

Using behavioural insights for citizen compliance and cooperation

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Abstract

In recent years, public agencies have frequently deployed behavioural insights to generate benefits for society, through encouraging citizens to comply with official requests, and more generally encouraging them to cooperate with public agencies to help deliver outcomes of collective benefit. In parallel, there has been a large increase in the amount and quality of the research evidence available on behavioural public policy. This review takes two contrasting areas where behavioural insights have been used: tax collection where government policy is compulsory (i.e. requiring compliance), and energy use where social objectives are non-compulsory, and achieved more by persuasion and encouragement. Processes of modifying and changing behaviour require different approaches whether the change is deemed necessary by the state or not. In taxes, the sole use of enforcement is rarely efficacious, whereas increasing the uncertainty of follow-up and audit increases compliance. Offering discounts for energy bills appears to be an effective method for achieving cooperation. However, the use of social norms and increased information and professional advice is effective for both compulsory and non-compulsory areas of compliance and cooperation. This has important implications for policymakers, who may be seeking effective methods of encouraging behaviour change. While there are differences in approaches for compulsory and non-compulsory areas of policy, there may be areas that move from non-statutory to statutory in the future. In this case, the development of desired social norms appears to be the most effective method of ensuring overall compliance.

Public organisations need to raise revenue, issue fines and collect debts from citizens, activities that are essential if governments are to function effectively. Many governments in the developed world have powers to carry out these functions, but others also rely on citizens complying voluntarily, taking advantage of embedded civic values and those promoted within modern society. In any case, voluntary payment is much more cost effective than chasing people through the courts. Behavioural insights have a major role to play in this niche. In recent years, there has been an increased interest in behavioural science and approaches to interventions across a wide range

of policymaking, such as exploring public economic and environmental consumption (Swim et al. 2011). Rooted in the process of understanding human decision-making – initially in the context of economics – behavioural science evolved to take into account a range of aspects of decision-making (e.g. Fishbein and Ajzen, 1975). Since the mid-2000s, governments' interest in behavioural science has increased dramatically, built on a growing body of academic work and popular books such as Thaler and Sunstein's *Nudge* (2008).

In 2010, the UK government set up the Behavioural Insights Team (BIT) to introduce behavioural inter-

ventions to improve the formation and delivery of public policies. One of the key areas of interest has been the use of behavioural insights to redesign letters and communications between citizens and governments (e.g. reminders to pay taxes or text messages to remind people to settle court fines). Randomised controlled trials (RCTs) were conducted to evaluate their effectiveness, and show that these interventions have delivered strong results (see Cabinet Office 2012). This approach has been emulated by the UK's HM Revenue and Customs and the Strategic Initiatives Branch of the Department for Premier and Cabinet in New South Wales. Other behavioural units have also been set up across the world.

In spite of these advances, knowledge about the effectiveness of behavioural interventions is still sparse. While there is literature on citizen compliance and cooperation, evidence is scattered across various subfields, such as criminology, transport studies, energy, or political science – just to name a few. Many RCTs have already been conducted but are not widely known, except by subject specialists, meaning policy-makers do not have access to the full range of academic knowledge when designing new forms of public compliance.

The basis for this evidence review is therefore twofold:

1. To draw together key literature in discipline sub-fields on the topic of behavioural compliance.
2. To get a better understanding of the conditions determining the success and failure of behavioural interventions.

To ensure the review was not too broad, the initial focus was on public and individual behaviour change – that is, citizen behaviour change with societal benefit. Thus in reviewing the literature it was important to find papers that firstly discussed specific public interventions, and secondly assessed their effectiveness. We excluded most 'grey' studies because of insufficient detail about study design.

After completing a preliminary review, it became apparent that there is a distinction between policy areas where the public is required to behave in a certain way, and those areas where compulsion is not present and cooperation is sought through an appeal to the public good or private benefit. For instance, although it is the law to pay tax in full and on time, it is not the law for the public to reduce their energy consumption by a recommended amount. Although at first glance this may seem a minor distinction, when it comes to effective interventions for behaviour change, it encourages a shift in approach.

Therefore, in addition to discussing interventions, current practices and the main conditions that determine the success or failure of behaviour change strategies, this review has since developed to address the sociology and psychology of behaviour change in compulsory and non-compulsory contexts. The focus of the review is on a policy area where behaviour is to some degree compulsory (i.e. the payment of taxes and associated fees and fines if taxes are unpaid), and one where behavior is non-compulsory (i.e. public homeowners' energy consumption). It is possible of course to examine other compulsory areas, such as licenses, or non-compulsory ones, such as transport use, so this choice must be regarded as generating evidence from two case studies.

Search Strategy

Relevant articles were retrieved through search engines (e.g. Google Scholar, UCL Metalib) and bibliographies/reference lists in journal articles and books using keywords such as 'tax evasion/compliance' or 'energy saving' or similar wording. One hundred and thirty-four papers were found that met the initial search criteria. Subsequently, articles were subjected to the selection criteria for inclusion in the review, leaving 122. Initially, texts were selected based on whether titles included keywords or similar wording relevant to the particular theme. Abstracts required mention of a quantitative or qualitative study on incentive scheme evaluation. In addition, texts were specifically required to refer to public interventions, and any papers that discussed businesses or workplaces were automatically excluded.

Out of 122 papers reviewed, a final list of 47 are discussed directly in this evidence review; 27 explore the payment of taxes, and 20 explore household energy consumption.[1] These 47 papers were selected as they cover the majority of results, conclusions and methodologies found across the broader review, and are useful to highlight some of the most interesting points of comparison.

Structure of the Review

We begin by describing the methodological approaches that define the field of evaluating behavioural interventions in tax and energy. This sets up a discussion of the implications that the different compulsory versus non-compulsory areas have on methodological choices and research questions. Next,

approaches are broken down by sub-theme, and interventions from both energy and tax fields and their efficacy are discussed. Finally, the conclusions bring together some of the major discussions across all of the areas, and frame these within the context of policy-making.

Within each section, there is a list of the key findings, which will enable policy-makers to see the most and least effective approaches for each area in that intervention at a glance. The Appendix provides a more detailed breakdown of each study forming the basis of this review.

Methodologies in evaluating behavioural interventions

The majority of studies in tax compliance used randomised controlled trials (RCTs) which, with good design and sample sizes, can provide unbiased results. RCTs can randomise participants into treatment (nudge) and control groups and then compare the results in relation to revenue obtained. This provides an estimate of the savings from changing procedures from tax compliance. The advantages of RCTs are balanced by some limitations. It can be hard to generalize from RCTs to other contexts and time periods (though this problem limits other methods too). It is also hard to dig down into why the nudge works, as the research usually only generates the headline result, though sub-group analysis can overcome this problem.

For this reason, this review deliberately includes studies which have used other valid methods, such as agent-based modeling, which is common in general tax literature, looking at specific experiments on the effectiveness of different incentive schemes (e.g. Hashimzadea et al. 2014); also see (Garrido and Mitton 2013). Agent-based modeling can examine a range of influences on the outcome rather than the just the treatment effect, so the changes in tax collection can be modeled as a system. This method can pick up the long-term dynamic impact of a change in tax or fine collection procedures rather than just a one off intervention, which itself may trigger other actions and behaviours.

The overarching question that drives much of the taxes and fines research is 'how can we ensure that individuals pay for public services or violation of those services?' It is possible that here lies the difference between the approaches across taxes and subsequent fees and fines associated with non-compliance: tax is entirely 'above board', carried out for

the public good, but fines are for those that have already violated rules around public services, and need to be discovered and punished. It is potentially this distinction, that fines are in fact harder to enforce than taxes as they are already associated with individuals who have committed an act of non-compliance, that means carrying out RCTs and natural field experiments on the effectiveness of fines becomes more difficult. For instance, many studies factor in explicitly the cost efficiency of detection of violators, and use this as a key determinant of the optimal fine (e.g. Polinsky and Shavell 2000).

As with tax, the majority of energy studies used RCTs, but many more in energy employed surveys of users. Several studies looked at the subjective impact of various incentives on energy use and energy cost savings, and compared this to the actual energy use changes. Interestingly, not only were many studies focused on getting households to use less energy or become more efficient in their energy use, but also on assessing the cost implications of various energy tariffs (e.g. Hydro One Networks 2006); Opinion Dynamics Corporation 2008). This indicates a shift in focus from evaluating compulsory interventions (in the primary interest of the state) to interventions that are non-compulsory and in the major interest of both the public and the state.

Some studies were conducted using variations on RCTs and natural field experiments, where it appears that various notification types (email, postal mail, text messages, personalized phone calls) have been found successful in increasing compliance in payment of fines (e.g. Haynes et al. 2013). These studies have all been carried out in specific instances where the public can be monitored with relative ease, such as registered individuals who have already committed a crime. In many instances, fines need to be given to individuals who are not registered with an authority to which they commit the crime, i.e. fly tipping or environmental pollution in a local lake. Here, it is not possible to monitor a treatment group and a control group of individuals. This may be another reason for why there is little hard data on public responses to enforcement of fines. There is also little research exploring whether greater engagement with the public increases compliance or cooperation excepting (Lamberton et al. 2014).

There are several other methods that are significantly under-used in both compulsory and non-compulsory settings. In addition, there is relatively little research using qualitative or survey-based instruments to complement the widely used quantitative techniques. The majority of tax literature focuses on the

use of mathematical models to understand the optimal fine structures that would enhance compliance of individuals in paying their fines (e.g. Lewis 1988).

The main questions among fines researchers focused on firstly 'how can we ensure that fines get paid?', and secondly 'how can fines increase future tax compliance?' The reliance on quantitative methodologies may reflect the less flexible research aims of compulsory areas such as taxes and fines. In contrast, with energy and non-compulsory areas there is room for a broader range of research questions that can include the more nuanced exploration of attitudes and values that qualitative research can provide.

The evaluation of behavioural interventions to increase compliance and cooperation in tax and energy

The next sections look at particular approaches to increasing compliance and cooperation.

Social norms

Social norms (Cialdini and Trost 1998) are behavioural standards that affect people on the individual, community and national levels, where people can react to knowledge about what others are doing. Social norms affect many areas of daily life. Within the tax compliance context, they can be defined as prevalence or acceptance of tax compliance or evasion, within a reference group such as people living a local area (Wenzel, 2005). Norms can be rightly or wrongly constructed by an individual (i.e. may actually reflect the views of those around them, or may not), and people will adhere to norms on specific issues. In the case of tax compliance, if an individual perceives that those around them or those that they personally relate to consistently evade taxes, that individual is also likely to evade taxation (see Hallsworth et al 2014). The literature review finds that changing and influencing perceived norms is an effective method for enhancing compliance and cooperation in individuals, especially when targeted within social groups.

Wenzel (2005) has shown, using two RCTs, that highlighting misperceptions about social norms to individuals is effective at increasing tax compliance in Australia. For instance, when an individual falsely perceives that their peers tend to evade, but is then informed otherwise, that individual will change their behaviour to be more in line with the new social ref-

erence of tax compliance. This effect was mirrored by two separate RCTs completed within ten years of each other on the Minnesota population (Coleman 1996; 2007).

Both Kirchler et al. (2007) and the Behavioural Insights Team (BIT) (Cabinet Office 2012) have reviewed the evidence on the impact of emphasising positive social norms (i.e. highlighting good behaviour from reference groups) on tax compliance, and shown that it is also an effective way of increasing tax compliance in individuals.

Andrei et al. (2013) used an agent-based simulation model to describe the relationships between individuals in a social network, with the aim of increasing tax compliance across the network. They found that those networks with a high degree of centrality had the largest positive effects on information propagation: social circles with a 'leader', or central well-connected figure (whether that be a socialite, respected individual or central figure such as a mayor) disseminate information more effectively within the group. By influencing several central figures within identified social networks, governments can help to disseminate information about positive social norms within the network, promoting increased honesty in tax reporting among individuals.

The research also highlights some conditions and exceptions to be aware of when appealing to social norms. Blumenthal et al. (2001) found no overall treatment effect in their RCT carried out in Minnesota. They posted out two types of letter with varying normative appeals, and then followed those taxpayers' reported income in the following tax year. Although there were no statistically significant treatment effects for the whole group, there were significant positive effects for some population sub-groups, including upper middle class taxpayers. However, the letters had a negative effect on tax compliance for those in the highest income bracket.

McGraw and Scholz (1991) conducted another RCT, this time asking participants to watch videotapes emphasising social norms and personal consequences of tax compliance and non-compliance. They found there was a positive predicted outcome on tax attitudes, however these attitudes did not translate into a change in participants' compliance.

Interestingly, social norms were one of the most highly researched areas in tax compliance, but were less prevalent in energy research. This may be due to the fact that energy saving is non-compulsory. Appealing to people's sense of 'social decency' norms may be less effective, but more research could test this hypothesis. However, several energy feedback

studies discussed the effect of comparing home energy use to people's neighbours, and generally found this to be effective (e.g. Schultz et al. 2008). This method of comparison is a form of social norm, but is more competitive than appealing to a sense of social decency. The use of norms on collective behavior has strong effects, such as Peterson et al.'s (2007) findings on energy consumption in dormitories. The use of feedback and/or norms on household bills is now a strong and repeated finding for energy (see Hayes and Cone 1977); (Winnett et al 1982); (Midden et al 1983); (Katzew and Johnson, 1984); (Brandon and Lewis 1999); (Matsukawa 2004); (Hydro One Networks 2006); Goldstein 2007; (Green 2008); (Allcott 2011); Alahmad et al 2012; (Allcott and Rogers 2012); (Costa and Kahn 2013)—see also meta-analysis by (Abrahamse and Steg 2013).

In a slight variation on the use of social norms, public shaming and stigmatisation has been explored in relation to tax compliance. This is not the case with energy, likely linked to the fact that energy is a non-compulsory area and it is harder to tap into social norms against which people can be stigmatised or shamed. Coricelli et al (2012), using a randomised trial in France, showed that if tax evasion is made public but the offender is not reintegrated to the group (i.e. consistently shamed without the chance to restore their reputation), they are more likely to continue to tax evade. However, if the offender is made public but successfully reintegrated, this has a positive effect on tax compliance. Murphy (2008) built on other research, such as Coricelli et al's study, indicating that shaming can lead to greater evasion in the future. Murphy's study found that those taxpayers who had been penalised for aggressive tax avoidance in the past and subsequently stigmatised as a result were less likely to comply in the future. Moral suasion does not work as a strategy (Torgler 2004); (Fellner et al. 2013), but stressing fairness in the communication is effective (Wenzel 2006).

The potentially negative or neutral outcomes for some interventions that use social norms indicate that care must be taken when contacting certain groups using social norms as an incentive for compliance or cooperation. In addition, it indicates that although social norms can be used to improve attitudes towards compliance and cooperation, these may need to be accompanied by another incentive to actually induce compliance or cooperation in individuals. With longer-term changes in attitudes, compliance and cooperation may come about as a result, but more research is required to confirm this claim.

Key findings:

- Communicating positive social norms to individuals has a positive effect on tax compliance (e.g. Hallsworth et al 2014).
- Using reference groups that individuals relate to is effective at encouraging individuals to undertake new compliant behaviours (e.g. Hallsworth et al. 2014).
- Challenging and contradicting misperceived social norms has a positive effect on tax compliance (e.g. Coleman 1996; 2007).
- Using central figures within social networks is a good way to help disseminate information on positive social norms and challenge perceived social norms (Andrei et al 2013).
- Stigmatisation of past offenders may decrease tax compliance (Murphy 2008).
- Public shaming without successive reintegration may decrease tax compliance (Coricelli et al 2012).

Professional advice and increased public information

Devos (2012) addressed the relatively small area of research into the impact that tax professionals' advice has on tax compliance, using a survey among Australian taxpayers. Devos found that when an individual had a tax agent there was an increase in tax compliance, and that the need for the tax agent strongly correlated with the need for compliance behaviour on the taxpayer's part.

Alm et al. (2010) found results in line with Devos (2012) in their randomised trial in the US, where professional information readily available to taxpayers significantly affected the tendency of an individual to file a tax return, and also affected the likelihood that the individual would report earnings accurately. Wenzel and Taylor (2004) found that sending rental property schedules to taxpayers for them to itemise their deductions reduced deductions compared to taxpayers who were not sent the schedule.

However, the HMRC (2009) undertook research into taxpayer experiences with assisted claims, and found that although taxpayers responded positively to their assisted journey through the claim process, overall the assistance had a limited impact on their understanding of their responsibilities when completing the process. It may be that professional services act as an incentive, as many taxpayers tend to want

to comply, but do not have the right information on how to do so accurately. However, tax services aimed at helping guide taxpayers through the filing process may actually do little to change underlying beliefs and ensure future tax compliance.

Many energy studies also focused on the use of technology and real-time energy use feedback using monitors in the home (e.g. Gleerup et al., 2010). The majority of these studies happened between 2005 and 2008, possibly signaling a trend in the use of new monitors in homes (e.g. Green 2008). It almost certainly indicated an overall trend in energy use research resulting from highly positive research outcomes that indicated the success of energy use feedback on reducing household energy use (e.g. Brandon and Lewis 1999).

Information can have a positive effect on reducing energy use in the form of workshops, though these may be expensive to scale up (Geller 1981). Campaigns at military bases have been shown to work too (McMakin et al. 2002).

The provision of advice and information to the public to increase cooperation and compliance has been found to be largely effective across energy and tax fields. Offering professional advice and information can make the initial process of submitting taxes easier, while offering an optional and non-forceful way of providing incentives to reduce energy use. Professional advice and workshops or other forms of personalised messaging or information provision forms the impression of a larger effort to increase compliance and cooperation, which may explain why these approaches and those in the social norms theme appear to be largely successful.

Key findings:

- Providing easy access to professional services for taxpayers increases tax compliance (Devos 2012).
- Communicating timely advice on energy consumption produces long-term reductions in usage (e.g. Hydro One Networks 2006).
- Home monitors and other feedback mechanisms provide significant reductions in home energy use (Matsukawa 2004).
- Personalising contact has a positive effect on compliance (Haynes et al 2013).
- Allowing taxpayers to indicate where they would like their tax to go, and communicating government strategies, have positive impacts on tax compliance (Lamberton et 2014).

- Messaging has a positive effect on increasing compliance with payment of fines (Haynes et al 2013).

Punishment

As far back as the 1980s, there has been research into how effective punishment is for reducing tax evasion (this strategy is almost impossible to apply to energy). At this time, there were several studies that reported negative correlations between perceived audit probability and tax evasion, but not enough to provide evidence for a causal relationship. Spicer and Thomas set up an RCT in the US in 1982 where groups were either told precise or imprecise probabilities of audit. They then measured the compliance rates of the subjects. Their results lent support to previous assumptions that increasing uncertainty of audit increases compliance (see also Slemrod et al. 2001). Much of the recent literature has focused on the use of punishment or threat of punishment (e.g. Iyer et al. 2010).

This result has since been backed up by several other studies: Kleven et al. (2011) found in a randomised trial in Denmark that prior audits and threat of audits had a significant impact on self-reported income, but no effect on third-party reported income, possibly because the blame is entirely on the individual with self-reported income.

Tan and Yim (2014) also experimented on a previous auditing rule (the 'bounded rule'), where taxpayers are informed of the maximum number of audits and it is then up to the taxpayers to decide on the probability of audit as a group. In their RCT, compared with the flat rate rule where taxpayers are informed of the constant probability of audit, they found that when uncertainty is high, compliance also tends to be high.

Hasseldine et al. (2007) conducted an RCT in the UK consisting of several treatment letters, including ones simply mentioning the possibility of audit, increased audit, and taxpayers preselected for audit. For each letter, there was a 56.4%, 53.8% and 53.7% increase in reported turnover respectively, lending further support to the idea that increased audit uncertainty increases tax compliance.

However, in slight contrast to the research above, Bergman and Nevarez's (2006) controlled trial on Argentinian and Chilean taxpayers found the counterintuitive result that on average audits did not increase future compliance. In fact, the gap between pre-audit and post-audit compliance rates actually wid-

ened – those who had been audited tended to evade more after the audit, most likely because they felt the chance of them being audited again in the near future was low. Murphy (2008) found that increased punishment can lead to greater evasion in the future. Her study found that those taxpayers who had been penalised for aggressive tax avoidance in the past, and subsequently stigmatised as a result, were less likely to comply in the future.

Pickhardt and Prinz (2014), in a summary of the main disciplines and approaches used in understanding tax compliance, argued that one of the most important lessons to be learnt from recent research was that employing instruments to deter evasion, such as audits, and other forms of punishment, is likely to decrease compliance. In their review, they discussed how compliance is likely to erode if governments treat all public as potential evaders, and with increased evasion it becomes harder to enforce or encourage compliance. To conclude, they indicated that simplified tax codes and more professional advice available coupled with some punishment would be an effective approach to compliance.

The theme of punishment was significantly less prevalent in the energy literature, most likely because energy reduction is non-compulsory, and punishment would not be credible (see Pickhardt and Prinz 2014).

Key findings:

- Increasing uncertainty of audit increases tax compliance (Kleven et al 2011).
- Increased punishment can lead to decreased tax compliance (Murphy 2008).

Rewards

Burger and Caldwell (2011) used an RCT in the US to show that those who believed they had an opportunity available to few others were more likely to agree with a request (i.e. filing taxes) than those who thought the opportunity was available to everyone. Kastlunger et al. (2011), in an RCT carried out in Italy, investigated the effect of rewards on tax compliance and found that overall there was no effect. In fact, it appears that it provoked an all or nothing type of behaviour for taxpayers. However, certain groups of taxpayer, such as those who are compliant and subsequently rewarded, are more likely to remain compliant in the future.

One of the major areas of study in energy was rewards, discounts and incentives from energy companies or the government. This can also include different pricing schemes, such as peak pricing or time-of-use pricing initiatives. Many discount or reward schemes were overall effective, but most of these results came with caveats, where only certain types of incentives work, while others do not (Country Energy of Australia 2005). The main issue is the large upfront cost for many people to install serious energy saving additions such as a new boiler or insulation. Although in the long run this would save people a lot of money, it could take families several years to see real-time effects, dissuading many. This is in line with psychological research that shows that humans are not fully rational beings and they do not always choose the best and most rewarding outcome, preferring mostly to play it safe and choose instant benefits over longer term ones (Fishbein and Ajzen 1975).

The increased focus and success of rewards within the energy field is likely related to its non-compulsory status. As was mentioned in the social norms section, the most effective use of social norms was in a competitive format, which aligns with the use of rewards. However, encouraging competition and offering rewards has less in common with a compulsory approach, where it could be argued that the state should not reward compliance, as compliance should be expected.

Key findings:

- Rewarding compliance has little overall effect on tax compliance (Kastlunger et al. 2011).
- Many discount or reward schemes are effective for reducing energy consumption (Country Energy of Australia 2005).

Conclusions

This review has covered some of the key literature across two policy areas that fall under compulsory compliance interventions and non-compulsory co-operation interventions. It compared various types of study to understand what are the most effective methods of intervention. The key findings have been framed in a broader context than just tax and energy, instead making comparisons across compulsory and non-compulsory areas, which ensures this review has much broader relevance to policy-making.

In order for policy-makers to make informed decisions about choosing interventions, there does need to be a clear evidence base from which to draw. In line with our first research question, this review has attempted to draw together some of the key areas of behavioural intervention research in two distinct areas. We found that overall, behavioural approaches focusing on social norms and provision of professional advice and information are often successful across both policy areas. Punishment, when used appropriately, can be effective in ensuring tax compliance, while rewards have little effect on tax but an overall positive effect on reducing energy consumption.

To address our second research question on the criteria for success of behavioural interventions, we have been able to discuss the important role of compulsory versus non-compulsory policy fields to behavioural interventions. This distinction may not be apparent when using other approaches to interventions, but from a behavioural and decision-making perspective, the drive and incentive to act in a certain way becomes incredibly important. Therefore, we have managed to draw out broader conclusions for policy-makers from reviewing two contrasting policy areas of tax and energy.

The results of this review therefore have important implications for policymakers, in helping review

the effectiveness of their interventions, and in directing intervention design. Across both compulsory and non-compulsory areas, the evidence shows social norms to have a significant effect on behaviour change. Therefore, if policymakers wish to change behaviour, investing in longer-term development of social norms may be the best course. This could be especially important for consideration of future changes in law. For instance, with climate change becoming an increasingly important issue for governments and public, changing social norms around energy use is currently in the public interest, but may well be an area that becomes law in the future in order to help governments reach their emissions targets. If this were to happen, the development of social norms pre-legislature could increase the likelihood of effective compliance.

Notes

1. These include five papers and four energy papers suggested by the reviewer. Four of the tax papers and one energy paper are themselves reviews or meta-analyses.

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Appendix

Table 1 Literature matrix of Tax Compliance, Fees and Fines studies reviewed

Study	Program/type of intervention	Population	Study design	Findings
Experimental				
Wenzel (2005)	Feedback about compliance	Australia	RCT, 64, 2nd 1500;	Feedback reduces deductions
Lamberton et al (2014)	Does offering tax choice increase compliance		RCT, pilot 125, 1st 182, 2nd 25	Choice increases tax by 15–16%
Coleman (1996)	Audit, service, norms on compliance	USA	RCT, 1,850,000	Audit works, performance does not, norms work
Coleman (2007)	Impact of norms (replication)	USA	RCT Control 8850, treatment 8537;	Replication of norms work
Slemrod et al (2001)	Probability of audit	USA	RCT 1724,	Audit works
Blumenthal et al (2001)	Normative appeals	USA, Minnesota	Difference-in-Difference analysis, 60,000	Appeals do not work
Tan and Yim (2014)	Uncertainty of audit	USA	Laboratory experiment, 192, 64 per group,	More uncertainty works
McGraw and Scholz (1991)	Deterrence vs social norms	USA	RCT; two groups and one control, 1142	Deterrence and norms do not increase compliance
Iyer et al (2010)	Enhancing risk and penalty awareness	USA	RCT, 2x2, 1000 construction firms	Risk and penalty work
Hasseldine et al (2007)	Norms versus sanctions	UK	RCT; 2x2, 7300, sole proprietors	Norms and sanctions both work
Kastlunger et al (2011)	Rewards on tax compliance; two reward conditions	Italy	Laboratory experiment, 86	No impact
Spicer and Thomas (1982)	Test audit probability	USA	Laboratory experiment; three groups, 54	Precise information on audit works
Hallsworth et al (2014)	Norms; six social norms messages	UK	RCT, 101,471	Local norm works best
Torgler (2004)	Moral suasion	Switzerland	580	No effect
Wenzel (2006)	Fairness	Australia	2052	Fairness works
Wenzel and Taylor (2004)	Itemise expenses	Australia	4500	Filling out form reduces deduction
Observational				
Fiorio and Santoro (2011)	Threat of audit	Italy	200,000; two groups	Threat letter works

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Bergman and Nevarez (2006)	Audit	Argentina and Chile	3000; VAT taxpayers	Audit increase non-compliance
Simulation				
Hashimzade et al (2012)	Social networks		n/a	Reinforcement of networks Varies by occupation
Garrido and Mittone (2011)	Audit	Italy	Data from experiments	Number of audits important
Qualitative				
HMRC (2009)	Assistance	UK	100; taxpayers who took up assistance options	Limited impact of assistance
Surveys				
Murphy (2008)	Attitudes to compliance	Australia	652; taxpayers who had avoided taxes	Perception of enforcement matters
Devos (2012)	Advice on compliance	Australia	174	Professionals increase compliance
Reviews				
Kirchler (2008)	Assessing the range of factors for compliance		67 studies and general papers	Importance of trust, norms
OECD (2010)	Review of factors affecting tax compliance		Literature review, questionnaire to members	Importance of deterrence, norms, fairness
Pickhardt and Prinz (2014)	Assessment of strong tools of enforcement		Review of 15 papers appearing in special issue of Journal of Economic Psychology	Audit can reduce compliance
Behavioural Insights Team (2012)	Review of evidence		General review of the policy evidence	Role of norms

Table 2 Literature matrix of Energy studies reviewed

Study	Program/type of intervention	Population	Sample group(s) and size(s)	Study design	Findings
Experimental					
Gleerup et al (2010)	Effects of SMS + e-mail on electricity use;	Denmark	1451 households	RCT; 3 treatments	Both email and SMS effective
Schultz et al (2008)	Social norms	USA	2359	RCT; 6 norm messages	Norms work
Costa and Kahn (2013)	Social norms	USA	c=49,000 t=35,000	RCT; home electricity reports	Liberals reduced more than conservatives
Allcott (2011)	Social norms	USA	600,000 households; RDD	RCT	Social norm work in high use households; injunctive norms in low use
Midden et al (1983)	Compare feedback and norms	Holland	91 apartments	RCT; 4 treatment groups	Feedback, norms and financial reinforcement works
Brandon and Lewis (1999)	Compare feedback information, norms	UK	120 households	RCT; 4 treatment groups focus groups	Only feedback works
Alahmad et al (2012)	Feedback	USA	151 households	RCT	Limited evidence that feedback works
Katzev and Johnson (1984)	Commitment and incentives	USA	90	RCT; 5 treatments	Commitment; incentive with commitment work
Winett et al (1982)	Feedback with information	USA	winter=83, summer= 54	RCT; 2x2 design	Feedback works
Matsukawa (2004)	Effect of monitoring device	Japan	319	RCT; 1 treatment	Monitoring works
Hydro One Networks (2006)	Feedback on time of use	Canada	400	RCT; meters	Feedback works
Allcott and Rogers (2012)	Feedback on energy use	USA	234,000 households	RCT; reports	Long-run impact
Geller (1981)	Conservation workshops	USA	117 individuals	RCT; workshop	Reduction in energy use

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Observational					
Petersen et al (2007)	Social norms	USA	1612	Comparison; two dorms provided with feedback	Reduction in energy use
Goldstein et al (2007)	Social norms		N unknown; four groups	Comparison	Norms work; room norm effect
Hayes and Cone (1977)	Information feedback, payments	USA	480 identical houses;	Comparison (assumed random)	Payment and feedback work
Green (2008)	Test meters and contacts	USA	300	Comparison; in home meters calls and emails	Programme works
Country Energy of Australia (2005)	Tests meters	Australia	200	Comparison; real time monitors in homes	Monitoring works
McMakin et al (2002)	Campaigns	USA	2 military bases	Before and after measurement	Energy savings
Reviews					
Abrahamse and Steg (2013)	Meta-analysis	RCTs worldwide	29 studies	Meta-analysis	Social influence works