (Del Carpio, 2013; Bott et al., 2014; Hallsworth et al., 2017; Alm et al., 2017a).

8) ***The information that tax authorities have on income sources is an essential component of a compliance strategy.*** Compliance is far greater on income subject to employer withholding and to third-party information sources than on income not subject to these features. In particular, withholding taxes at source via employer source withholding vastly improves compliance (at least on items subject to withholding) (Internal Revenue Service, 2016a), and providing third-party information to the tax authorities also improves compliance (Marchese, 2009; Johannesen, 2014; Adhikari et al., 2016; Naritomi, 2016; Slemrod et al., 2017). Further, the sharing of this information across governments in the U.S. (e.g., federal governments, state governments) has been found to improve compliance (Alm, Erard, and Feinstein, 1996; Troiano, 2017). Even here, however, the effects of withholding can be mixed. Withholding that applies to only some sources of reporting has been found to improve compliance of these sources (Agostini and Martinez A., 2014; Pomeranz, 2015; Fack and Landais, 2016). However, if there are other margins of behaviour that are not subject to withholding, individuals have been found to reduce compliance along these other margins (Carillo, Pomeranz, and Singhal, 2017).

9) ***The information that individuals are provided about the tax system and about other individuals affects compliance, but in sometimes surprising ways.*** For example, higher audit rates have no impact on compliance if this "official" information is not provided; if it is provided, higher audit rates increase compliance (Alm, Jackson, and McKee, 2009). However, the effects of information on compliance can also be counterintuitive. Telling individuals that they will be "closely examined" (via a message) generally increases the compliance rate of

these individuals (Slemrod, Blumenthal, and Christian, 2001); however, the compliance rate of those individuals who infer that they will not be closely examined falls, and the net impact on overall compliance is often negative (Alm and McKee, 2006). Relatedly, knowing what your "neighbours" are doing affects your own decisions, and not always in a way that increases compliance: if you know that your neighbours are cheating, you will tend to cheat yourself, and vice versa (Alm, Bloomquist, and McKee, 2017). This result implies that telling people about audits can sometimes backfire because what your neighbours do affects what you do. Finally, knowing how your tax dollars are spent often has a positive, if small, impact on compliance (Alm, Jackson, and McKee, 1993a; Pommerehne and Weck-Hannemann, 1996; Alm, McClelland, and Schulze, 1999). Consequently, information that individuals have about the tax system and about other individuals does not always improve compliance.

10) The knowledge that taxpayers have – or do not have – about the tax system affects compliance, but the impacts are unresolved. Taxpayers often do not know what they should pay in taxes, given a complex and uncertain tax system. As a result, they have increasingly come to rely upon paid tax practitioners (and also tax preparation software) in the preparation of their taxes.[32] Indeed, field data suggest that an increase in complexity leads to greater use of a tax practitioner (Long and Caudill, 1987; Dubin, Graetz, and Wilde, 1992; Christian, Gupta, and Lin, 1993), in large part because a taxpayer's lack of understanding about taxes leads him or her to rely upon someone else (e.g., the tax professional) who is seen as much more

[32] According to written testimony of John A. Koskinen, Commissioner of the Internal Revenue Service, before the Senate Finance Committee on Regulation of Tax Return Preparers (8 April 2014), 56 percent of tax returns were prepared with the help of a paid tax preparer, while another 34 percent were completed using tax preparation software. See https://www.irs.gov/uac/commissioners-comments-statements-and-remarks.

knowledgeable (Eriksen and Fallan, 1996; Sakurai and Braithwaite, 2003). Because field data also indicate that compliance is generally lower for returns prepared by a practitioner (Erard, 1993, 1997), the use of tax practitioner is associated with reduced tax compliance. However, laboratory experiments suggest that a more complicated tax system often (if not always) tends to decrease compliance and that better administrative services that make it easier for an individual to pay taxes tends to improve compliance (Alm, Jackson, and McKee, 1993b; Alm, Cherry, Jones, and McKee, 2010; Alm et al., 2017b). Even so, these effects are weak and variable. It may well be that "mental accounting" may help explain the impacts of complexity (Muehlbacher, Hartl, and Kirchler, 2017).

11) Demographics matters. There is consistent evidence that compliance may be motivated, or at least affected, by numerous demographic variables. For example, the analysis of TCMP data suggests that compliance tends to be lower for individuals who are younger, who are single, and who are self-employed (Clotfelter, 1983; Witte and Woodbury, 1985; Dubin and Wilde, 1988; Dubin, Graetz, and Wilde, 1990; Feinstein, 1991; Beron, Tauchen, and Witte, 1992; Erard, 1993; Erard and Ho, 2001; Alm, Clark, and Leibel, 2016). There is also evidence that individuals in laboratory experiments are more likely to decrease their compliance if they are male, if they are younger, and if they do not prepare their own taxes (Friedland, Maital, and Rutenberg, 1978; Baldry, 1987; Alm, Jackson, and McKee, 1992a; Alm and McKee, 2004, 2006; Alm, Cherry, Jones, and McKee, 2010, 2012; Kastlunger et al., 2010; Alm, Bloomquist, and McKee, 2017). The effects of most other demographic variables are uncertain. These results indicate clearly the great heterogeneity of individual behaviour, a finding that has been consistently found in survey evidence going all the way

back to Vogel (1974) and continuing more recently with Torgler (2003b): individuals who are otherwise identical but differ only in (say) age exhibit very different compliance behaviours.

12) Individuals are motivated by many factors beyond narrow financial interest. Individuals who are identified as having greater sympathy (e.g., "concern for another's wellbeing", measured by the frequency of pro-social behaviour) are more compliant, and individuals who are "primed" to elicit empathy (e.g., "putting yourself in someone else's shoes") or to do the "moral" action are more compliant (Christian and Alm, 2014). Other motivations have also been found to affect compliance. For example, Konrad and Qari (2012) and Gangl, Torgler, and Kirchler (2016) find empirical evidence that individuals who exhibit greater "patriotism" are more compliant, possibly because more patriotism generates more cooperation. In promising if still tentative work, there is emerging evidence that the compliance decision creates emotional (or psychic) distress, as measured by skin conductance responses (Coricelli et al., 2010) or heart rate variability (Dulleck et al., 2016). However, the role of emotions in tax compliance decisions remains largely unexamined.

3.5. Summary Redux

The empirical evidence indicates that individuals are motivated by narrowly defined, and individually based, financial considerations (e.g., audits, penalties). However, the evidence also indicates that they are motivated by non-financial considerations (e.g., sympathy, empathy, guilt, shame, morality). Further, there is some evidence that they are motivated by social considerations (e.g., social norms, public goods, voting, neighbour behaviour). There is also evidence that individuals are motivated by information and by the ways in which they process this information. Finally, the evidence is clear that there is great heterogeneity across individuals; that is, individuals cannot be represented by a single representative agent, but must be considered a collection of different segments.

This last conclusion – on individual heterogeneity – is especially important. Put differently, there is no "typical" individual who responds predictably and reliably to all policies. People are complicated, motivated by many different factors, and responsive (if at all) in different ways. In this regard, Gould (1996) emphasizes that it is grossly misleading to represent a complex system by a single, so-called representative agent, who behaves in some average or typical way. Instead, most systems have incredible variety – a "full house" of individual behaviours – and the proper understanding of any system requires recognition of this basic fact. Indeed, Gould (1996) argues that the ways in which a system changes over time are attributable largely to changes in the amount of variation within the system, rather than to changes in some largely meaningless "average" behaviour across its individual members.

This lesson seems especially apt for tax compliance. People exhibit a remarkable diversity in their behaviour. There are individuals who always cheat and those who always comply, some who behave as if they maximize the expected utility of the tax evasion gamble, others who seem to overweight low probabilities, 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 guided by such things as social norms, moral sentiments, and equity. These findings suggest to me that it is unlikely that a single unifying theory of tax compliance can ever be devised, one that incorporates the incredible variation in individual behaviour exhibited by the many analyses of taxpayer compliance, one that explains the behaviour of all individuals at all times, or even one that explains the actions of the same person at all times. Perhaps our research should still be devoted to the pursuit of such a holy grail. However, these findings suggest to me that our

research needs to recognize that a "theory" of taxpayer compliance must really consist of a "full house" of theories, each explaining the behaviour of different individuals at different times.

Indeed, recent research both by the Internal Revenue Service (2010) and by Her Majesty's Revenue and Customs Service (HMRC, 2009) suggests that understanding the "full house" of taxpayer heterogeneity is essential in determining a "full house" of policies to control evasion. This research indicates that taxpayers may usefully be divided, or segmented, along several key dimensions, especially awareness, ability, opportunity, and motivation.

On "awareness", taxpayers vary considerably in their knowledge of tax requirements, their capacity to learn about their responsibilities, their perceptions of the consequences of not meeting those responsibilities, and their awareness of any services to assist them with their taxes. Similarly, taxpayers also differ in their "ability" to comply: some have better records than others, some have more time to work on their returns, and some have more financial resources to seek outside tax assistance. Further, taxpayers differ in their "opportunity" to deliberately or unintentionally fail to meet their tax obligation. Taxpayers whose only source of income is subject to third-party information reporting and withholding have little opportunity to evade their taxes; taxpayers with significant self-employment earnings, rental receipts, tax shelters, and/or itemized deductions have much greater opportunity for both deliberate misstatements and unintentional errors.

Finally, as emphasized throughout this paper, taxpayers differ in their "motivation" to pay taxes. Indeed, the Internal Revenue Service (2010) suggests 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* (or rational calculator)
- "Pathologically defiant" or "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.[33]

Devising policies to improve compliance requires recognizing the existence of these many taxpayer segments and then targeting policies appropriately, as I discuss next.

4. DEVISING POLICIES TO IMPROVE COMPLIANCE

What does all of this work suggest about devising government policies to improve compliance?

I believe that there are three "paradigms" for tax administration that emerge from this research. 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 I term the traditional "*Enforcement Paradigm*" – the emphasis is exclusively on repression of illegal behaviour through frequent audits and stiff penalties. This has been the conventional paradigm of tax administrations throughout history, and it fits well the standard portfolio model of tax evasion based upon the economics-of-crime theory.

However, 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

[33] There are of course many other ways of classifying, or segmenting, taxpayers. See the earlier discussion of schemes by Schmölders (1960), Frey (1997), Torgler (2003b), McBarnett (2004), Kirchler, Hoelzl, and Wahl (2008), and Braithwaite (2009).

to taxpayer-citizens, in order to assist taxpayers in every step of their filing returns and paying taxes. This new "*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.

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 behaviour 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 tax administration. I term this a "*Trust Paradigm*". It is consistent with the role of various behavioural economics factors like social norms broadly defined 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.

Given this discussion, designing strategies to control tax evasion fall into three main categories, each consistent with one of the three paradigms: increase the likelihood and the threat of punishment, improve the provision of tax services, and change the tax culture. Specifically:

First, there is scope for an improvement in policies to increase detection and punishment (e.g., the Enforcement Paradigm). Traditionally, there are three main aspects of tax administration: taxpayer registration, taxpayer audit, and collections. Improvements in each of these areas are feasible, all of which would enhance detection and punishment. These policies include such obvious actions as increasing the number of audits, improving the quality of the audits (and of the auditors), using more

systematic audit selection methods (e.g., "scoring" methods), improving information-sharing across governments, increasing penalties for tax cheating, applying these penalties often and consistently, publicizing tax evasion convictions in the media as an alternative type of non-financial penalty, relying more heavily on source-withholding whenever possible, facilitating payments through the banking system, granting additional power for collecting delinquent accounts, and increasing taxpayer registration and identification via better use of third-party information. These are all standard methods for increasing enforcement, and one consistent with a paradigm that views the taxpayer as a potential criminal who must be deterred from cheating.

Second, there is scope for an improvement in the services of the tax administration by becoming more "consumer-friendly", along the lines of the Service Paradigm. Such policies include promoting taxpayer education, providing taxpayer services to assist taxpayers in filing returns and paying taxes, improving phone advice service, improving the tax agency website, simplifying taxes and tax forms, and simplifying the payment of taxes. The basic thrust of these actions is to treat the taxpayer more as a client than as a potential criminal.

Third, there may be scope for a government-induced change in the culture of paying taxes, consistent with the Trust Paradigm, by using the mass media to reinforce tax compliance as the ethical form of behaviour, publicizing cheaters, emphasizing the link between payment of taxes and the receipt of government services, targeting certain groups (e.g., new firms or employees) in order to introduce from the start the notion that paying taxes is "the right thing to do", enlisting other organizations to promote compliance, avoiding actions that lead individuals to think cheating is "okay" (e.g., a tax amnesty), addressing perceived inequities in the ways people feel that they are treated, and promoting a tax administrator – and a taxpayer – "code of ethics". It is this third paradigm that is, I believe, an essential but largely neglected strategy for improving compliance.

In short, there should be a "full house" of strategies to address the "full house" of motivations. Even so, the actual evidence supporting these paradigms is not always compelling. Clearly, additional research is required on the potential impacts of these three paradigms, which leads to my final and concluding comments.

5. And Some Future Directions

It is, I hope, apparent that enormous amounts have been learned about what motivates tax compliance. However, it should also be apparent that much remains to be learned. One way to organize one's thinking about these unresolved issues is to group these questions according to the three tax administration paradigms.

The *Enforcement Paradigm* has to date been the subject of most of the research efforts. Even so, a far from exhaustive list of unanswered issues includes the following types of questions. Do higher audit rates increase compliance, or do they destroy "trust" in government and crowd out "intrinsic motivation"? How long lasting are the effects of audits? How do less formal audits (e.g., information returns) affect compliance? Can more effective strategic audit selection methods be designed? How is information about enforcement disseminated among taxpayers, and how do taxpayers respond to this information? Does the specific way in which the tax agency communicates with taxpayers (e.g., letter, phone, email) affect compliance? What is the effect of an audit on the audited individual (e.g., the specific deterrent effect of an audit) versus its effect on non-audited individuals (e.g., the general deterrent effect)? How effective are higher financial penalty rates? Are non-financial penalties a deterrent? Does public disclosure act as a deterrent?

On the *Service Paradigm*, there are also unresolved questions. For example, how does complexity affect individual compliance? Does the presence of taxpayer uncertainty about either

taxable income or the various administrative parameters like the audit rate or the fine rate affect compliance? Does tax simplification contribute to more tax compliance? Can better tax agency services improve taxpayer compliance? What specific services can the tax agency provide? What is the role of tax preparers in individual tax compliance? Can improved government service provision of *individual* inducements (e.g., social insurance programs, lotteries) and/or *group* payoffs (e.g., public programs) improve compliance? Again, this list is far from exhaustive.

Still other and perhaps more difficult questions relate to the *Trust Paradigm*. How can the impact of greater "trust" on tax compliance actually be measured? If there is in fact a demonstrable – and measurable – effect of trust on tax compliance, how can such trust be changed by deliberate policy actions? What is the role of a social norm (or its many related notions) in compliance? How can a social norm be affected by deliberately chosen government policies? What role do societal institutions (e.g., collective decision rules) play in this process? How can "fairness" be defined? Does the perception of fairness lead to increased trust in government, with a subsequent improvement in compliance? Does an increase in inequality affect perceptions of fairness? How can political support for improved tax compliance be generated? What are the social dynamics of compliance, and how can these dynamics be affected by government policies?

There are also even broader and more fundamental questions, of which I list only a few.[34] Given the demonstrable heterogeneity of taxpayers, how can these taxpayer "segments" be identified? Are there dimensions beyond awareness, ability, opportunity, and motivation that

[34] Note that there are also many unresolved issues that go well beyond "What Motivates Tax Compliance?" It is especially important to examine the revenue, distributional, and allocative effects of tax evasion, including the resulting implications for "optimal tax administration". For example, see the many IRS tax gap studies for analyses of revenue effects (available online at https://www.irs.gov/uac/the-tax-gap); see Alm, Bahl, and Murray (1991), Johns and Slemrod (2010), and Alm and Sennoga (2010) for analyses of distributional effects; see Alm (1985) and Kesselman (1989) for analyses of allocative effects; and see Slemrod and Gillitzer (2014) and Keen and Slemrod (2017) for analyses of optimal tax administration.

generate taxpayer segments, such as emotions? Even if one can identify these segments, how can different government policies be specifically targeted to these different segments? How does the effectiveness of government policies differ by taxpayer segment? What is the appropriate sequencing of the three paradigms in their implementation (e.g., does the effectiveness of, say, enforcement depend upon the prior existence of trust)? Why do the same (apparent) policies work in some settings and not in others? A promising recent approach has been suggested by Kerschbamer (2015) in his "Equality Equivalence Test".

In this regard, I conclude with three predictions about the direction of future research. First, theory is essential, and new theories will continue to be developed. However, I believe that there will be growing recognition that one theory may not fit all individuals at all times, or even the same individual at different times. Individuals in their infinite variety exhibit a "full house" of behaviours, behaviours that cannot be neatly captured by a single methodology. As a result, I believe that it will be important to develop multiple theories of behaviour, theories that allow the introduction into the compliance decision of numerous factors beyond simply enforcement. Indeed, I believe that these new theories will be largely outside the mainstream of economics and indeed will move beyond psychology to sociology, anthropology, and other social sciences in order to understand better which features of naturally occurring settings are likely to affect individual and group decisions. For example, the notion of "reciprocity" arises in large part from anthropology, and that of "adherence to group norms" from sociology. These theories may also move beyond the social sciences to the physical sciences, as argued recently by Torgler (2016a). For example, biology may well help explain the ways in which a system (e.g., paying taxes) based on cooperation and competition evolves over time, the channels by which culture and social norms are affected by genetics, the means by which demographics (e.g., age, gender) affect

behaviour like compliance, or the connections between emotions, neural activities, and subsequent decision-making like tax compliance behaviour.[35] Using alternative perspectives on human behaviour cannot help but expand our understanding of individual behaviour. I also believe that the focus will tend to shift away from modeling *individual* behaviour to modeling *group* behaviour, including the evolution over time of aggregate behaviour. Such aggregate behaviour will necessarily be forced to consider taxes beyond the individual income tax (including especially taxes on internationally mobile firms, products, and factors), and "agent-based models" will emerge as a leading tool here.

Second, I believe that administrative data will be increasingly used in testing theory. Even so, I also believe that experiments – both laboratory experiments and controlled field experiments – will play a decisive role in developing and testing these theories.

Finally, I believe – or rather I hope – that there will be increasing recognition that any answers that emerge from our research will necessarily apply only to the specific setting that is being considered. As I have argued elsewhere (Alm, 2017), "[s]pecific circumstances differ so profoundly across individuals, firms, markets, countries, and time that most any attempt to define 'best practices' that apply in all circumstances will lead to profoundly misleading public policy recommendations". These difficulties should not discourage the search for, say, *specific* policy guidelines that apply to a *specific* setting at a *specific* point in time. However, such guidelines will necessarily be couched in the specific circumstances under consideration, and they will be quite unlikely to apply in other settings. Rather, public policies must make intimate connection to the time and institutional settings in which they are employed. However, even if economics cannot

[35] For example, Arbex et al. (2018) find suggestive evidence that higher levels of testosterone across Canadian male subjects are weakly associated with lower levels of tax evasion, consistent with the notion that testosterone may increase pro-social behaviour.

identify "the" truth, it can often identify "a" truth, and the possibility of identifying "a" truth suggests the ways in which economists can play a useful role in public policy discussions. So, as I have also argued (Alm, 2017), "[e]conomists should continue to develop multiple theories that inform public policies, but we should also focus our efforts on identifying and testing the critical assumptions that drive the results of these theories, recognizing that the validity of any assumptions will depend intimately on specific circumstances".

References

Acemoglu, Daron, and Matthew O. Jackson. 2017. Social norms and the enforcement of laws. *Journal of the European Economic Association* 15 (2): 245-295.

Adhikari, Bibek, James Alm, Brett Collins, Michael Sebastiani, and Eleanor Wilking. 2016. Taxpayer responses to third-party income reporting: Evidence from a natural experiment in the taxicab industry. *IRS Research Bulletin, 6th Annual Joint Research Conference on Tax Administration*. Washington, D.C.: Internal Revenue Service and the Urban-Brookings Tax Policy Center, 3-8.

Advani, Arun, William Elming, and Jonathan Shaw. 2015. How long-lasting are the effects of audits? TARC Discussion Paper 011-15. Exeter, UK: Tax Administration Research Centre, University of Exeter.

Agostini, Claudio A., and Claudia Martinez A. 2014. Response of tax credit claims to tax enforcement: Evidence from a quasi-experiment in Chile. Fiscal Studies 35 (1): 41-65.

Aitken, Sherie S., and Laura Bonneville. 1980. *A General Taxpayer Opinion Survey*. Washington, D.C.: A report prepared by CSR Inc. for the Internal Revenue Service (Contract No. TIR-79-2).

Akerlof, George A. 1980. A theory of social custom, of which unemployment may be one consequence. *The Quarterly Journal of Economics* 94 (4): 749-775.

Allingham, Michael G., and Agnar Sandmo. 1972. Income tax evasion: A theoretical analysis. *Journal of Public Economics* 1 (3-4): 323-338.

Alm, James. 1985. The welfare cost of the underground economy. *Economic Inquiry* 23 (2): 243-263.

Alm, James. 1988a. Noncompliance and payroll taxation in Jamaica. *The Journal of Developing Areas* 22 (4): 477-495.

Alm, James. 1988b. Uncertain tax policies, individual behavior, and welfare. *The American Economic Review* 78 (1): 237-245

Alm, James. 1999. Tax compliance and administration. In *Handbook on Taxation*, W. Bartley Hildreth and James A. Richardson (eds.). New York, NY: Marcel Dekker, Inc., 741-768.

Alm, James. 2012. Measuring, explaining, and controlling tax evasion: Lessons from theory, field studies, and experiments. *International Tax and Public Finance* 19 (1): 54-77.
Alm, James. 2014a. Does an uncertain tax system encourage "aggressive tax planning"? *Economic Analysis and Policy* 44 (1): 30-38.
Alm, James. 2014b. Expanding the theory of tax compliance from individual to group motivations. In *A Handbook of Alternative Theories in Public Economics*, Francesco Forte, Ram Mudambi, and Pietro Navarra (eds.). Cheltenham, UK – Northampton, MA: Edward Elgar Publishing, 260-277.
Alm, James. 2017. Is economics useful for public policy? *Southern Economic Journal* 83 (4): 835-854.
Alm, James, Roy Bahl, and Matthew N. Murray. 1990. Tax structure and tax compliance. *The Review of Economics and Statistics* 72 (4): 603-613.
Alm, James, Roy Bahl, and Matthew N. Murray. 1991. Tax base erosion in developing countries. *Economic Development and Cultural Change* 39 (4): 849-872.
Alm, James, Roy Bahl, and Matthew N. Murray. 1993. Audit selection and income tax underreporting in the tax compliance game. *Journal of Development Economics* 42 (1): 1-33.
Alm, James, Michele Bernasconi, Susan Laury, Daniel J. Lee, and Sally Wallace. 2017. Culture, compliance, and confidentiality: Taxpayer behavior in the United States and Italy. *Journal of Economic Behavior & Organization* 140: 176-196.
Alm, James, Calvin Blackwell, and Michael McKee. 2004. Audit selection and firm compliance with a broad-based sales tax. *National Tax Journal* 57 (2): 209-227.
Alm, James, Kim M. Bloomquist, and Michael McKee. 2015. On the external validity of laboratory tax compliance experiments. *Economic Inquiry* 53 (2): 1170-1186.
Alm, James, Kim M. Bloomquist, and Michael McKee. 2017. When you know your neighbor pays taxes: Information, peer effects, and tax compliance. *Fiscal Studies* 38 (4): 587-613.
Alm, James, David Bruner, and Michael McKee. 2016. Honesty and dishonesty in taxpayer communications in an enforcement regime. *Journal of Economic Psychology* 56: 85-96.
Alm, James, Todd L. Cherry, Michael Jones, and Michael McKee. 2010. Taxpayer information assistance services and tax reporting behavior. *Journal of Economic Psychology* 31 (4): 577-586.
Alm, James, Todd L. Cherry, Michael Jones, and Michael McKee. 2012. Social programs as positive inducements for tax participation. *Journal of Economic Behavior & Organization* 84 (1): 85-96.
Alm, James, Jeremy Clark, and Kara Leibel. 2016. Enforcement, socio-economic diversity, and tax filing compliance in the United States. *Southern Economic Journal* 82 (3): 725-747.
Alm, James, Mark B. Cronshaw, and Michael McKee. 1993. Tax compliance with endogenous audit selection rules. *Kyklos* 46 (1): 27-45.
Alm, James, Brian Erard, and Jonathan S. Feinstein. 1996. The relationship between state and federal tax audits. In *Empirical Foundations of Household Taxation*, Martin Feldstein and James M. Poterba (eds.). Chicago, IL: National Bureau of Economic Research and the University of Chicago Press, 235-273.
Alm, James, Zachary Hawley, Jin Man Lee, and Joshua J. Miller. 2016. Property tax delinquency and its spillover effects on nearby properties. *Regional Science and Urban Economics* 58: 61-77.

Alm, James, Timothy R. Hodge, Gary Sands, and Mark Skidmore. 2015. Detroit property tax delinquency – Social contract in crisis. *Public Finance and Management* 14 (3): 280-305.

Alm, James, Betty R. Jackson, and Michael McKee. 1992a. Deterrence and beyond: Toward a kinder, gentler IRS. In *Why People Pay Taxes: Tax Compliance and Enforcement*, Joel Slemrod (ed.). Ann Arbor, MI: The University of Michigan Press, 311-329.

Alm, James, Betty R. Jackson, and Michael McKee 1992b. Estimating the determinants of taxpayer compliance with experimental data. *National Tax Journal* 45 (1): 107-114.

Alm, James, Betty R. Jackson, and Michael McKee. 1993a. Fiscal exchange, collective decision institutions, and tax compliance. *Journal of Economic Behavior & Organization* 22 (4): 285-303.

Alm, James, Betty R. Jackson, and Michael McKee. 1993b. Institutional uncertainty and taxpayer compliance. *The American Economic Review* 82 (4): 1018-1026.

Alm, James, Betty R. Jackson, and Michael McKee. 2009. Getting the word out: Increased enforcement, audit information dissemination, and compliance behavior. *Journal of Public Economics* 93 (3-4): 60-84.

Alm, James, and Sarah Jacobson. 2007. Using laboratory experiments in public economics. *National Tax Journal* 60 (1): 129-152.

Alm, James, Erich Kirchler, Stephan Muehlbacher, Katharina Gangl, Eva Hofmann, Christoph Kogler, and Maria Pollai. 2012. Rethinking the research paradigms for analyzing tax compliance behaviour. *CESifo Forum* 13 (2): 33-40.

Alm, James, Jorge Martinez-Vazquez, and Chandler McClellan. 2016. Corruption and firm tax evasion. *Journal of Economic Behavior & Organization* 124: 146-163.

Alm, James, and Chandler McClellan. 2012. Tax morale and tax compliance from the firm's perspective. *Kyklos* 65 (1): 1-17.

Alm, James, Gary H. McClelland, and William D. Schultz. 1992. Why do people pay taxes? *Journal of Public Economics* 48 (1): 21-38.

Alm, James, Gary H. McClelland, and William D. Schultz. 1999. Changing the social norm of tax compliance by voting. *Kyklos* 52 (2): 141-171.

Alm, James, and Michael McKee. 2004. Tax compliance as a coordination game. *Journal of Economic Behavior & Organization* 54 (3): 297-312.

Alm, James, and Michael McKee. 2006. Audit certainty, audit productivity, and taxpayer compliance. *National Tax Journal* 59 (4): 801-816.

Alm, James, Michael McKee, William D. Schulze, Carrie von Bose, and Jubo Yan. 2017a. Appeals to social norms and taxpayer compliance. Department of Economics Working Paper. New Orleans, LA: Tulane University.

Alm, James, and Mikhail I. Melnik. 2010. Do ebay sellers comply with state sales taxes? *National Tax Journal* 63 (2): 215-236.

Alm, James, and Mikhail I. Melnik. 2012. Cross-border shopping and state use tax liabilities: Evidence from ebay transactions. *Public Budgeting & Finance* 32 (1): 5-35.

Alm, James, Isabel Sanchez, and Anna de Juan. 1995. Economic and noneconomic factors in tax compliance. *Kyklos* 48 (1): 3-18.

Alm, James, William D. Schulze, Carrie von Bose, and Jubo Yan. 2017b. A taxpayer's use of a tax preparer: Choice considerations and compliance effects. Department of Economics Working Paper. New Orleans, LA: Tulane University.

Alm, James, and Edward B. Sennoga. 2010. Mobility, competition, and the distributional effects of tax evasion. *National Tax Journal* 63 (4, Part 2): 1055-1084.
Alm, James, and Benno Torgler. 2006. Culture differences and tax morale in the United States and in Europe. *Journal of Economic Psychology* 27 (2): 224-226.
Alm, James, and Benno Torgler. 2012. Do ethics matter? Tax compliance and morality. *Journal of Business Ethics* 101 (4): 635-651.
Alm, James, and Mohammed Yunus. 2009. Spatiality and persistence in U.S. individual income tax compliance. *National Tax Journal* 62 (1): 101-124.
Almunia, Miguel, and David Lopez-Rodriguez. 2018. Under the radar: The effects of monitoring firms on tax compliance. *American Economic Journal: Economic Policy* forthcoming.
Andreoni, James, Brian Erard, and Jonathan Feinstein. 1998. Tax compliance. *The Journal of Economic Literature* 36 (2): 818-860.
Andrighetto, Giulia, Nan Zhang, Stefania Ottone, Ferruccio Ponzano, John D'Attoma, and Sven Steinmo. 2016. Are come countries more honest than others? Evidence from a tax compliance experiment in Sweden and Italy. *Frontiers in Psychology*. Available online at https://www.frontiersin.org/articles/10.3389/fpsyg.2016.00472/full.
Andreoni, James, and A. Abigail Payne. 2013. Charitable giving. In *Handbook of Public Economics, Volume 5*, Alan Auerbach, Raj Chetty, Martin Feldstein, and Emmanuel Saez (eds.). Amsterdam, The Netherlands: Elsevier B. V. – North Holland Publishers, Chapter 1, 1-50.
Angner, Erik and George Loewenstein. 2010. Behavioral economics. In *Handbook of the Philosophy of Science, Volume 13*, Uskali Mäki (ed.). Amsterdam, The Netherlands: Elsevier Publishing, 67-101.
Angrist, Joshua D., and Jorn-Steffen Pischke. 2010. The credibility revolution in empirical economics: How better research design is taking the con out of econometrics. *The Journal of Economic Perspectives* 24 (2): 3-30.
Arbex, Marcelo, Justin M. Carre, Shawn N. Geniole, and Enlinson Mattos. 2018. Tax evasion, testosterone, and personality traits. Department of Economics Working Paper Series 18-01. Windsor, Ontario: University of Windsor.
Arcand, Jean-Louis, and Gregoire Rota Graziosi. 2005. Tax compliance and rank dependent expected utility. *The Geneva Risk and Insurance Review* 30 (1): 57-69.
Ariely, Dan. 2008. *Predictably Irrational – The Hidden Forces That Shape Our Decisions*. New York, NY: Harper Collins.
Axelrod, Robert. 1984. *The Evolution of Cooperation*. New York, NY: Basic Books, Inc.
Battiston, Pietro, and Simona Gamba. 2016. The impact of social pressure on tax compliance: A field experiment. *International Review of Law and Economics* 46: 78-85.
Bazart, Cecile, and Michael Pickhardt. 2011. Fighting income tax evasion with positive rewards. *Public Finance Review* 39 (1): 124-149.
Beck, Paul J., and Woon-Oh Jung. 1989a. An economic model of taxpayer compliance under uncertainty. *Journal of Accounting and Public Policy* 8 (1): 1-27.
Beck, Paul J., and Woon-Oh Jung. 1989b. Taxpayers' reporting decisions and auditing under information asymmetry. *The Accounting Review* 66: 468-487.
Beck, Paul J., Jon S. Davis, and Woon-Oh Jung. 1991. Experimental evidence on taxpayer reporting behavior. *The Accounting Review* 66 (3): 535-558.

Becker, Gary S. 1968. Crime and punishment – An economic approach. *The Journal of Political Economy* 76 (2): 169-217.

Becker, Winfried, Heinz-Jurgen Buchner, and Simon Sleeking. 1987. The impact of public transfer expenditures on tax evasion: An experimental approach. *Journal of Public Economics* 34 (2): 243-252.

Beer, Sebastian, Matthias Kasper, Erich Kirchler, and Brian Erard. 2016. Do audits deter future noncompliance? Evidence on self-employed taxpayers. *IRS Research Bulletin, 6th Annual Joint Research Conference on Tax Administration*. Washington, D.C.: Internal Revenue Service and the Urban-Brookings Tax Policy Center, 9-11.

Berger, Melissa, Gerlinde Fellner-Rohling, Rupert Sausgruber, and Christian Traxler. 2016. Higher taxes, more evasion? Evidence from border differentials in TV license fees. *Journal of Public Economics* 135 74-86.

Bernasconi, Michele. 1998. Tax evasion and order of risk aversion. *Journal of Public Economics* 67 (1): 123-134.

Bernasconi, Michele, and Alberto Zanardi. 2004. Tax evasion, tax rates, and reference dependence. *FinanzArchiv* 60 (3): 422-445.

Blackwell, Calvin. 2010. A meta-analysis of incentive effects in tax compliance experiments. In *Developing Alternative Frameworks for Explaining Tax Compliance Behavior*, James Alm, Jorge Martinez-Vazquez, and Benno Torgler (eds.). New York, NY: Routledge, 97-112.

Bloomquist, Kim. 2011. Tax compliance as an evolutionary coordination game: An agent-based approach. *Public Finance Review* 39 (1): 25-49.

Blumenthal, Marsha, Charles Christian, and Joel Slemrod. 2001. Do normative appeals affect tax compliance? Evidence from a controlled field experiment in Minnesota. *National Tax Journal* 54 (1): 125-128.

Bø, Erlend E., Joel Slemrod, and Thor O. Thoresen. 2015. Taxes on the internet: Deterrence effects of public disclosure. *American Economic Journal: Economic Policy* 7 (1): 36-62.

Bolton, Gary E. and Axel Ockenfels. 2000. ERC: A theory of equity, reciprocity, and competition. *The American Economic Review* 90 (1): 166-193.

Bordignon, Massimo. 1993. A fairness approach to income tax evasion. *Journal of Public Economics* 52 (3): 345-362.

Bosco, Luigi, and Luigi Mittone. 1997. Tax evasion and moral constraints: Some experimental evidence. *Kyklos* 50 (3): 297-324.

Bott, Kristina, Alexander W. Cappelen, Erik Ø. Sørensen, and Bertil Tungodden. 2014. You've got mail: A randomized field experiment on tax evasion. Department of Economics Discussion Paper 26/2014. Bergen, Norway: Norwegian School of Economics.

Braithwaite, Valerie. 2009. *Defiance in Taxation and Governance – Resisting and Dismissing Authority in a Democracy*. Cheltenham, UK and Northhampton, MA: Edward Elgar Publishing.

Camerer, Colin F. 2015. The promise and success of lab-field generalizability in experimental economics: A reply to Levitt and List. In *The Methods of Modern Experimental Economics*, Guillaume R. Frechette and Andrew Schotter (eds.). New York, NY: Oxford University Press, Chapter 14.

Camerer, Colin F. and George F. Loewenstein. 2004. Behavioral economics: Past, present and future. In *Advances in Behavioral Economics*, Colin F. Camerer, George F. Loewenstein,

and Matthew Rabin (eds.). Princeton, NJ: Russell Sage Foundation and Princeton University Press, 1-61.
Carillo, Paul, Dina Pomeranz, and Monica Singhal. 2017. Dodging the taxman: Firm misreporting and limits to tax enforcement. *American Economic Journal: Applied Economics* 9 (2): 144-164.
Casagrande, Alberto, Daniela Di Cagno, Alessandro Pandimiglio, and Marco Spallone. 2015. The effect of competition on tax compliance: The role of audit rules and shame. *Journal of Behavioral and Experimental Economics* 59: 96-110.
Casal, Sandro, Christoph Kogler, Luigi Mittone, and Erich Kirchler. 2016. Tax compliance depends on voice of taxpayers. *Journal of Economic Psychology* 56: 141-150.
Casal, Sandro, and Luigi Mittone. 2016. Social esteem versus social stigma: The role of anonymity in an income reporting game. *Journal of Economic Behavior & Organization* 124: 55-66.
Castro, Lucio, and Carlos Scartascini. 2015. Tax compliance and enforcement in the Pampas: Evidence from a field experiment. *Journal of Economic Behavior & Organization* 116: 65-82.
Chen, Kong-Pin and C.Y. Cyrus Chu. 2005. Internal control versus external manipulation: A model of corporate income tax evasion, *The RAND Journal of Economics* 36 (1): 151-164.
Chernick, Howard, and David Merriman. 2013. Using littered pack data to estimate cigarette tax evasion in NYC. *National Tax Journal* 66 (2): 635-668.
Chetty, Raj. 2006. A new method of estimating risk aversion. *The American Economic Review* 96 (5): 1821-1834.
Choo, C. Y. Lawrence, Miguel A. Fonseca, and Gareth D. Myles. 2016. Do students behave like real taxpayers in the lab? Evidence from a real effort ta compliance experiment. *Journal of Economic Behavior & Organization* 124: 102-114.
Christian, Roberta Calvet, and James Alm. 2014. Sympathy, empathy, and tax compliance. *Journal of Economic Psychology* 40: 62-82.
Christian, Charles W., Sanjay Gupta, and Suming Lin. 1993. Determinants of tax preparer usage: Evidence from panel data. *National Tax Journal* 46 (4): 487-503.
Clotfelter, Charles T. 1983. Tax evasion and tax rates: An analysis of individual returns. *The Review of Economics and Statistics* 65 (3): 363-373.
Coleman, James A. 1990. *Foundations of Social Theory*. Cambridge, MA: Belknap Publishers.
Congdon, William J., Jeffrey R. Kling, and Sendhil Mullainathan. 2011. *Policy and Choice – Public Finance through the Lens of Behavioral Economics.* Washington, D.C.: The Brookings Institution Press.
Coricelli, Giorgio, Mateus Joffily, Claude Montmarquette, and Marie Claire Villeval. 2010. Cheating, emotions, and rationality: An experiment on tax evasion. *Experimental Economics* 13 (2): 226-247.
Cowell, Frank A. 1981. Taxation and labour supply with risky activities. *Economica* 48 (192): 365-379.
Cowell, Frank A. 1985. Tax evasion with labour income. *Journal of Public Economics* 26 (1): 19-34.
Cowell, Frank A. 1990. *Cheating the Government: The Economics of Evasion*. Cambridge, MA: The MIT Press.

Cowell, Frank A., and James P. F. Gordon. 1988. Unwillingness to pay: Tax evasion and public good provision. *Journal of Public Economics* 36 (3): 305-321.
Cox, James C., Daniel Friedman, and Vjollca Sadiraj. 2008. Revealed altruism. *Econometrica* 76 (1): 31-69.
Crocker, Keith J., and Joel Slemrod. 2005. Corporate tax evasion with agency costs. *Journal of Public Economics* 89 (9-10): 1593-1610.
Cronshaw, Mark B., and James Alm. 1995. Tax compliance with two-sided uncertainty. *Public Finance Quarterly* 23 (2): 139-166.
Cross, Rod, and G. K. Shaw. 1982. On the economics of tax aversion. *Public Finance/Finances Publiques* 37 (1): 36-47.
Cummings, Ronald G., Jorge Martinez-Vazquez, Michael McKee, and Benno Torgler. 2009. Tax morale affects tax compliance: Evidence from surveys and an artefactual field experiment. *Journal of Economic Behavior & Organization* 70 (3): 447-457.
Dawes, Robyn M. 1980. Social dilemmas. *Annual Review of Psychology* 31: 169-193.
DeBacker, Jason, Bradley T. Heim, Anh Tran, and Alexander Yuskavage. 2015. Legal enforcement and corporate behavior: An analysis of tax aggressiveness after an audit. *Journal of Law and Economics* 58 (2): 291-324.
Del Carpio, Lucia. 2013. Are the neighbors cheating? Evidence from a social norm experiment on property taxes in Peru. Department of Economics Working Paper. Princeton, NJ: Princeton University.
De Paula, Aureo, and Jose A. Scheinkman. 2011. The informal sector: An equilibrium model and some empirical evidence from Brazil. *The Review of Income and Wealth* 57 (S1): S8-AS26.
Dhami, Sanjit, and Ali al-Nowaihi. 2007. Why do people pay taxes? Prospect theory versus expected utility theory. *Journal of Economic Behavior & Organization* 64 (1): 171-192.
Doerrenberg, Philipp, and Jan Schmitz. 2017. Tax compliance and information returns – A field experiment with small firms. *Journal of Behavioral Economics for Policy* 1 (1): 47-54.
Dubin, Jeffrey. 2007. Criminal investigation enforcement activities and taxpayer noncompliance. *Public Finance Review* 35 (4): 500-529.
Dubin, Jeffrey, Michael Graetz, and Louis L. Wilde. 1990. The effect of audit rates on the federal individual income tax, 1977-1986. *National Tax Journal* 43 (4): 395-409.
Dubin, Jeffrey A., Michael J. Graetz, Michael A. Udell, and Louis L. Wilde. 1992. The demand for tax return preparation services. *The Review of Economics and Statistics* 74(1): 75-82.
Dubin, Jeffrey A., and Louis L. Wilde. 1988. An empirical analysis of federal income tax auditing and compliance. *National Tax Journal* 41 (1): 61-74.
Dulleck, Uwe, Jonas Fooken, Cameron Newton, Andrea Ristl, Markus Schaffner, and Benno Torgler. 2016. Tax compliance and psychic costs: Behavioral experimental evidence using a physiological marker. *Journal of Public Economics* 134: 9-18.
Dwenger, Nadja, Henrik Kleven, Imran Rasul, and Johannes Rincke. 2016. Extrinsic and intrinsic motivations for tax compliance: Evidence from a field experiment in Germany. *American Economic Journal: Economic Policy* 8 (3): 203-232.
Eide, Erling, Kristine von Simson, and Steinar Strom. 2011. Rank-dependent utility, tax evasion, and labor supply. *FinanzArchiv* 67 (3): 261-281.
Eisenhauer, Joseph G. 2008. Ethical preferences, risk aversion, and taxpayer behavior. *The Journal of Socio-Economics* 37 (1): 45-63.

Elffers, Henk. 1991. *Income Tax Evasion: Theory and Measurement*. Deventer, The Netherlands: Kluwer Academic Publishers.
Ellsberg, Daniel. 1961. Risk, ambiguity, and the Savage axioms. *The Quarterly Journal of Economics* 75 (4): 643-669.
Elster, Jon. 198). *The Cement of Society – A Study of Social Order*. Cambridge, UK: Cambridge University Press.
Erard, Brian. 1992. The influence of tax audits on reporting behavior. In *Why People Pay Taxes: Tax Compliance and Enforcement*, Joel Slemrod (ed.). Ann Arbor, MI: The University of Michigan Press, 95-114.
Erard, Brian. 1993. Taxation with representation: An analysis of the role of tax practitioners in tax compliance. *Journal of Public Economics* 52 (2): 163-197.
Erard, Brian. 1997. Self-selection with measurement errors: A microeconometric analysis of the decision to seek tax assistance and its implications for tax compliance. *Journal of Econometrics* 81 (2): 319-356.
Erard, Brian, and Jonathan S. Feinstein. 1994. The role of moral sentiments and audit perceptions in tax compliance. *Public Finance* 49 (1): 70-89.
Erard, Brian, and Chih-Chin Ho. 2001. Searching for ghosts: Who are the nonfilers and how much tax do they owe? *Journal of Public Economics* 81 (1): 25-50.
Fack, Gabrielle, and Camille Landais. 2016. The effect of tax enforcement on tax elasticities: Evidence from charitable contributions in France. *Journal of Public Economics* 133: 23-40.
Falk, Armin, and James J. Heckman. 2009. Lab experiments are a major source of knowledge in the social sciences. *Science* 326 (5952): 535-538.
Falkinger, Josef, and Herbert Walther. 1991. Rewards versus penalties: On a new policy against tax evasion. *Public Finance Quarterly* 19 (1): 67-79.
Fehr, Ernst and Klaus M. Schmidt. 1999. A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics* 114 (3): 817-868.
Feige, Edgar L. 2016. Reflections on the meaning and measurement of unobserved economies: What do we really know about the "shadow economy"? *Journal of Tax Administration*, 2 (1): 5-41.
Feinstein, Jonathan S. 1991. An econometric model of income tax evasion and its detection. *The RAND Journal of Economics* 22 (1): 14-35.
Feld, Lars P., and Bruno S. Frey. 2002. Trust breeds trust: How taxpayers are treated. *Economics of Governance* 3 (2): 87-99.
Feld, Lars P., Bruno S. Frey, and Benno Torgler. 2006. Rewarding honest taxpayers. In *Managing and Maintaining Compliance*, Henk Elffers, Peter Verboon, and Wim Huisman (eds.). The Hague, The Netherlands: Boom Legal Publishers, 45-61.
Feld, Lars P., and Jean-Robert Tyran. 2002. Tax evasion and voting: An experimental analysis. *Kyklos* 55 (2): 197-121.
Feldman, Naomi, and Joel Slemrod. 2007. Estimating tax compliance with evidence from unaudited tax returns. *The Economic Journal* 117 (518): 327-352.
Fellner, Gerlinde, Rupert Sausgruber, and Christian Traxler. 2013. Testing enforcement strategies in the field: Threat, moral appeal, and social information. *Journal of the European Economic Association* 11 (3): 634-600.

Fochmann, Martin, and Eike B. Kroll. 2016. The effects of rewards on tax compliance decisions. *Journal of Economic Psychology* 52: 38-55.
Fortin, Bernard, Guy Lacroix, and Marie-Claire Villeval. 2007. Tax evasion and social interactions. *Journal of Public Economics* 91 (11-12): 1-19.
Frechette, Guillaume R. 2015. Laboratory experiments: Professionals versus students. In *The Methods of Modern Experimental Economics*, Guillaume R. Frechette and Andrew Schotter (eds.). New York, NY: Oxford University Press, Chapter 17.
Friedland, Nehemiah, Shlomo Maital, and Aryeh Rutenberg. 1978. A simulation study of income tax evasion. *Journal of Public Economics* 10 (1): 107-116.
Friend, Irwin, and Marshall E. Blume. 1975. The demand for risky assets. *The American Economic Review* 65 (5): 900-922.
Frey, Bruno. 1997. *Not Just For the Money – An Economic Theory of Personal Motivation*. Cheltenham, United Kingdom: Edward Elgar Publishing Limited.
Gandelman, Nestor, and Ruben Hernandez-Murillo. 2013. What do happiness and health satisfaction data tell us about relative risk aversion? *Journal of Economic Psychology* 39: 301-312.
Gangl, Katharina, Benno Torgler, and Erich Kirchler. 2016. Patriotism's impact on cooperation with the state: An experimental study on tax compliance. *Political Psychology* 37 (6): 867-881.
Gangl, Katharina, Benno Torgler, Erich Kirchler, and Eva Hoffman. 2014. Effects of supervision on tax compliance: Evidence from a field experiment in Austria. *Economic Letters* 123 (3): 378-382.
Gemmell, Norman, and Marisa Ratto. 2012. Behavioral responses to taxpayer audits: Evidence from random taxpayer inquiries. *National Tax Journal* 65 (1): 33-58.
Glaeser, Edward L. 2004. Psychology and the market. *The American Economic Review Papers and Proceedings* 94 (2): 408-413.
Glaeser, Edward L. 2006. Paternalism and psychology. *The University of Chicago Law Review* 73 (1): 133-156.
Gneezy, Uri, and Also Rustichini. 2000. A fine is a price. *Journal of Legal Studies* 29 (1): 1-17.
Goerke, Laszlo, and Marco Runkel. 2006. Profit tax evasion under oligopoly with endogenous market structure. *National Tax Journal* 59 (4): 851-857.
Gordon, James P. F. 1989. Individual morality and reputation costs as deterrents to tax evasion. *European Economic Review* 33 (4): 797-805.
Gorodnichenko, Yuriy, Jorge Martinez-Vazquez, and Klara Sabirianova Peter. 2009. Myth and reality of flat tax reform: Micro estimates of tax evasion response and welfare effects in Russia. *The Journal of Political Economy* 117 (3): 504-554.
Gould, Stephen Jay. 1996. *Full House: The Spread of Excellence from Plato to Darwin*. New York, NY: Harmony Books.
Graetz, Michael J., Jennifer F. Reinganum, and Louis L. Wilde. 1986. The tax compliance game: Toward an interactive theory of tax enforcement. *Journal of Law, Economics, and Organization* 2 (1): 1-32.
Graetz, Michael J., and Louis L. Wilde. 1985. The economics of tax compliance: Fact and fantasy. *National Tax Journal* 38 (3): 355-363.
Greenberg, Joseph. 1984. Avoiding tax avoidance: A (repeated) game-theoretic approach. *Journal of Economic Theory* 32 (1): 1-13.

Gruber, Jonathan, and Emmauel Saez. 2002. The elasticity of taxable income: Evidence and implications. *Journal of Public Economics* 84 (1): 1-32.
Guala, Francesco, and Luigi Mittone. 2010. How history and convention create norms: An experimental study. Journal of Economic Psychology 31 (4): 749-756.
Hall, Robert E. 1988. Intertemporal substitution in consumption. *The Journal of Political Economy* 96 (2): 339-357.
Hallsworth, Michael. 2014. The use of field experiments to increase tax compliance. *Oxford Review of Economic Policy* 30 (4): 658-679.
Hallsworth, Michael, John A. List, Robert D. Metcalfe, and Ivo Vlaev. 2017. The behavioralist as tax collector: Using natural field experiments to enhance tax compliance. *Journal of Public Economics* 148: 14-31.
Hansen, Lars Peter, and Kenneth J. Singleton. 1983. Stochastic consumption, risk aversion, and the temporal behavior of asset returns. *The Journal of Political Economy* 92 (2): 249-265.
Harrison, Glenn W., Morten Lau, and E. Elisabet Rutström. 2015. Theory, experimental design and econometrics are complementary (and so are lab and field experiments). In *The Methods of Modern Experimental Economics*, Guillaume R. Frechette and Andrew Schotter (eds.). New York, NY: Oxford University Press, Chapter 15.
Hasegawa, Makoto, Jeffrey L. Hoopes, Ryo Ishida, and Joel Slemrod. 2013. The effect of public disclosure on reported taxable income: Evidence from individuals and corporations in Japan. *National Tax Journal* 66 (3): 571-608.
Hashimzade, Nigar, Gareth D. Myles, and Binh Tran-Nam. 2013. Applications of behavioural economics to tax evasion. *Journal of Economic Surveys* 27 (5): 941-977.
Henderson, J. Vernon, Adam Storeygard, and David N. Weil. 2012. Measuring economic growth from outer space. *The American Economic Review* 102 (2): 994-1028.
Her Majesty's Revenue and Customs (HMRC). 2009. *Individuals Prioritisation: An Investigation into Segmentation of the Individuals Customer Base*. London, United Kingdom: Research Report.
Homans, George C. 1961. *Social Behavior*. New York, NY: Harcourt Brace and World.
Internal Revenue Service. 2006. *Tax Year 2001 Federal Tax Gap* (Extended Version). Washington, D.C.: IRS Office of Research, Analysis, and Statistics. Available online at: http://www.irs.gov/pub/irs-soi/01rastg07map.pdf.
Internal Revenue Service. 2010. *Final Report for Planning Theoretical Research (T.O. 0002).* Washington, D.C.: Internal Revenue Service.
Internal Revenue Service. 2012. *Tax Gap Estimates for Tax Year 2006 - Overview*. Washington, D.C.: IRS Office of Research, Analysis, and Statistics. Available online at: https://www.irs.gov/pub/newsroom/overview_tax_gap_2006.pdf.
Internal Revenue Service. 2016a. *Tax Gap Estimates for Tax Years 2008-2010*. Washington, D.C.: IRS Office of Research, Analysis, and Statistics. Available online at: https://www.irs.gov/pub/newsroom/tax%20gap%20estimates%20for%202008%20through%202010.pdf.
Internal Revenue Service. 2016b. *Internal Revenue Service Data Book* (Publication 55B). Washington, D.C.: Internal Revenue Service.
Iyer, Govind S., Philip M. J. Reckers, and Debra L. Sanders. 2010. Increasing tax compliance in Washington state: A field experiment. *National Tax Journal* 63 (1): 7-32.

Johannesen, Niels. 2014. Tax evasion and Swiss bank deposits. *Journal of Public Economics* 111: 46-62.
Johns, Andrew, and Joel Slemrod. 2010. The distribution of income tax noncompliance. *National Tax Journal* 63 (3): 397-418.
Joulfaian, David. 2000. Corporate income tax evasion and managerial preferences. *The Review of Economics and Statistics* 82 (4): 698-701.
Kagel, John H. 2015. Laboratory experiments: The Lab in relationship to field experiments, field data, and economic theory. In *The Methods of Modern Experimental Economics*, edited by Guillaume R. Frechette and Andrew Schotter (eds.). New York, NY: Oxford University Press, Chapter 16.
Kahneman, Daniel. 2011. *Thinking, Fast and Slow*. New York, NY: Farrar, Straus and Giroux.
Kahneman, Daniel, and Amos Tversky. 1979. Prospect theory: An analysis of decision under risk. *Econometrica* 47 (2): 263-292.
Kamdar, Nipoli. 1997. Corporate income tax compliance: A time series analysis. *Atlantic Economic Journal* 25 (1): 37-49.
Karakostas, Alexandrow, and Daniel John Zizzo. 2016. Compliance and the power of authority. *Journal of Economic Behavior & Organization* 124: 67-80.
Kastlunger, Barbara, Stefan G. Dressler, Erich Kirchler, Luigi Mittone, and Martin Voracek. 2010. Sex differences in tax compliance: Differentiating between demographic sex, gender-role orientation, and prenatal masculinization (2D:4D). *Journal of Economic Psychology* 31 (4): 542-552.
Kastlunger, Barbara, Erich Kirchler, Luigi Mittone, and Julia Pitters. 2009. Sequences of audits, tax compliance, and taxpaying strategies. *Journal of Economic Psychology* 30 (3): 405-418.
Kastlunger, Barbara, Edoardo Lozza, Erich Kirchler, and Alfred Schabmann. 2013. Powerful authorities and trusting citizens: The slippery slope framework and tax compliance in Italy. *Journal of Economic Psychology* 34 (1): 36-54.
Keen, Michael. 2007. VAT attacks! *International Tax and Public Finance* 14 (4): 365-381.
Keen, Michael, and Ben Lockwood. 2010. The value added tax: Its causes and consequences. *Journal of Development Economics* 92 (2): 138-151.
Keen, Michael, and Joel Slemrod. 2017. Optimal tax administration. *Journal of Public Economics* 152: 133-142.
Keen, Michael, and Stephen Smith. 2006. VAT fraud and evasion: What do we know and what can be done? *National Tax Journal* 59 (4): 861-887.
Kerschbamer, Rudolf. 2015. The geometry of distributional preferences and a non-parametric identification approach: The Equality Equivalence Test. *European Economic Review* 76: 85-103.
Kesselman, Jonathan R. 1989. Income tax evasion: An intersectoral analysis. *Journal of Public Economics* 38 (2): 137-182.
Kessler, Judd B., and Lise Vesterlund. 2015. The external validity of laboratory experiments: The misleading emphasis on quantitative effects. In *The Methods of Modern Experimental Economics*, Guillaume R. Frechette and Andrew Schotter (eds.). New York, NY: Oxford University Press, Chapter 18.
Kim, Youngse. 2003. Income distribution and equilibrium multiplicity in a stigma-based model of tax evasion. *Journal of Public Economics* 87 (9): 1591-1616.

Kinsey, Karyl A. 1992. Deterrence and alienation effects of IRS enforcement: An analysis of survey data. In *Why People Pay Taxes: Tax Compliance and Enforcement*, Joel Slemrod (ed.). Ann Arbor, MI: The University of Michigan Press, 259-285.

Kirchler, Erich. *The Economic Psychology of Tax Behaviour*. Cambridge, UK: Cambridge University Press.

Kirchler, Erich, Erik Hoelzl, and Ingrid Wahl. 2008. Enforced versus voluntary tax compliance: The "slippery slope" framework. *Journal of Economic Psychology* 29 (2): 210-225.

Kirchler, Erich, and Ingrid Wahl. 2010. Tax compliance inventory TAX-I: Designing an inventory for surveys of tax compliance. *Journal of Economic Psychology* 31 (3): 331-346.

Klepper, Steven, and Daniel S. Nagin. 1989. The role of tax practitioners in tax compliance. *Policy Sciences* 22 (2): 167-192.

Kleven, Henrik J., Martin B. Knudsen, Claus T. Kreiner, Søren Pedersen, and Emmanuel Saez. 2011. Unwilling or unable to cheat? Evidence from a randomized tax audit experiment in Denmark. *Econometrica* 79 (3): 651-692.

Kleven, Henrik J., and Mazhar Waseem. 2013. Using notches to uncover optimization frictions and structural elasticities: Theory and evidence from Pakistan. *The Quarterly Journal of Economics* 128 (2): 669-723.

Koessler, Ann-Kathrin, Benno Torgler, Lars P. Feld, and Bruno S. Frey. 2016. Commitment to pay taxes: A field experiment on the importance of promise. CESifo Working Paper No. 6186. Munich, Germany: Center for Economic Studies and the ifo Institute.

Kogler, Christoph, Larissa Batrancea, Anca Nichita, Jozsef Pantya, Alexis Belianin, and Erich Kirchler. 2013. Trust and power as determinants of tax compliance: Testing the assumptions of the slippery slope framework in Austria, Hungary, Romania, and Russia. *Journal of Economic Psychology* 34 (1): 169-180.

Kogler, Christoph, Luigi Mittone, and Erich Kirchler. 2016. Delayed feedback on tax audits affects compliance and fairness perceptions. *Journal of Economic Behavior & Organization* 124: 81-87.

Konrad, Kai, A., and Salmai Qari. 2012. The last refuge of a scoundrel? Patriotism and tax compliance. *Economica* 79 (315): 516-533.

Korobow, Adam, Chris Johnson, and Robert Axtell. 2007. An agent-based model of tax compliance with social networks. *National Tax Journal* 60 (3): 589-610.

Kuchumova, Yulia (Paramonova). 2017. The optimal deterrence of tax evasion: The trade-off between information reporting and audits. *Journal of Public Economics* 145: 162-180.

Laibson, David I. 1997. Golden eggs and hyperbolic discounting. *The Quarterly Journal of Economics* 112 (2): 443-477.

Laibson, David I. 1998. Life-cycle consumption and hyperbolic discount functions. *European Economic Review* 42 (4): 861-871.

Landsberger, Michael, and Isaac Meilijson. 1982. Incentive generating state dependent penalty system. *Journal of Public Economics* 19 (3): 333-352.

Ledyard, John O. 1995. Public goods: A survey of experimental research. In *The Handbook of Experimental Economics*, John H. Kagel and Alvin E. Roth (eds.). 111-194. Princeton, NJ: Princeton University Press, 111-194.

Lefebvre, Mathieu, Pierre Pestieau, Arno Riedl, and Marie Claire Villeval. 2015. Tax evasion and social information: An experiment in Belgium, France, and the Netherlands. *International Tax and Public Finance* 22 (3): 401-425.

LeMieux, Thomas, Bernard Fortin, and Pierre Frechette. 1994. The effect of taxes on labor supply in the underground economy. *The American Economic Review* 84 (1): 231-254.

Levitt, Steven D., and John A. List. 2007. What do laboratory experiments measuring social preferences reveal about the real world? *The Journal of Economic Perspectives* 21 (2): 153-174.

Long, James E., and Steven B. Caudill. 1987. The usage and benefits of paid tax return preparation. *National Tax Journal* 40 (1): 35-46.

Loomes, Graham, and Robert Sugden. 1982. Regret theory: An alternative theory of rational choice under uncertainty. *The Economic Journal* 92 (368): 805-824.

Loomes, Graham, and Robert Sugden. 1987. Testing for regret and disappointment in choice under uncertainty. *The Economic Journal* 97 (388a): 118-129.

Malik, Arun S., and Robert M. Schwab. 1991. The economics of tax amnesties. *Journal of Public Economics* 46 (1): 29-49.

Marchase, Carla. 2009. Rewarding the consumer for curbing the evasion of commodity taxes? *FinanzArchiv* 65 (4): 383-402.

Martinez-Vazquez, Jorge, and Mark Rider. 2005. Multiple modes of tax evasion: Theory and evidence. *National Tax Journal* 58 (1): 51-76.

Mascagni, Giulia. 2018. From the lab to the field: A review of tax experiments. *Journal of Economic Surveys* forthcoming.

McBarnet, Doreen. 2004. *Crime, Compliance, and Control*. Burlington, VT: Ashgate/Dartmouth Publishers Ltd.

McCaffery, Edward J., and Joel Slemrod (eds.). 2006. *Behavioral Public Finance*. New York, NY: Russell Sage Foundation.

Maciejovsky, Boris, Erich Kirchler, and Herbert Schwarzenberger. 2007. Misperceptions of chance and loss repair: On the dynamics of tax compliance. *Journal of Economic Psychology* 28 (6): 678-691.

Marrelli, Massimo, and Riccardo Martina. 1988. Tax evasion and strategic behavior of the firms. *Journal of Public Economics* 37 (1): 55-69.

Meyer, Bruce D. Wallace K. C. Mok, and James X. Sullivan. 2015. Household surveys in crisis. *The Journal of Economic Perspectives* 29 (4): 199-226.

Mittone, Luigi. 2006. Dynamic behaviour in tax evasion: An experimental approach. *The Journal of Socio-Economics* 35 (5): 813-835.

Mittone, Luigi, Fabrizio Panebianco, and Alessandro Santoro. 2017. The bomb-crater effect of tax audits: Beyond the misperception of chance. *Journal of Economic Psychology* 61: 225-243.

Muehlbacher, Stephan, Barbara Hartl, and Erich Kirchler. 2017. Mental accounting and tax compliance: Experimental evidence for the effect of mental segregation of tax due and revenue on compliance. *Public Finance Review* 45 (1): 118-139.

Murray, Matthew N. 1995. Sales tax compliance and audit selection. *National Tax Journal* 48(4): 515-530.

Myles, Gareth D., and Robin A. Naylor. 1996. A model of tax evasion with group conformity and social customs. *European Journal of Political Economy* 12 (1): 49-66.

Naritomi, Joana. 2016. Consumers as tax auditors. LSE Working Paper. London, UK: London School of Economics.
Nur-tegin, Kanybek. 2008. Determinants of business tax compliance. *The B. E. Journal of Economic Analysis and Policy* 8 (1): Article 18.
Onu, Diana, and Lynne Oats. 2016. "Paying tax is part of life": Social norms and social influence in tax communications. *Journal of Economic Behavior & Organization* 124: 29-42.
Ortega, Daniel, and Carlos Scartascini. 2015. Don't blame the messenger: A field experiment on delivery methods for increasing tax compliance. IDB Working Paper Series No. IDB-WP-627. Washington, D.C.: Inter-American Development Bank.
Paetzold, Jorg, and Hannes Winner. 2016. Taking the high road? Compliance with commuter tax allowances and the role of evasion. *Journal of Public Economics* 143: 1-14.
Pencavel, John H. 1979. A note on income tax evasion, labor supply, and nonlinear tax schedules. *Journal of Public Economics* 12 (1): 115-124.
Perez-Truglia, Ricardo, and Ugo Troiano. 2015. Tax debt enforcement: Theory and evidence from a field experiment in the United States. Department of Economics Working Paper. Ann Arbor, MI: University of Michigan.
Pestieau, Pierre, and Uri M. Possen. 1991. Tax evasion and occupational choice. *Journal of Public Economics* 45 (1): 107-125.
Pissarides, Christopher A., and Guglielmo Weber. 1989. An expenditure-based estimate of Britain's black economy. *Journal of Public Economics* 39 (1): 17–32.
Pomeranz, Dina. 2015. No taxation without information: Deterrence and self-enforcement in the value added tax. *The American Economic Review* 105 (8): 2539-2569.
Pommerehne, Werner W., and Hannelore Weck-Hannemann. 1996. Tax rates, tax administration, and income tax evasion in Switzerland. *Public Choice* 88 (1/2): 161-170.
Pyle, D. J. 1991. The economics of taxpayer compliance. *Journal of Economic Surveys* 5 (2): 163-198.
Quiggin, John. 1982. A theory of anticipated utility. *Journal of Economic Behavior & Organization* 3 (4): 323-343.
Rabin, Matthew. 1993. Incorporating fairness into game theory and economics. *The American Economic Review* 83 (5): 1281-302
Rabin, Matthew. 1998. Psychology and economics. *The Journal of Economic Literature* 36 (1): 11-46.
Reinganum, Jennifer F., and Louis L. Wilde. 1985. Income tax compliance in a principal-agent framework. *Journal of Public Economics* 26 (1): 1-18.
Reinganum, Jennifer F., and Louis L. Wilde. 1986. Equilibrium verification and reporting policies in a model of tax compliance. *International Economic Review* 27 (3): 739-760.
Reinganum, Jennifer F., and Louis L. Wilde. 1991. Equilibrium enforcement and compliance in the presence of tax practitioners. *Journal of Law, Economics, and Organization* 7 (1): 163-181.
Richardson, Maryann, and Adrian Sawyer. 2001. A taxonomy of the tax compliance literature: Further findings, problems and prospects. *Australian Tax Forum* 16: 137-284.
Rice, Eric M. 1992. The corporate tax gap: Evidence on tax compliance by small corporations. In *Why People Pay Taxes: Tax Compliance and Enforcement,* Joel Slemrod (ed.). Ann Arbor, MI: University of Michigan Press, 125-161.Why people pa

Rickard, J. A., A. M. Russell, and T. D. Howroyd. 1982. A tax evasion model with allowance for retroactive penalties. *Economic Record* 58 (4): 379-385.
Roth, Alvin E. 1987. Laboratory experimentation in economics. In *Advances in Economic Theory, Fifth World Congress*, Truman Bewley (ed.). Cambridge, UK: Cambridge University Press, 269-299.
Saez, Emmanuel. 2010. Do filers bunch at kink points? *American Economic Journal: Economic Policy* 2 (3): 180-212.
Saez, Emmanuel, Joel Slemrod, and Seth Giertz. 2009. The elasticity of taxable income with respect to marginal tax rates: A critical review. *The Journal of Economic Literature* 50 (1): 3-50.
Sakurai, Yuka, and Valerie Braithwaite. 2003. Taxpayers' perceptions of practitioners: Finding one who is effective and does the right thing? *Journal of Business Ethics* 46 (4): 375-387.
Sandmo, Agnar. 2012. An evasive topic: Theorizing about the hidden economy. *International Tax and Public Finance* 19 (1): 5-24.
Schmeidler, David. 1989. Subjective probability and expected utility theory without additivity. *Econometrica* 57 (3): 571-587.
Schmölders, Gunter. 1960. *Das Irrationale in der Offentlichen Finanzwirtschaft* [The Irrational in Public Finance]. Frankfurt am Main, Germany: Suhrkamp.
Schneider, Friedrich. 2016a. Estimating the size of the shadow economy: Methods, problems, and open questions. *Turkish Economic Review* 3 (2): 256-280.
Schneider, Friedrich. 2016b. Comment on Feige's paper "Reflections on the meaning and measurement of unobserved economies: What do we really know about the 'shadow economy'?" *Journal of Tax Administration* 2 (2): 82-92.
Schneider, Friedrich, and Dominik H. Enste. 2002. *The Shadow Economy: Theoretical Approaches, Empirical Studies, and Political Implications*. Cambridge, UK: Cambridge University Press.
Scotchmer, Suzanne. 1989. The effects of tax advisors on tax compliance. In *Taxpayer Compliance, Volume 2: Social Science Perspectives*, Jeffrey A. Roth and John T. Scholz (eds.). Philadelphia, PA: University of Pennsylvania Press, 182-199.
Scotchmer, Suzanne, and Joel Slemrod. 1989. Randomness in tax enforcement. *Journal of Public Economics* 38 (1): 17-32.
Segal, Uzi, and Avia Spivak. 1990. First order and second order risk aversion. *Journal of Economic Theory* 51 (1): 111-125.
Semerad, Pavel, and Lucie Bartunkova. 2016. VAT control statement as a solution to tax evasion in the Czech Republic. *Procedia – Social and Behavioral Sciences* 220: 417-423.
Sheffrin, Steven M., and Robert K. Triest. 1992. Can brute deterrence backfire? Perceptions and attitudes in taxpayer compliance. In *Why People Pay Taxes: Tax Compliance and Enforcement*, Joel Slemrod (ed.). Ann Arbor, MI: The University of Michigan Press, 193-218.
Simon, Herbert. 1955. A behavioral model of rational choice. *The Quarterly Journal of Economics* 69 (1): 99-118.
Slemrod, Joel. 1985. An empirical test for tax evasion. *The Review of Economics and Statistics* 67 (2): 232-238.
Slemrod, Joel. 2007. Cheating ourselves: The economics of tax evasion. *The Journal of Economic Perspectives* 21 (1): 25-48.

Slemrod, Joel. 2016. Caveats to the research use of tax-return administrative data. *National Tax Journal* 69 (4): 1003-1020.
Slemrod, Joel, Marsha Blumenthal, and Charles C. Christian. 2001. Taxpayer response to an increased probability of audit: Evidence from a controlled experiment in Minnesota. *Journal of Public Economics* 79 (3): 455-483.
Slemrod, Joel, Brett Collins, Jeffrey L. Hoopes, Daniel Reck, and Michael Sebastiani. 2017. Does credit-card information reporting improve small-business tax compliance? *Journal of Public Economics* 149: 1-19.
Slemrod, Joel, and Christian Gillitzer. 2014. *Tax Systems*. Cambridge, MA: The MIT Press.
Slemrod, Joel, and Caroline Weber. 2012. Evidence of the invisible: Toward a credibility revolution in the empirical analysis of tax evasion and the informal economy. *International Tax and Public Finance* 19 (1): 25-53.
Slemrod, Joel, and Shlomo Yitzhaki. 2002. Tax avoidance, evasion, and administration. In *Handbook of Public Economics, Volume 4* (Chapter 22), Alan J. Auerbach and Martin Feldstein (eds.). Amsterdam, London, and New York: Elsevier B.V. North Holland Publishers, 1423-1470.
Smith, Vernon L. 1982. Microeconomic systems as an experimental science. *The American Economic Review* 72 (5): 923-955.
Snow, Arthur, and Ronald S. Warren, Jr. 2005. Ambiguity about audit probability, tax compliance, and taxpayer welfare. *Economic Inquiry* 43 (4): 865-871.
Spicer, Michael W., and Lee A. Becker. 1980. Fiscal inequity and tax compliance: An experimental approach. *National Tax Journal* 33 (2): 171-175.
Spicer, Michael W., and Rodney E. Hero. 1985. Tax evasion and heuristics: A research note. *Journal of Public Economics* 26 (2): 263-267.
Srinivasan, T. N. 1973. Tax evasion: A model. *Journal of Public Economics* 2 (4): 339-346.
Thaler, Richard H., and Cass R. Sunstein. 2008. *Nudge: Improving Decisions about Health, Wealth, and Happiness*. New Haven, CT: Yale University Press.
Torgler, Benno. 2002. Speaking to theorists and searching for facts: Tax morale and compliance in experiments. *Journal of Economic Surveys* 16 (5): 657-683.
Torgler, Benno. 2003a. Beyond punishment: A tax compliance experiment with taxpayers in Costa Rica. *Revista de Analisis Economico – Economic Analysis Review* 18 (1): 27-56.
Torgler, Benno. 2003b. Tax morale, rule-governed behaviour, and trust. *Constitutional Political Economyh* 14 (2): 119-140.
Torgler, Benno. 2004. Moral suasion: An alternative tax policy strategy? Evidence from a controlled field experiment. *Economics of Governance* 5 (3): 235-253.
Torgler, Benno. 2007. *Tax Compliance and Tax Morale: A Theoretical and Empirical Analysis*. Cheltenham, UK: Edward Elgar Publishing.
Torgler, Benno. 2016a. Can tax compliance research profit from biology? Review of Behavioral Economics 3 (1): 113-144.
Torgler, Benno. 2016b. Tax compliance and data: What is available and what is needed. *The Australian Economic Review* 49 (3): 352-364.
Traxler, Christian 2010. Social norms and conditional cooperative taxpayers. *European Journal of Political Economy* 26 (1): 89-103.
Troiano, Ugo. 2017. Intergovernmental cooperation and tax enforcement. NBER Working Paper No. 24153. Cambridge, MA: National Bureau of Economic Research.

Ullmann-Margalit, Edna. 1977. *The Emergence of Norms*. Oxford, NY: Clarendon Press.
Vogel, Joachim. 1974. Taxation and public opinion in Sweden: An interpretation of recent data. *National Tax Journal* 27 (4): 499-514.
Wahl, Ingrid, Barbara Kastlunger, and Erich Kirchler. 2010. Trust in authorities and power to enforce tax compliance: An empirical analysis of the "slippery slope framework". *Law & Policy* 32 (4): 383-406.
Wahl, Ingrid, Stephan Muehlbacher, and Erich Kirchler. 2010. The impact of voting on tax payments. *Kyklos* 63 (1): 144-158.
Webley, Paul. 1987. Audit probabilities and tax evasion in a business simulation. *Economics Letters* 25 (3): 267-270.
Webley, Paul, Henry Robben, Henk Elffers, and Dick Hessing. 1991. *Tax Evasion: An Experimental Approach*. Cambridge, UK: Cambridge University Press.
Witte, Anne D., and Diane F. Woodbury. 1985. The effect of tax laws and tax administration on tax compliance: The case of the U.S. individual income tax. *National Tax Journal* 38 (1): 1-13.
World Values Survey. Vienna, Austria: Institute for Comparative Survey Research. Available online at http://www.worldvaluessurvey.org/wvs.jsp.
Yaniv, Gideon. 1988. Withholding and non-withheld tax evasion. *Journal of Public Economics* 35 (2): 183-204.
Yaniv, Gideon. 1999. Tax compliance and advanced tax payments: A prospect theory analysis. *National Tax Journal* 52 (4): 753-764.
Yankelovich, Skelly, and White, Inc. 1984. *Taxpayer Attitudes Survey: Final Report*. Washington, D.C.: Internal Revenue Service.
Yitzhaki, Shlomo. 1974. A note on "Income tax evasion: A theoretical analysis". *Journal of Public Economics* 3 (2): 201-202.
Young, H. Peyton (1998). Social norms and economic welfare. *European Economic Review* 41 (3-5): 821-830.
Zhang, Nan, Giulia Andrighetto, Stefania Ottone, Ferruccio Ponzano, and Sven Steimo. 2016. "Willing to pay?" Tax compliance in Britain and Italy: An experimental analysis. *PLoS ONE* 11 (2). Available online at http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0150277 .