A Few Lessons for Climate Change Action from the Literature on Cooperation and Behavioural Economics

Judd Ormsby and Suzi Kerr

Motu Economic and Public Policy Research
judd.ormsby@motu.org.nz; suzi.kerr@motu.org.nz

Motu

MOTU NOTE #17
JANUARY 2015

Wind farm at Makara, 2014

This background paper was prepared by Judd Ormsby and Suzi Kerr for participants in Motu's Low-Emission Future Dialogue. This group of stakeholders and technical experts from government, the private sector, academia and NGOs is meeting regularly over 2014–15 to discuss New Zealand's possible pathways toward a global low-emission future. The Dialogue aims to build understanding among participants, identify common ground, and use progressive in-depth discussions to generate and develop innovative solutions, not to generate consensus. The Dialogue builds on Motu's Climate Dialogue, which ran in 2007, and Motu's Agricultural Emissions Dialogue, which ran for 10 meetings through 2011–12.

1. Introduction

Simple economics is characterised by selfish rational actors. More sophisticated economics, including new developments in behavioural economics, tells a different story that is more hopeful for cooperation and allows the discipline to contribute to climate mitigation beyond emissions pricing and cost-benefit analysis. In this short paper we focus on two issues relevant to climate mitigation action:

(i) Free-riding and the potential for cooperation.

(ii) Why people make systematically bad decisions (for themselves as well as society) and ways to improve decision-making and achieve some costless mitigation.

Thank you to Catherine Leining, Trent Smith and Anna Robinson for their helpful comments, suggestions and guidance on earlier drafts. Naturally, all errors and omissions are our own responsibility.

Makara Beach, 2014

2. Free-riding and the Potential for Cooperation

2.1. Climate Change as a Free-Rider Problem

Most weekends I (Judd) like to drive out to Makara Beach, about a half-hour drive from where I live. I like to sit in the café, order a cheese and onion toasted sandwich, drink coffee and eat chips. It's an enjoyable way to spend a Sunday. But it's likely one of the most emissions-intensive ways to spend my time. I know climate change is a problem. I know that it makes economic sense for us to mitigate. I know that climate change might even alter my enjoyment of trips to Makara or lower my future earnings through its effect on the economy in general. But I also know that whether or not I go out to Makara will make no detectable difference to the Earth's climate. My carbon emissions may be high, but they are a drop in the ocean of global emissions. When mitigating my carbon emissions is costly, I have an enormous incentive to "free-ride". The cost could be in terms of money, in the case of investing in a solar panel for my home, or it could be in terms of the quality of my leisure, in the case of my visits to Makara.

This is the nature of a free-rider problem: the fruits of our individual labours are distributed among many, so that the individual benefit – our slice of our own labour – is small. Thus, simple economic theory would predict that we all end up behaving individually in a way that makes us worse off as a group.

In the next section we will explain the standard solution to free-rider problems like these and why it isn't available to climate change. Then in section 2.3 we explain the evidence for altruism, which helps dampen free-riding. In the second part of this short paper, section 3, we look at some reasons why people can make truly bad decision – not just for bad for society but bad for themselves. This allows the possibility of mitigation that is costless, and we suggest some ways in which we might achieve this.

2.2. A Standard Solution: Regulation by an External Authority

The standard solution to free-rider problems is regulation by an external authority.[1] This could be in the form of price signals that "internalise" costs and benefits of actions, e.g. a tax on bad behaviour, a subsidy for good behaviour or a cap-and-trade programme. Or it might be in the form of strict rules that directly prohibit certain behaviours or technologies. In the case of climate change, we could have rules restricting the types of vehicles we can drive, or building standards requiring insulation in our homes.

The key component of the "standard" solution is that the regulation (of whatever form) is enforced by an external body. For example, New Zealand fisheries also suffer from externality problems, and so the New Zealand government regulates fisheries to protect fish stocks. But since climate change is a *global* problem, the standard solution is not possible: we don't have a global external authority – there simply is no world government. The closest thing we have to an external authority is the United Nations, but it isn't a world government because, among other things, it has limited power to enforce its resolutions and sanctions. Does this mean we are doomed to complete inaction?

2.3. Evidence on Voluntary Cooperation

The assumption that people will free-ride unless there is an external enforcer has become known as the *zero contribution thesis*. The idea is not new: many people interpret Thomas Hobbes' "state of nature", where the life of man is "solitary, poor, nasty, brutish, and short", as the result of some sort of cooperation problem that government is required to solve. However, a large body of experimental evidence from the behavioural economics and psychology literature contradicts the zero-contribution thesis. In fact, it is well established that in many situations people do manage – to an extent – to cooperate and get out of the state of nature without an external enforcer.

Before we explain the results of the experimental literature, it is helpful to give a basic outline of the laboratory games used to derive them. One example of a game used to test experimentally for cooperation is a public goods game. In a public goods game, a number of people are given an endowment of money and can choose to contribute any portion of this to a pot. The amount of money in the pot is then doubled and distributed equally among all the players – regardless of how much (if anything) each player contributed to the pot. This game is played once. Here the pot could be seen as analogous to greenhouse gas mitigation. Contributing to the pot is costly but efficient (it can make us all better off), yet because all the benefits are distributed equally it is not in any individual's narrowly defined self-interest to contribute.

To make this clear, consider that you are playing this game in a group of five. Suppose we give everybody an endowment of $10 and each person is allowed to put any portion of this money into the pot. The money in the pot is then doubled and distributed equally among the five people. Regardless of what others do, you get only 40 cents back on every dollar you put in, so a self-interested person would put no money in the pot. If everybody reasons the same way, nobody puts any money in – as predicted by the zero-contribution thesis – and everyone is left with the $10

1 Where the likely benefits from addressing free-riding are large enough to offset the cost of creating and enforcing regulation.

they started with. But if everybody had instead acted cooperatively and donated the full $10, then there would be $10 × 5 = $50 contributed to the pot, which is then doubled to $100 and given back to all participants as $20 each. So if everyone acted cooperatively, they would all be twice as well off.

Drawing on previous summaries of the experimental literature on cooperation, such as Ostrom (2000, 140) and Chaudhuri (2011), we summarise the results we think are most relevant to climate mitigation:

(i) The empirical results show that on average people contribute 40–60 percent of their endowment. This first finding contradicts the zero-contribution thesis. People do, in fact, manage a level of cooperation when narrow self-interest would suggest otherwise. However, people do not cooperate fully and so do not completely escape the "state of nature".

(ii) When we see others cooperating, we are more likely to cooperate ourselves. This is because most of us are conditional cooperators. That is, we are willing to cooperate provided that others do so as well. People respond to social norms – people like to fit in and "no one wants to be a sucker". This suggests that, in a repeated situation such as climate mitigation, as more people are seen to mitigate we are likely to get a positive feedback loop – more people will believe that others are mitigating and hence more people will mitigate.[2] This could make the job of national governments and the United Nations easier – as they foster some mitigation, this could create a virtuous circle.

(iii) Context matters: cooperation rates depend on "framing". Things that shouldn't affect a completely self-interested and perfectly rational person (in the narrow economic sense) do affect real people's behaviour. For example, people are less cooperative when they interact via a computer instead of face to face, partly because when they interact face to face they can shame each other into cooperating, and partly because when we can identify who will benefit from our actions we are more likely to be generous. Hence generosity can be influenced! Emissions could be reduced by changing social norms so that people start to feel social pressure to reduce their emissions and put pressure on others to do the same. The best way to change social norms is never obvious, but we will provide one example in section 3.3 on default choices.

(iv) Cooperation can even occur among narrowly self-interested rational people if the game is to be played indefinitely. In repeated games, people consider not only their immediate pay-offs but also the effect of their behaviour on others' future cooperation, which affects their future pay-offs. The existence of generosity and reciprocity makes this cooperation easier to create and sustain.

These results raise three questions for design of policies and actions:

(i) How can we develop climate-friendly social norms?

(ii) How can we make climate action more visible to trigger the power of social norms?

(iii) Can we change the context in which people mitigate to stimulate cooperation?

2 This can also work in the opposite direction – where the absence of mitigation means that fewer and fewer people cooperate.

Makara Beach, 2014

3. Bad Decisions

Suppose Tom is shopping for a car. He has narrowed his choice down to two alternatives: a Clunker and an Eco-car. The Eco-car is more economical and will save him $10,000 in fuel over the next 10 years but will cost $2,000 more than the Clunker. Tom decides to buy the Clunker.[3]

Was Tom's decision a bad decision? After all, it *seems* to make him worse off in the long run. A dyed-in-the-wool neoclassical economist will argue that Tom has what economists call a high discount rate: he has a strong preference for current consumption rather than future consumption, and hence saving $2,000 now versus $10,000 over the next 10 years is actually in his best interest. According to the neoclassical economist, if Tom's well-meaning father was to step in and somehow force Tom to buy the more expensive Eco-car, then Tom would be made worse off. In contrast to neoclassical theory, behavioural developments in economics (which are now essentially mainstream) suggest that for a whole host of reasons Tom's decision could indeed make him worse off.

Because people make bad decisions – and not just "bad for society" in the case of my visits to Makara, but bad for the individual – there are some ways for people to mitigate greenhouse gas emissions that don't make them worse off. I will talk about some of the systematic errors that people make, discuss the particular example of energy-cost myopia, and then talk about how we can help people change these behaviours.

3.1. Bounded Rationality

Where neoclassical economics assumes that we are very good at computing costs and benefits, taking into account the passing of time and the probabilities of various events occurring, insights in behavioural economics show that we often struggle

3 This example is adapted from Nordhaus 2013, 267–271

to do these things and can make systematic errors of judgement. The literature on bounded rationality is vast and interesting – there are lots of different ways in which we make systematic errors. Examples include the way people look for patterns and read causality into random processes, and how people are much more likely to buy insurance immediately after an earthquake despite there being little change in the probability of a big earthquake striking. For simplicity, we want to give you a taste of the different things a "perfectly rational" person might want to consider when buying a car.

Suppose, in our example above, Tom can borrow money cheaply by topping up his mortgage, say at a rate of 7 percent. For those of you versed in finance, you will know that it is easy to show that borrowing $2,000 at 7 percent to earn $10,000 over the next 10 years is a profitable investment – Tom can make himself unambiguously better off.[4] However, Tom may just not consider this possibility when he buys his car, or he may not bother to perform the calculation. Moreover, the fuel savings he makes in the future are uncertain: among other things, they depend on what petrol will cost and how much Tom will drive; and how much Tom will get for the car if and when he sells it. This makes the calculation even more difficult – should Tom get out a spreadsheet, make a financial model of his investment and subject it to serious sensitivity analysis about future fuel prices and kilometres driven? With a 7 percent borrowing rate and a $10,000 expected return, when Tom does this he'll probably find that only in very extreme scenarios will it make sense to buy the Clunker. But when he's standing in the shop making his decision, will he think about it? Clearly a lot of us wouldn't.

3.2. Time Inconsistent Preferences

Consider a choice between being given half a box of chocolates now and a full box of chocolates a week from now. Many people when given this choice prefer to receive half a box of chocolates now. But when we get them to consider the choice between half a box of chocolates a year from now and a full box of chocolates a year and one week from now, many people choose the full box of chocolates a year and one week from now. In both cases people are being asked to wait a week to receive a full box of chocolates instead of a half-box. People who switch their decisions – and a lot of us do – do not discount consistently over time.

One way of viewing this result is that in the near term we are in a "hot state" – when we can see and smell the half-box of chocolates in front of us – and we find it very hard to make short-run sacrifices. But when we are in a "cold state" and thinking over the longer term, we find it much easier to resist temptation and make sacrifices to do what makes us better off overall. Relating back to our initial example, it is possible that Tom finds it hard to resist the $2,000 up-front discount of the Clunker even though the Eco-car would really would make him better off.

3.3. Default Choices

People have a tendency to take the default option. A classic example is organ donation. Consider a system where, when filling out an organ donation form there is a box marked "tick if you would like to donate your organs when you die". Now

4 A simple way to show this is that after 10 years, if Tom has made no repayments on his loan it will have grown to approximately $3,900 – far less than the $10,000 in fuel savings. In fact, since the $10,000 in fuel savings will occur over the course of the next 10 years (it will not all occur at the end of the period), this means that Tom's net savings will be even greater than that suggested here.

consider the same form except that instead it reads "tick if you do not want to donate your organs when you die". In the first case the default is not to donate organs, while in the second case the default is to donate organs.

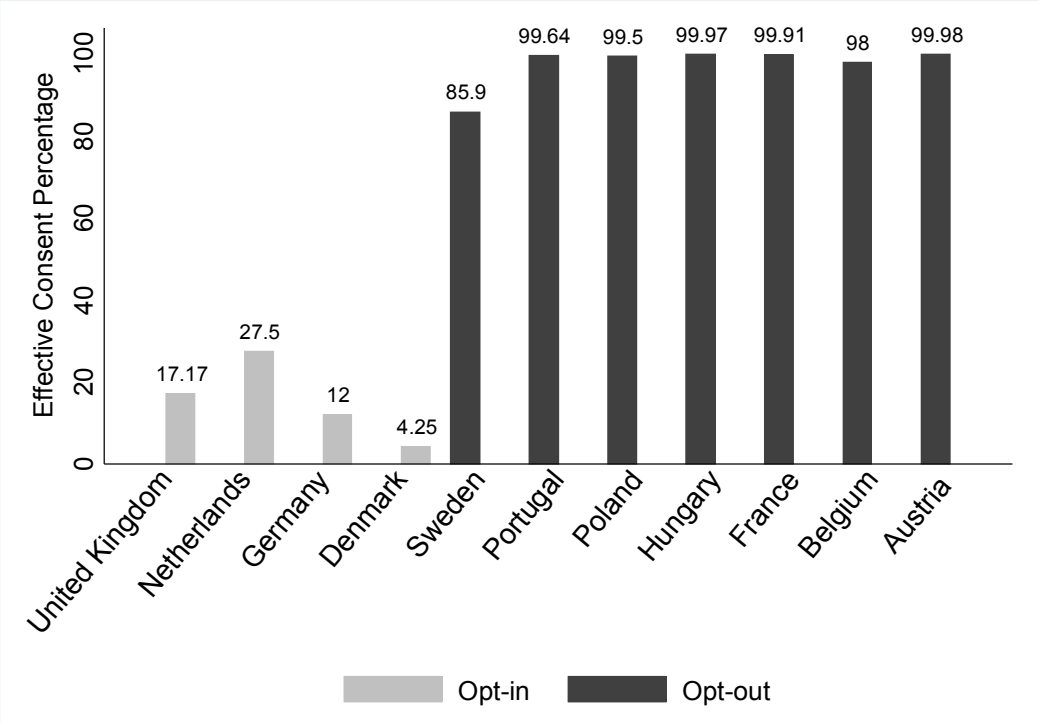

Figure 1. The effect of default choices on organ donation. (Reproduction of figure from Johnson and Goldstein, 2003.)

Figure *1* shows a number of European countries. For the countries on the left in light grey, the default is not to donate organs. That is, people must actively tick a box (or similar) saying that they would like to donate organs. These countries have low organ donations. For the countries on the right in black, the default is "presumed consent". If you do not want to donate organs then you have to actively tick a box saying so. The differences between the "opt-in" and "opt-out" schemes are striking. This is especially so when you consider that countries like the Netherlands launched a large campaign to get people to donate and achieved little, while countries like Hungary do not have such campaigns and have achieved high donation rates.[5]

The results of this literature are striking. Very simple and costless changes in systems that do not seem to impact directly on people's freedom to choose – after all, changing a form is relatively easy – can have massive impacts on what people actually choose. Innovative ways of applying this to reducing greenhouse gas emissions could potentially achieve a lot at little cost if we made the default choice the low-emission choice. For example, if you want to offset your emissions with air travel, you currently have to opt in by checking a box. If we instead structured air fares so that the default is to pay for the emission offsetting, then the "default" theory suggests people would be much more likely to pay to mitigate.

5 If you are worried that there might be other differences between these countries, research has been carried out looking at a larger pool of countries and controls for this – as well as controlled experiments that have the same result. See, for example, Johnson and Goldstein (2003).

Other examples that spring to mind include having plumbers install a water-conserving showerhead unless instructed otherwise, and having electricians install timers on hot water cylinders that heat water only during non-peak use times.

One final point that deserves mentioning is that defaults may affect social norms, not just individual behaviour. Davidai et al. (2012) compare the attitude of people across countries with different opt-in versus opt-out defaults for organ donation. They find that people in opt-in countries view donating organs as a significant act of altruism: people in these countries are likely to view it as "more like leaving 50% of one's estate to charity than like leaving 5%". People who live in opt-out countries do not think that organ donation is as noble: these people are likely to see lack of organ donation as "more like skipping your child's graduation than like skipping your child's baseball game". There is a possibility that different attitudes give rise to these different defaults and not the other way around. However, given that we usually view the countries in the study as being otherwise quite similar, it seems pretty plausible that it is the default causing the shift in social norms.

Influencing social norms through defaults might then encourage people to make changes in other areas of their lives. For example, it's hard to think how we could design a form that made the default catching a bus instead of driving. But if defaults in other areas shift social norms towards a lower emission footprint, then perhaps this will have effects on other aspects of behaviour such as public transport use. Social norms for mitigation and observed low emissions behaviour can contribute to the virtuous circle of cooperation discussed earlier.

3.3.1. Nudge

Defaults are an example of the more general concept of a "nudge". A nudge is a means of changing behaviour without affecting people's freedom to choose and without putting obstacles in the way of their choices. An example of a nudge other than a default includes the order in which food is placed in a cafeteria. Neoclassical microeconomic theory predicts that people would not be affected by such nudges. There is a lot of evidence, however, that in some cases nudges can change behaviour. The upshot of nudges is that they can be cheap to implement and do not necessarily make people worse off. Nudges are also heavily marketed by the inventors of the term, Richard Thaler and Cass Sunstein, as being politically bipartisan – libertarians can support nudges since they don't affect people's freedom to choose, while paternalists can use nudges to get people to change their behaviour (see Sunstein and Thaler 2003; Thaler and Sunstein 2003; Thaler and Sunstein 2008). On the other hand, nudges have been criticised for being temporary, having little effect, or requiring too great an information burden on government – after all, it is always difficult to know when people's decisions are actually making them worse off or not.

This discussion leaves the following questions for further thought:

(i) It's hard to know when people should buy the Eco-car. When should we force them?

(ii) Can we take advantage of 'hot states' to encourage climate-friendly decisions?

(iii) How can we design nudges or default choices to lower emissions?

View from Mt Kaukau, 2014

4. Conclusion

Effectively addressing climate change, as with any free-rider problem, is difficult. People's tendencies to contribute at least a little to public goods and the existence of conditional cooperators makes solving these problems easier. Any policy that fosters social norms for low emission behaviour can build on this. However, not all mitigation activity faces a free-rider problem. Evidence from behavioural economics shows that we do not always act optimally in our own best interest, and for "irrational reasons" we sometimes make bad decisions. As such, there are some ways we can reduce emissions at virtually no cost, and there is room for various non-price-based interventions.

Further Reading

For those of you who would like to read more about behavioural economics and its application to climate change, two of the best sources we've encountered are: the section in chapter 3 on behavioural economics and climate change in the IPCC *Working Group III Report* (Kolstad C et al. 2014, 64–68); and a paper called 'The Role of Behavioural Economics in Energy and Climate Policy' by Pollitt and Shaorshadze (2011). We would also recommend Allcott and Rogers (2012), whose paper looks at the long-run effects of behavioural interventions on energy.

If you are interested in behavioural economics more generally (rather than just its application to climate change), we recommend Dan Ariely's free online Coursera course *A Beginner's Guide to Irrational Behavior* (Ariely 2014). In recent years, several popular books have also been written on behavioural economics. Daniel Kahneman's *Thinking Fast and Slow* (2013) has been especially well received. Finally, an excellent recent paper on time inconsistent preferences is Adams et al. (2014).

5. References

Adams, Abi, Laurens Cherchye, Bram De Rock, and Ewout Verriest. 2014. "Consume Now or Later? Time Inconsistency, Collective Choice and Revealed Preference." *American Economic Review*, 1–32.

Allcott, Hunt, and Todd Rogers. 2012. *The Short-Run and Long-Run Effects of Behavioral Interventions: Experimental Evidence from Energy Conservation*. National Bureau of Economic Research. http://www.nber.org/ papers/w18492.

Ariely, Dan. 2014. "A Beginner's Guide to Irrational Behavior". Free Online Course. *Coursera*. Accessed August 13. https://www.coursera.org/course/behavioralecon.

Chaudhuri, Ananish. 2011. "Governing the Commons: Swords or Covenants?" Plenary Lecture presented at the 52nd Annual Meeting of the New Zealand Association of Economists, Wellington, NZ, June 30. http://homes.eco.auckland.ac.nz/acha192/NZAE%202011%20Keynote.pdf.

Davidai, Shai, Thomas Gilovich, and Lee D. Ross. 2012. "The Meaning of Default Options for Potential Organ Donors." *Proceedings of the National Academy of Sciences* 109 (38): 15201–5.

Johnson, Eric J., and Daniel Goldstein. 2003. "Do Defaults Save Lives?" *Science* 302: 1338–39.

Kolstad C, K. Urama, J. Broome, A. Bruvoll, M. Cariño Olvera, D. Fullerton, C. Gollier, et al. 2014. "Social, Economic and Ethical Concepts and Methods." In *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, United Kingdom and New York, NY, USA.: Cambridge University Press.

Nordhaus, William. 2013. *The Climate Casino: Risk, Uncertainty, and Economics for a Warming World*. New Haven, CT, USA and London, United Kingdom: Yale University Press.

Ostrom, Elinor. 2000. "Collective Action and the Evolution of Social Norms." *Journal of Economic Perspectives* 14 (3): 137–58.

Pollitt, Michael G., and Irina Shaorshadze. 2011. "The Role of Behavioural Economics in Energy and Climate Policy." https://www.repository.cam.ac.uk/handle/1810/242021.

Sunstein, Cass R., and Richard H. Thaler. 2003. "Libertarian Paternalism Is Not an Oxymoron." *The University of Chicago Law Review*, 1159–1202.

Thaler, Richard H., and Cass R. Sunstein. 2003. "Libertarian Paternalism." *American Economic Review*, 175–79.

———. 2008. *Nudge: Improving Decisions about Health, Wealth, and Happiness*. Yale University Press. http://books.google.co.nz/books?hl=en&lr=&id=dSJQn8egXvUC&oi=fnd&pg=PA17&dq=nudge&ots=0dFULLHg_t&sig=DoXNU7JwWIkA7a4_52puCyy0CQ0.