

PERSPECTIVE

Hayekian behavioral economics

Cass R. Sunstein*

Harvard Law School, Cambridge, MA, USA

*Correspondence to: E-mail: csunstei@law.harvard.edu

(Received 21 January 2021; accepted 21 January 2021; first published online 19 March 2021)

Abstract

One of Friedrich Hayek's most important arguments pointed to the epistemic advantages of the price system, regarded as an institution. As Hayek showed, the price system incorporates the information held by numerous, dispersed people. Like John Stuart Mill, Hayek also offered an epistemic argument on behalf of freedom of choice. A contemporary challenge to that epistemic argument comes from behavioral economics, which has uncovered an assortment of reasons why choosers err, and also pointed to possible distortions in the price system. But, even if those findings are accepted, what should public institutions do? How should they proceed? A neo-Hayekian approach would seek to reduce the knowledge problem by asking what individual choosers actually do under epistemically favorable conditions. In practice, that question can be disciplined by asking five subsidiary questions: (1) What do consistent choosers, unaffected by self-evidently irrelevant factors, end up choosing? (2) What do informed choosers choose? (3) What do active choosers choose? (4) When people are free of behavioral biases, including (say) present bias or unrealistic optimism, what do they choose? (5) What do people choose when their viewscreen is broad, and they do not suffer from limited attention? These questions are illustrated with reference to the intense controversy over fuel economy standards.

Keywords: internalities; present bias; loss aversion; Hayek

In no system that could be rationally defended would the state just do nothing. An effective competitive system needs an intelligently designed and continuously adjusted legal framework as much as any other. Even the most essential prerequisite of its proper functioning, the prevention of fraud and deception (including exploitation of ignorance), provides a great and by no means yet fully accomplished object of legislative activity.

– Friedrich Hayek

Why respect liberty? Friedrich Hayek and John Stuart Mill offered intriguingly overlapping answers to that question. Hayek's distinctive account was rooted in his critique of socialism and centralized planning. He emphasized that however well motivated, planners have far less knowledge than participants in markets do. Many of his central insights grew out of what he saw as the fatal problems with centralized

© The Author(s), 2021. Published by Cambridge University Press

government judgments about prices and quantities. Those problems were, above all, epistemic. Hayek emphasized that the price system must be taken as an institution, and that on epistemic grounds, it has unique properties.

Some of Hayek's most important contributions to social thought are captured in his great (and short) 1945 essay, 'The Use of Knowledge in Society' (Hayek, 1945).¹ In that essay, Hayek claimed that the advantage of prices is that they aggregate both the information and the tastes of numerous people, incorporating far more material than could possibly be assembled by any other institution, such as a central planner, group, or board. Hayek emphasized the unshared nature of information – the 'dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess'. That knowledge certainly includes facts about products, but it also includes preferences and tastes, and all of these are taken into account by a well-functioning market. Hayek stressed that above all, the 'very important but unorganized knowledge which cannot possibly be called scientific in the sense of general rules: the knowledge of the particular circumstances of time and place'.

For Hayek, the key economic question involves institutional design: How to incorporate that unorganized and dispersed knowledge? No particular person or group can possibly solve that problem (Bergh, 2020). However legitimate and appealing their goals, central planners, and the institutions they run, cannot have access to all of the knowledge held by diverse people. Taken as a whole, the knowledge held by those people is far greater than that held by even the wisest and most well-chosen group of experts. Hayek's central point is that the best solution comes from the price system. His claim is that in a system in which a knowledge of relevant facts is dispersed among many people, prices act as an astonishingly concise and accurate coordinating and signaling device. They incorporate dispersed knowledge and in a sense also publicize it, because the price itself operates as a signal to all.

Even better, the price system has a wonderfully automatic quality, particularly in its ability to respond quickly to changes. If new information shows that a product – a television, a car, a cell phone, a watch – does not always work, people's demand for it will rapidly fall, and so too the price. And when a commodity suddenly becomes scarcer, the market will respond to that fact. In Hayek's account, the price system works remarkably well as an institution, not because any participant can see all its features, but because the relevant information is communicated to everyone through prices.

Hence, Hayek claims that it '[i]s more than a metaphor to describe the price system as a kind of machinery for registering changes, or a system of telecommunications which enables individual producers to watch merely the movement of a few pointers'. Hayek describes this process as a 'marvel', and adds that he has chosen that word on purpose so as 'to shock the reader out of the complacency with which we often take the working of the mechanism for granted'. On Hayek's account, the price system is an extraordinary device for capturing collective intelligence, in part because it collects what everyone knows, and in part because it imposes the right incentives.

In view of modern behavioral findings about human error, it would be possible to object that the price system is not always so marvelous, and that other institutions

¹Superb treatments of Hayek's thought include Boettke (2018).

might do better. Suppose, for example, that consumers show limited attention, unrealistic optimism, or present bias; if so, the price signal will miss something important, and the ‘system of telecommunications’ will give the wrong messages (Gabaix, 2017). It would also be possible to agree with Hayek’s arguments about planning and prices, while also thinking that certain forms of regulation, run by public institutions, are not out of bounds. In fact, Hayek himself did not abhor regulation as such. Consider these words: ‘Probably nothing has done as much harm to the liberal cause as the wooden insistence of some liberals on some rough rules of thumb, above all the principle of *laissez faire*’. (Hayek (2007) did not choose his words carelessly, and it is worth pausing over that claim.) Or these: ‘To prohibit the use of certain poisonous substances or to require special precautions in their use, to limit working hours or to require certain sanitary arrangements, is fully compatible with the preservation of competition. The only question here is whether in the particular instance the advantages gained are greater than the social costs that they impose’. Perhaps a mandatory seatbelt law, a ban on trans fats, or a regulation of exposure to certain carcinogens in the workplace would be unobjectionable. Do Hayek’s arguments count against cigarette taxes, or taxes on sugar-sweetened beverages? Do they amount to a general large-scale objection to paternalism from public institutions?

The answers to these questions are not entirely clear. In much of his work, Hayek was concerned with the largest issues – the nature of liberty, the impossibility of planning, the best conception of the rule of law, the proper role of government, the role of tradition, and so on. On many specific issues, involving which institutions should do exactly what, he did not offer particular prescriptions. Here is a revealing passage, written at a characteristically high level of generality, and worth quoting at length (Hayek, 2001):

There are, finally, undoubted fields where no legal arrangements can create the main condition on which the usefulness of the system of competition and private property depends: namely, that the owner benefits from all the useful services rendered by his property and suffers for all the damages caused to others by its use. Where, for example, it is impracticable to make the enjoyment of certain services dependent on the payment of a price, competition will not produce the services; and the price system becomes similarly ineffective when the damage caused to others by certain uses of property cannot be effectively charged to the owner of that property. In all these instances there is a divergence between the items which enter into private calculation and those which affect social welfare; and, whenever this divergence becomes important, some method other than competition must have to be found to supply the services in question. Thus neither the provision of signposts on the road nor, in most circumstances, those of the roads themselves can be paid for by each individual user. Nor can certain harmful effects of deforestation, of some methods of farming, or of the smoke and noise of factories, be confined to the owner of the property in question or to those who are willing to submit to the damage for an agreed compensation. In such instances we must find some substitute for the regulation by the price mechanism. But the fact that we have to resort to the substitution of direct regulation by authority where the conditions for the proper working of competition

cannot be created, does not prove that we should suppress competition where it can be made to function.

From this passage, we see that Hayek was keenly alert to the problem of externalities, and that he favored ‘some substitute for regulation by the price mechanism’. But he did not spend much time specifying his preferred ‘substitute’, or the institution that would design it.

Focused on coercion, Hayek showed little enthusiasm for paternalism, and while he did not discuss it as such, his work on liberty can easily be read to stand against it: ‘Coercion is evil precisely because it thus eliminates an individual as a thinking and valuing person and makes him a bare tool in the achievement of the ends of another’ (Hayek, 2011). This is a strikingly Kantian formulation, not speaking of welfare at all; notice the use of the word ‘evil’ and the objection to treating people as means rather than ends. And indeed, Hayek seemed to embrace something like a Kantian, non-welfarist foundation for freedom. In his introduction to *The Constitution of Liberty*, he wrote, ‘Some readers will perhaps be disturbed by the impression that I do not take the value of individual liberty as an indisputable ethical presupposition and that, in trying to demonstrate its value, I am possibly making the argument in its support a matter of expediency. That would be a misunderstanding’ (Hayek, 2011).

But, at pivotal points, Hayek extended his epistemic argument in favor of markets to make a very general institutional claim, not at all rooted in ‘an indisputable ethical presupposition’, on behalf of liberty and against coercion. Consider his suggestion that ‘the awareness of our irremediable ignorance of most of what is known to somebody is *the chief basis of the argument for liberty*. This is especially true in the economic field. If it appears that the market mechanism leads to the effective utilization of more knowledge than any directing agency can possess, this is the chief foundation of the case for economic freedom ...’ (Hayek, 2014b). That passage is in a long-unpublished lecture. He put the same point more concisely in *The Constitution of Liberty*: ‘The case for individual freedom rests chiefly on the recognition of the inevitable ignorance of all of us concerning a great many of the factors on which the achievement of our ends and welfare depends’ (Hayek, 2011).

For Hayek, the key point involves that ‘irremediable ignorance’, a problem that besets outsider institutions and planners of all kinds. This can be taken to be a much broader argument than his claim that the price system is ‘a marvel’. Consider in the same vein this suggestion: ‘If there were omniscient men, if we could know not only all that affects the attainment of our present wishes but also our future wants and desires, there would be little case for liberty’ (Hayek, 2011). That is a provocative statement, and it is worth pausing over it. Hayek roots his claim for liberty, his most cherished ideal, in the absence of ‘omniscient men’. If there were such men, we would be able to offer ‘little case for liberty’. (I disagree with that view, for multiple reasons, and I doubt that Hayek really believed it, either; but let us not let that point detain us here.)

Hayek was keenly interested in psychology. He wrote an ambitious and lengthy book on the subject, in which he emphasized that human beings did not have unmediated access to physical reality and instead saw it through categories of their own (Hayek, 2014a). But nothing in his work in psychology presaged modern behavioral

science, and it would be implausible to say that Hayek was a behavioral economist in the contemporary sense. He did not anticipate behavioral findings²; he did not explore individual biases, such as present bias, optimistic bias, or availability bias. He did not have anything to say about their relevance to institutional design or to the price system.

To be sure, Hayek was more than alert to the fact that individual choosers lack important information, and that lack played a defining role in his thinking. He often emphasized the extent to which each of us lives amidst, and benefits from, a set of norms, cultural understandings, traditions, and institutions that were not designed by anyone, that have been built up over time, that serve essential functions, and that we do not and cannot understand (Hayek, 2014b):

What I want to show is that men are in their conduct *never* guided *exclusively* by their understanding of the causal connection between particular known means and certain desired ends, but always also by rules of conduct of which they are rarely aware, which they certainly have not consciously invented, and that to discern the function and significance of this is a difficult and only partially achieved task of scientific effort.

If there is a Hayekian theory of behavioral biases, it might begin there, and it might also emphasize that individuals might be prone to relying excessively on *local* information. But if anything, Hayek is best taken to suggest not that people are biased, but that despite their ignorance, they show a kind of ecological rationality, acting in accordance with rules, which operate as devices to help us to cope with our inevitable ignorance (Vanberg, 2017).

Hayek's frequent emphasis on individual ignorance to the question of institutional design is exceedingly important, and central to his thinking, but it should not be confused with a suggestion that choosers err when they make food choices, when they decide whether to wear masks during a pandemic, or when they select appliances or pension plans. And when Hayek spoke of 'irremediable ignorance', he was speaking of planners and comparing them to choosers – a point that counts against paternalism, or any displacement of individual choices by outsiders.

The relationship between Hayek and Mill is both immensely complicated and fascinating (Caldwell, 2008; Sunstein, 2015). But in emphasizing 'irremediable ignorance', Hayek sounded a lot like Mill, whose central arguments did not involve autonomy as such, but a knowledge of relevant facts, and who was most likely to have it. In *On Liberty*, Mill insisted:

²Frantz and Leeson (2013) and Frantz (2020) offer many instructive essays on Hayek, his emphasis on individual ignorance, and his conception of 'behavior', but the essays do not claim that behavioral economics, in the form originated and practiced by Robert Shiller, Richard Thaler, David Laibson, George Loewenstein, Matthew Rabin, and others, was anticipated by Hayek's work. Some work that criticizes modern behavioral economics might be loosely described as Hayekian. See, for example, Rizzo and Whitman (2019). But I would be cautious about the association. Hayek did not speak to the question of how to handle individual departures from rationality, or argue that apparent departures were no such thing. We might be able to say, very loosely, that it is in a Hayekian spirit to see various behaviorally suspect choices as an outgrowth of evolved practices and norms, so that we should be cautious about interfering with them – but very loosely.

The only purpose for which power can be rightfully exercised over any member of a civilized community, against his will, is to prevent harm to others. His own good, either physical or moral, is not a sufficient warrant. He cannot rightfully be compelled to do or forbear because it will be better for him to do so, because it will make him happier, because, in the opinion of others, to do so would be wise, or even right.

Mill's argument for his famous Harm Principle is also epistemic. Like Hayek, Mill believed that choosers are in the best position to know what is good for them. In Mill's view, the problem with outsiders, including government officials, is that they lack the necessary information. Mill contended that the individual 'is the person most interested in his own well-being', and the 'ordinary man or woman has means of knowledge immeasurably surpassing those that can be possessed by anyone else'. When society seeks to overrule the individual's judgment, it does so on the basis of 'general presumptions', and these 'may be altogether wrong, and even if right, are as likely as not to be misapplied to individual cases'. If the goal is to ensure that people's lives go well, Mill concludes that the best solution is to allow people to find their own path.

So far as I am aware, Hayek never endorsed the Harm Principle. (This is a genuine puzzle, because he knew Mill's work well, and had a great deal to say about it (Peart, 2015).) Whether or not he thought that it was too stringent (or perhaps too weak), his arguments against coercion, and Mill's overlapping defense of the Harm Principle, have been put under considerable pressure by behavioral findings. Emphasizing the occasional human propensity to blunder, and the incentives of sellers to exploit those blunders, some people have questioned whether the price system is always so marvelous (Akerlof & Shiller, 2015), and have been asking whether new institutional arrangements, involving mandates and bans, have a fresh justification (Conly, 2013; Bubb & Pildes, 2014). Some of the answers seem profoundly anti-Hayekian; because coercion is involved, they might well be taken, on Hayekian premises, to be indefensible abridgements of liberty. But, the motivation for those answers is clear: If we know that people's choices lead them in the wrong direction, why should we insist on freedom of choice? In the face of human errors, is it not odd, or even perverse, to insist on that form of freedom? Is it not especially odd to do so if we know that in many contexts, people choose wrongly, thus injuring their future selves? Ought not institutional design to take behavioral biases into account? Recall Hayek's claims about the relationship between omniscience and freedom.

No one doubts that in some cases, people lack relevant information; we have seen that Hayek himself emphasized that point, not only in speaking of the dispersed nature of knowledge, but also and more relevantly in defending government information campaigns. Thus (Hayek, 2011):

Where ... most individuals do not even know that there is useful knowledge available and worth paying for, it will often be an advantageous investment for the community to bear some of the costs of spreading such knowledge. We all have an interest in our fellow citizens' being put in a position to choose

wisely, and if some have not yet awakened to the possibilities which technological developments offer, a comparatively small outlay may often be sufficient to induce the individuals to take advantage of new opportunities and thence to advance further on their own initiative.

Is Hayek endorsing a kind of nudging? No doubt about it (so long as we include, as we should, educative nudges as nudges). In other cases, we can identify a behavioral market failure, in the sense that people fall prey to an identifiable behavioral bias, and their choices make their lives go worse by their own lights. When this is so, a corrective response might be put on the table, perhaps in the form of a nudge, perhaps in the form of a tax, perhaps in the form of a mandate. Notwithstanding Hayek and Mill, some kind of planning institution, or choice architect, might have more information than choosers do, and might not fall prey to a behavioral bias. It is important, of course, to emphasize the word ‘might’. Planners might claim to find a behavioral bias when there is no such thing; planners might have (bad) incentives of their own; planners might be subject to the influence of well-organized private groups; planners might themselves be subject to behavioral biases. Still, a corrective response would seem to be on the table.

But, putting a response on the table is one thing; deciding whether to impose it, and choosing its content, is another. Hayek did not speak to the question of how to handle individual departures from rationality, or argue that apparent departures were no such thing.³ While he offered serious objections to planning, he did not explore such questions as whether default rules are an appropriate response to inertia or procrastination, whether salient disclosures are essential to overcome limited attention, or whether fuel economy mandates are an appropriate response to present bias and myopic loss aversion. His high-level concerns about coercion, and about the deficiencies of planners, cannot resolve concrete questions of this kind.

But, if there is such a thing as Hayekian behavioral economics, and if institutional design might be based on it, it would firmly reject the idea that public officials should be content to identify individual errors and declare victory. An approach to institutional design with Hayekian roots might engage in a comparative analysis: How costly are those errors, compared with the errors that would be introduced by corrective efforts? To engage in that analysis, one would have to know something about the relevant institutions. If a decision is made to proceed with some kind of remedy, a Hayekian approach, rooted in both Kantian and utilitarian thinking, might try to reduce the knowledge problem by asking about *what individual choosers do under epistemically favorable conditions*. In fact, a stream of research is asking exactly that

³See Rizzo and Whitman (2019) for some arguments to the latter effect. Very briefly: It is true that an outside observer might not understand the utility function of a chooser. It is also true that what an outsider might take to be present bias, inertia, or limited attention might be nothing of the sort. These points are legitimate cautionary notes about behaviorally informed interventions. At the same time, departures from rationality are real. We might be able to explain them, *ex post*, but those explanations are sometimes what Matthew Rabin calls ‘explain-away-tions’, that is, quite implausible efforts to explain things away, or what Charles Black called ‘one-step-ahead-of-the-sheriff’ arguments, that is, desperate arguments, trying to escape from something (here: data). Departures from rationality are not merely real; they can create serious trouble, including terrible suffering and unnecessary death. What are we going to do about that?

question.⁴ In practice, it can be disciplined by asking five subsidiary questions (Allcott et al., 2019):

- (1) What do consistent choosers, unaffected by clearly irrelevant factors or ‘frames’, choose (Goldin, 2015, 2017)⁵?
- (2) What do informed choosers choose?
- (3) What do active choosers choose? (If we focus on active choosers, we will protect against the possibility that outcomes are a product of inertia or procrastination.)
- (4) In circumstances in which people are free of (say) present bias or unrealistic optimism, what do they choose?
- (5) What do people choose when their viewscreen is broad, and they do not suffer from limited attention?

In principle, the best approach would be for relevant institutions to ask all five questions. Active choosers who are uninformed might blunder; the same is true of informed choosers who procrastinate or suffer from inertia. If public institutions can learn what consistent, informed, and active choosers, uninfluenced by present bias or limited attention, choose, they might have real guidance (assuming that inconsistent, uninformed, and passive choosers, influenced by present bias or limited attention, are not otherwise differently situated from the former group). All of the questions can be answered empirically, and what we might call neo-Hayekian behavioural economics is trying to do exactly that. For example:

- (1) Should employers offer opt-in savings plans, or opt-out plans? Suppose that many employees are affected by the frame; whether they end up in a savings plan depends on whether it is opt-in or opt-out. Suppose that many others are unaffected by the frame; they choose consistently. If the consistent choosers are not different from the inconsistent ones, except for the fact that they are affected by the frame, we have a reason to think that the choices of the consistent choosers are the right ones (Goldin, 2015, 2017).
- (2) A simple absence of information might lead consumers to fail to choose fuel-efficient motor vehicles, suggesting that some kind of nudge, or perhaps even a mandate, would be a good idea. Experiments might be designed to provide consumers with relevant information and see what they choose (Allcott & Knittel, 2019). The choices of informed consumers might be taken as the foundation for analysis of the value of an intervention.
- (3) Suppose that most consumers make an active choice to enroll in certain programs, when those programs are designed so as to promote active choosing. If so, there is at least some reason to think that such programs are in

⁴From varying perspectives, but within the same extended family, see Allcott et al. (2019), Bernheim and Rangel (2007), Bernheim and Rangel (2009), Bernheim (2016), Bernheim and Taubinsky (2018), Goldin (2015) and Allcott and Sunstein (2015).

⁵Note, however, that even if consistent choosers are unaffected by frames, they might be affected by some bias, such as present bias or optimistic bias.

- consumers' interests. If most consumers do not enroll in such programs when active choosing is not promoted, we have reason to think that their failure to do so might be a product of inertia or inattention (Adusumalli *et al.*, 2020).
- (4) Experiments might be designed to make the potential economic savings of (say) energy-efficient appliances highly salient, at least potentially overcoming present bias and limited attention (Allcott & Taubinsky, 2015). If consumers choose or do not choose energy-efficient appliances in such circumstances, we will have learned something about what is likely to increase their welfare – not everything, but something.
 - (5) When people are giving clarity about a wide range of product characteristics, we might investigate what they choose. Suppose, for example, that hidden fees are made clear and conspicuous, so that people with limited attention can see them. What do people choose then?

As noted, there might be heterogeneity in the relevant population, making it challenging to generalize from what some part of a population does. But suppose that there is no such heterogeneity. In principle and sometimes in practice, efforts to answer these subsidiary questions should help public institutions with welfare analysis, where it is often challenging to know how to proceed when behavioral findings seem to cast doubt on standard uses of revealed preferences.⁶ And, in fact, efforts to answer the subsidiary questions might justify some kind of response, not because planners like responses in the abstract, but *because planners are building on the choices of (the right) choosers*.

It is worth emphasizing that by signaling the possibility of Hayekian behavioral economics, I am not suggesting that Hayek would necessarily endorse any particular approach. Hayek did not engage behavioral science, and it is speculative in the extreme, and possibly fanciful, to say that he, personally, 'would have' favored one or another approach. To know what he would have favored, we would have to know how it would have reacted to (say) the work of Daniel Kahneman, Amos Tversky, Richard Thaler, George Loewenstein, Matthew Rabin, Robert Shiller, and Ralph Hertwig. With respect to that question, the answer is the same as what Gertrude Stein said of Oakland: 'There is no there'. A view about what 'Hayek would have thought' is necessarily interpretive in Ronald Dworkin's sense (Dworkin, 1985); it is not a matter of excavation, or simply finding something. What I am urging here is that there is a kind of behavioral economics that can claim to be Hayekian in spirit, in the sense that it engages, and embraces, Hayek's central concerns.

No one believes that fines or subsidies are a sufficient approach to the problem of violent crime. No one thinks that people get to choose whether to steal or to assault. In the face of a standard market failure, government intervention has a familiar justification; consider the problem of air pollution. It is true that even in such contexts,

⁶For a very different perspective, see Sugden (2019), which might be taken to offer a Hayekian approach to behavioral economics, one that is far less interested in correction of individual error than the approach defended here. For discussion, see Sunstein (2020).

default rules may have an important role; consider the possibility of default rules in favor of clean energy (Pichert & Katsikopoulos, 2008; Ebeling & Lotz, 2015). But, the effects of defaults, taken by themselves, might well prove too modest for the problem at hand, and they hardly exhaust the repertoire of appropriate responses.

Notwithstanding Hayek's arguments, the price system is not always so marvelous. In some areas, including occupational safety and energy policy, there are behavioral market failures (Akerlof & Dickens, 1982; Bar-Gill, 2012; Mullainathan & Shafir, 2013; Bohnet, 2016). Recall that if people are suffering from present bias, unrealistic optimism, limited attention, or a problem of self-control, prices might not capture important factors. If the result is a serious welfare loss for those people, there is an argument for some kind of public response, potentially including institutions that impose mandates. When people are running high risks of mortality or otherwise ruining their own lives, it might make sense to adopt a mandate or a ban, certainly on welfare grounds. (Admittedly, it is not at all clear that Hayek would agree; consider his sharp remarks about coercion.) After all, people have to get prescriptions for certain kinds of medicines, and even in freedom-loving societies, people are forbidden from buying certain foods, or running certain risks in the workplace, simply because the dangers are too high.

In short, behavioral findings suggest that the price signal might be misleading in important respects. Whatever Hayek thought of particular restrictions along these lines, they were not his main target. In the end, many occupational safety and health regulations must stand or fall on behavioral grounds; they forbid workers from facing certain risks, perhaps because unrealistic optimism or present bias might lead them to do so unwisely (Akerlof & Dickens, 1982). On Hayekian grounds, the best response might well be for public institutions to provide information. But, we could certainly identify cases in which the best approach is a mandate or a ban, because that response is preferable, from the standpoint of social welfare, to any alternative, including information, economic incentives, or defaults. It is also true, of course, that the best approach might be to do nothing – to allow market failures, including behavioral market failures, on the ground that the cure would be worse than the disease.

I now turn to a case study, involving fuel economy mandates. I explore the possibility of rejecting the price signal and defending such mandates, as opposed to economic incentives, by reference to behavioral market failures, captured in insufficient consumer attention, *ex ante*, to economic and time savings. The more general goal is to ask whether expert institutions that impose such mandates may reduce 'internalities', understood as the costs that choosers impose on their future selves (Allcott & Sunstein, 2015). I intend the issue of fuel economy mandates to be exemplary. A similar analysis might be made of cigarettes taxes, taxes on soda-sweetened beverages (Allcott *et al.*, 2019), savings policy, mask mandates, and many other problems. After sketching the argument, I will explore whether on (what I am calling) broadly Hayekian grounds, the argument might be found convincing.

In principle, fuel economy mandates, perhaps imposed by institutions charged with environmental protection, might simultaneously reduce externalities and externalities. On imaginable assumptions, such mandates might turn out to have higher net benefits than carbon taxes, because the former, unlike the latter, deliver consumer

savings.⁷ To say the least, this is not a conventional view, because fuel economy standards are a highly inefficient response to the externalities produced by motor vehicles, especially when compared with optimal corrective taxes (Karplus *et al.*, 2013).

In the end, everything turns on whether the imaginable assumptions turn out to be true. What behavioral economists consider to be errors might be viewed, by some neo-Hayekians, as not errors at all. My goal is not to run the numbers or to reach a final conclusion, but to make three more general points, which are that (1) mandates might turn out to be justified on welfare grounds, (2) the standard economic preference for economic incentives misses something of considerable importance, and (3) a Hayekian approach allows us to make some progress in assessing (1) and (2).

Most motor vehicles emit pollution, including greenhouse gases, and the use of gasoline increases national dependence on foreign oil. Recall Hayek's acknowledgment: 'Nor can certain harmful effects of deforestation, or of some methods of farming, or of the smoke and noise of factories, be confined to the owner of the property in question or to those who are willing to submit to the damage for an agreed compensation. In such instances we must find some substitute for the regulation by the price mechanism'. With respect to greenhouse gases, we are dealing with something akin to 'the smoke and noise of factories'.

But, what is the right substitute? This is a question of institutional design. On broadly Hayekian grounds, some kind of cap-and-trade system or corrective tax is the best response, designed to ensure that drivers internalize the social costs of their activity. The reason is largely epistemic: as compared to regulatory mandates, cap-and-trade systems and corrective taxes allow for competition and leave the private sector with a great deal of flexibility, and a capacity for innovation (Potts, 2018). They can find their own means to the chosen goal, which means that economic incentives of some kind, and not mandates, are the appropriate instrument (Stewart & Wiener, 2003). They can compete over means, and competition is a discovery procedure (Hayek, 2014b). For any given reduction in pollution levels, incentives impose a lower cost (Ackerman & Stewart, 1987). The choice between cap-and-trade and carbon taxes raises a host of important questions, but they are not at issue here.⁸

For obvious reasons, a great deal of recent analysis has been focused on greenhouse gas emissions and how best to reduce them (Nordhaus, 2015). In principle, regulatory institutions have a host of options. They might create subsidies (say, for electric cars). They might use nudges (say, by providing information about greenhouse gas emissions on fuel economy labels) (Sunstein & Reisch, 2014). They might impose regulatory mandates (say, with fuel economy and energy efficiency standards). Careful analysis suggests that carbon taxes can produce reductions in greenhouse gas emissions at a small fraction of the cost of fuel economy mandates (Karplus *et al.*, 2013; Davis & Knittel, 2019; Knittel, 2019). On one account, 'A fuel economy standard is shown to be at least six to fourteen times less cost effective than a price

⁷Bubb and Pildes (2014) similarly contend that fuel economy regulation might be justified by reference to behavioral considerations, but they focus only on externalities. The conclusion is much easier to justify by reference to internalities, which Bubb and Pildes bracket in their provocative discussion.

⁸For a defense of carbon taxes, see Nordhaus (2015).

instrument (fuel tax) when targeting an identical reduction in cumulative gasoline use' (Karplus *et al.*, 2013).

These are points about how best to reduce externalities, and on Hayekian grounds, they seem decisive. But behaviorally informed regulators focus on consumer welfare, not only on externalities. They are concerned about a different kind of market failure. They speculate that at the time of purchase, many consumers might not give sufficient attention to the costs of driving a car (Bubb & Pildes, 2014). Even if they try, they might not have a sufficient understanding of those costs, because it is not simple to translate differences in miles per gallon (MPG) into economic and environmental consequences (Larrick & Soll, 2008). An obvious response, preserving freedom of choice and in a more Hayekian spirit, would be disclosure, in the form of a fuel economy label that would correct that kind of behavioral market failure (EPA, 2015). In principle, such a label, if behaviorally informed, should solve the problem, because they avoid coercion. Consider Hayek's words on the latter topic, again sounding quite Kantian (Hayek, 2011):

By 'coercion' we mean such control of the environment or circumstances of a person by another that, in order to avoid greater evil, he is forced to act not according to a plan of his own but to serve the ends of another. Except in the sense of choosing the lesser evil in a situation forced on him by another, he is unable either to use his own intelligence or knowledge or to follow his own aims and beliefs. Coercion is evil precisely because it thus eliminates an individual as a thinking and valuing person and makes him a bare tool in the achievement of the ends of another.

Labels do not do that. They do not coerce, and they also do not discriminate (a particular problem for Hayek, who opposed 'commands', which do discriminate). In short, labels should be used to promote consumer welfare, by increasing the likelihood that consumers will make optimal choices, and corrective taxes should be used to respond to externalities. This might even be seen as a broadly Hayekian approach to the problem.

This position has evident appeal, and it might well be right. But, it would be possible to wonder whether a label will be sufficiently effective; this is an empirical question, not resolvable in the abstract. Perhaps some or many consumers will pay too little attention to the label, and hence will not purchase cars that would save them a significant amount of money (Bubb & Pildes, 2014). And if some or many consumers are genuinely inattentive to the costs of operating a vehicle (at the time of purchase), then it is possible that fuel economy standards, with a level of stringency that would be difficult to defend on standard economic grounds, might turn out to be justified.

In support of that argument, it would be useful for public institutions to focus directly on two kinds of consumer savings from fuel economy standards, involving internalities rather than externalities: money and time. In fact, the vast majority of the quantified benefits from recent fuel economy standards come not from environmental improvements, but from money saved at the pump; turned into monetary equivalents, the time savings are also significant. Under the Obama

Administration, at least, the Department of Transportation found consumer savings of about \$529 billion; time savings of \$15 billion; energy security benefits of \$25 billion; carbon dioxide emission reduction benefits of \$49 billion; other air pollution benefits of about \$14 billion; and less than \$1 billion from reduced fatalities (NHTSA, 2012). The total projected benefits were \$633 billion over 15 years, of which a remarkable 84% come from savings at the pump, and no less than 86% from those savings along with time savings (Bento *et al.*, 2019). The Trump Administration is rethinking those numbers by reference to recent work (Busse *et al.*, 2013; Sallee *et al.*, 2016; Allcott & Knittel, 2019) raising questions about whether consumers are insufficiently attentive to the economic savings, but according to one of its early accounts, the consumer savings were projected to be in the same general vicinity (and actually were actually even higher) (Bento *et al.*, 2019).

The problem is that on standard economic grounds, which modern Hayekians should be inclined to support, it is not at all clear that these consumer benefits are entitled to count in the analysis, because they are purely private savings, and do not involve externalities in any way (Gayer & Viscusi, 2013). In deciding which cars to buy, consumers can certainly take account of the private savings from fuel-efficient cars; if they chose not to buy such cars, it might be because they do not value fuel efficiency as compared to other vehicle attributes (such as safety, esthetics, and performance). Where is the market failure?

If the problem lies in a lack of information, the standard economic prescription is the same as the behaviorally informed one: *Fix the label and provide that information so that consumers can easily understand it.* We can understand this prescription in Hayekian terms as a plea for an educative nudge, rather than a more aggressive kind of intervention. And indeed, educative nudges are a key tool in the toolbox of the behaviorally informed policy maker. They might be seen as part of the same general program favored by those who prefer 'boosts', understood as efforts to inform and educate people so as to promote their own agency (Hertwig, 2017).

We have seen, however, that even with the best fuel economy label in the world, consumers might turn out to be insufficiently attentive to the benefit of improved fuel economy at the time of purchase, not because they have made a rational judgment that they are outweighed by other factors, but simply because they focus on other variables, such as performance, size, and cost (Gabaix & Laibson, 2006). The problem may be one of insufficient attention (Gabaix, 2017). A behavioral hunch, discussed below, is that automobile purchasers do not give adequate consideration to economic savings.⁹ Apart from savings, there is the question of time: How many consumers think about time savings when they are deciding whether to buy a fuel-efficient vehicle?

Such questions raise a host of empirical issues. But if consumers are not paying enough attention to savings in terms of money and time, a suitably designed fuel

⁹The hunch is questioned by Allcott and Knittel (2019), Sallee *et al.* (2016), and Busse *et al.* (2013). The hunch is supported in Gillingham *et al.* (2019). A sharp, balanced discussion can be found in Graham *et al.* (2019), with what seems to me a prudent conclusion: 'It seems that agency analysts should adopt a middle-ground position between full consumer valuation of fuel economy and no consumer valuation of fuel economy, and perform sensitivity analyses with different partial degrees of consumer valuation'.

economy mandate might well be justified, because it would produce an outcome akin to what would be produced by consumers who are at once informed and attentive (Sunstein, 2019). Energy efficiency requirements might be justified in similar terms, and indeed, the argument on their behalf might be stronger.¹⁰ If the benefits of mandates greatly exceed their costs, and if there is no significant consumer welfare loss (in the form, for example, of reductions in safety, performance, or esthetics), then the mandates would seem to serve to correct a behavioral market failure. And indeed, the US Government has so argued (EPA, 2010):

The central conundrum has been referred to as the Energy Paradox in this setting (and in several others). In short, the problem is that consumers appear not to purchase products that are in their economic self-interest. There are strong theoretical reasons why this might be so:

- Consumers might be myopic and hence undervalue the long term.
- Consumers might lack information or a full appreciation of information even when it is presented.
- Consumers might be especially averse to the short-term losses associated with the higher prices of energy-efficient products relative to the uncertain future fuel savings, even if the expected present value of those fuel savings exceeds the cost (the behavioral phenomenon of ‘loss aversion’).
- Even if consumers have relevant knowledge, the benefits of energy-efficient vehicles might not be sufficiently salient to them at the time of purchase, and the lack of salience might lead consumers to neglect an attribute that it would be in their economic interest to consider.
- In the case of vehicle fuel efficiency, and perhaps as a result of one or more of the foregoing factors, consumers may have relatively few choices to purchase vehicles with greater fuel economy once other characteristics, such as vehicle class, are chosen.

Of course, public institutions should be cautious before accepting a behavioral argument on behalf of mandates or bans. Hayek himself was skeptical about the reliance on the wisdom of experts: ‘One thing, in fact, which the work on this book has taught me is that our freedom is threatened in many fields because of the fact that we are much too ready to leave the decision to the expert or to accept too uncritically his opinion about a problem of which he knows intimately only one little aspect’ (Hayek, 2011; see also Scheall *et al.*, 2019). Behavioral biases have to be demonstrated, not simply asserted; as I have noted, important research suggests that consumers do pay a lot of attention to the benefits of fuel-efficient vehicles.¹¹ Some of that research finds that with changes in gas prices, consumers adjust their purchasing decisions, strongly suggesting that in choosing among vehicles, consumers are highly attentive to fuel economy (Busse *et al.*, 2013; Sallee *et al.*, 2016). Other research points in the

¹⁰For suggestive evidence, see Newell and Siikamäki (2015). Note that the miles-per-gallon measure is hardly hidden, and there is nothing quite as salient for energy efficiency.

¹¹For valuable, inconclusive discussions, see Allcott (2016) and Allcott and Greenstone (2012).

same direction. It finds that when aggressive steps are taken to inform consumers of fuel economy, they do not choose different vehicles, which suggests that a lack of information, and perhaps a lack of salience, are not causal factors here (Allcott & Knittel, 2019).

On the other hand, some evidence cuts the other way. A large-scale study of actual behavior finds that after a significant correction of an erroneously stated miles per gallon measures, consumers were relatively unresponsive (Gillingham *et al.*, 2019). As Gillingham writes, ‘Using the implied changes in willingness-to-pay, we find that consumers act myopically: consumers are indifferent between \$1 in discounted fuel costs and 15-38 cents in the vehicle purchase price when discounting at 4%’. Puzzlingly, many consumers do not buy hybrid vehicles even in circumstances in which it would seem rational for them to do so (Duncan *et al.*, 2019). According to the leading study, a significant number of consumers choose standard vehicles even when it would be in their economic interest to choose a hybrid vehicle, and even when it is difficult to identify some other feature of the standard vehicle that would justify their choosing it.

It is also possible to think that even if consumers are responsive to changes in gasoline prices, they are still myopic with respect to choices of vehicles that have technological advances. Graham puts it crisply (Graham *et al.*, 2019):

Consumers are more familiar with changes in fuel price than with changes in technology, since consumers experience fuel prices each time they refill their tank. Vehicle purchases are much less common in the consumer’s experience, especially purchases that entail major changes to propulsion systems. Many consumers – excluding the limited pool of adventuresome ‘early adopters’ – may be reticent to purchase vehicles at a premium price that are equipped with unfamiliar engines, transmissions, materials, or entirely new propulsion systems (e.g., hybrids or plug-in electric vehicles), even when such vehicles have attractive EPA fuel-economy ratings.

More broadly, the government’s numbers, finding no significant consumer welfare loss from fuel economy standards, are consistent with the suggestion that consumers are suffering from some kind of behavioral bias. At the same time, the government’s numbers, projecting costs and benefits, might be wrong (Gayer & Viscusi, 2013). Engineering estimates might overlook some losses that consumers will actually experience. No one doubts that consumers have highly diverse preferences with respect to vehicles, and even though they are not mere defaults, fuel economy standards should be designed to preserve a wide space for freedom of choice (Greenstone *et al.*, 2020). Appropriate standards ensure that such space is maintained. Economic incentives have inherent advantages on this count.

A real question, of course, is the magnitude of net benefits from alternate approaches. If the consumer savings are taken to be very large, fuel economy standards are likely to have correspondingly large net benefits. To give a very rough, intuitive sense of how to think about the comparative question, let us suppose that the US government imposed an optimal carbon tax. Simply for the purposes of analysis,

suppose that it is \$50 per ton, understood to capture the social cost of carbon.¹² Suppose that in relevant sectors, including transportation, a certain number of emitters decide to reduce their emissions, on the ground that the cost of reducing them is (on average) \$Y, which is lower than \$50. The net benefit of the carbon tax would be \$50 minus Y, multiplied by the tons of carbon emissions that are eliminated. It is imaginable that the resulting figure would be very high. But it is not necessarily higher than the net benefits of well-designed fuel economy standards.

With these qualifications, an argument for fuel economy standards, made by reference to behavioral market failures and to internalities in particular, is at least plausible. In this context, nudges (in the form of an improved fuel economy label) and mandates (in the form of standards) might march hand in hand. It is true that if the goal is only to reduce externalities, a carbon tax is far better than a regulatory mandate. It is also true that for Hayekian reasons, the best approach to internalities should not be coercion but instead appropriate disclosure, designed to promote salience and to overcome limited attention. Even if we trust the empirical findings, we might not trust regulatory institutions and their capacity to assess them (Schubert, 2017). But with an understanding of behavioral findings, a regulatory approach, promoting consumer welfare as well as reducing externalities, might turn out to have higher net benefits than the standard economic remedy of corrective taxes and disclosure.

With respect to both content and institutional design, everything turns on what the evidence shows, and on the particular numbers. But in principle, the regulation of other features of motor vehicles could also be justified in behavioral terms; certain safety equipment might not be sufficiently salient to consumers at the time of purchase, and some such equipment might fall in the category of experience goods (Sunstein, 2019). Credit markets can be analyzed similarly (Sarin, 2019). The broadest point is that while a presumption in favor of freedom of choice makes a great deal of sense (Glaeser, 2006) it is only a presumption. It might be overcome, especially when it can be shown that behavioral biases are having significant effects.

How can that be done? What are the appropriate institutional arrangements? Can an approach be adopted that might fairly claim to be Hayekian? In view of Hayek's skepticism about coercion and top-down expertise, the answer is not at all clear (Schubert, 2017). But return to the five questions with which I began. At least in the first instance, and possibly in the last, behaviorally informed policy ought to be based not on the preferences and values of social planners, but on learning from the choices of informed and unbiased choosers. It might well turn out to be possible to identify those choices. Once we have done so, we might be on the road toward identifying appropriate interventions, whether they involve nudges, taxes, subsidies, or mandates. Perhaps it would be extravagant to claim that those interventions, defended by reference to people's choices under epistemically favorable conditions, are Hayekian. But it may not be extravagant to say that they are in Hayek's general spirit, and respectful of his most fundamental concerns.

¹²A great deal depends on whether a domestic or global figure is chosen. For discussion, see Gayer and Viscusi (2013) and Kotchen (2018).

Acknowledgments. I am most grateful to Hunt Allcott, Oren Bar-Gill, Peter Boettke, Bruce Caldwell, Tyler Cowen, Geoffrey Hodgson, Adam Oliver, and Lucia Reisch for valuable comments on a previous draft. I am also grateful to Allcott for joint work that proved essential for the discussion here.

References

- Ackerman, B. and R. B. Stewart (1987), 'Reforming environmental law', *Columbia Journal of Environmental Law*, **13**(1): 171–199.
- Adusumalli, S., J. E. Westover, D. S. Jacoby, D. S. Small, C. VanZandbergen, J. Chen, A. M. Cavella, R. Pepe, C. A. L. Rareshide, C. K. Snider, K. G. Volpp, D. A. Asch and M. S. Patel (2020), 'Effect of passive choice and active choice interventions in the electronic health record to cardiologists on statin prescribing: A cluster randomized clinical trial', *JAMA Cardiology*, **6**(1): 40–48.
- Akerlof, G. A. and W. Dickens (1982), 'The economic consequences of cognitive dissonance', *The American Economic Review*, **72**(2): 307–319.
- Akerlof, G. A. and R. J. Shiller (2015), *Phishing for phools: The economics of manipulation and deception*. Princeton: Princeton University Press.
- Allcott, H. (2016), 'Paternalism and energy efficiency: An overview', *Annual Review of Economics*, **8**(1): 145–176.
- Allcott, H. and M. Greenstone (2012), 'Is there an energy efficiency gap?' *Journal of Economic Perspectives*, **26**(1): 3–28.
- Allcott, H. and C. Knittel (2019), 'Are consumers poorly informed about fuel economy? Evidence from two experiments', *American Economic Journal: Economic Policy*, **11**(1): 1–37.
- Allcott, H. and C. R. Sunstein (2015), 'Regulating externalities', *Journal of Policy Analysis and Management*, **34**(3): 698–705.
- Allcott, H. and D. Taubinsky (2015), 'Evaluating behaviorally motivated policy: Experimental evidence from the lightbulb market', *American Economic Review*, **105**(8): 2501–2538.
- Allcott, H., B. B. Lockwood and D. Taubinsky (2019), 'Should we tax sugar-sweetened beverages? An overview of theory and evidence', *Journal of Economic Perspectives*, **33**(3): 202–227.
- Bar-Gill, O. (2012), *Seduction by contract: Law, economics, and psychology in consumer markets (First Edition)*. Oxford: Oxford University Press.
- Bento, A. M., M. R. Jacobsen, C. R. Knittel and A. A. van Benthem (2019), Estimating the costs and benefits of fuel-economy standards. National Bureau of Economic Research, No. c14288. Retrieved from: <https://www.nber.org/books-and-chapters/environmental-and-energy-policy-and-economy-volume-1/estimating-costs-and-benefits-fuel-economy-standards>
- Bergh, A. (2020), 'Hayekian welfare states: Explaining the coexistence of economic freedom and big government', *Journal of Institutional Economics*, **16**(1): 1–12.
- Bernheim, B. D. (2016), 'The good, the bad, and the ugly: A unified approach to behavioral welfare economics', *Journal of Benefit-Cost Analysis*, **7**(1): 12–68.
- Bernheim, B. D. and A. Rangel (2007), 'Toward choice-theoretic foundations for behavioral welfare economics', *American Economic Review*, **97**(2): 464–470.
- Bernheim, B. D. and A. Rangel (2009), 'Beyond revealed preference: Choice-theoretic foundations for behavioral welfare economics', *Quarterly Journal of Economics*, **124**(1): 51–104.
- Bernheim, B. D. and D. Taubinsky (2018), 'Behavioral public economics', in B. D. Bernheim, S. DellaVigna and D. Laibson (eds), *Handbook of behavioral economics: Applications and foundations*, 381–516, Amsterdam: North-Holland.
- Boettke, P. J. (2018), *F. A. Hayek: Economics, political economy and social philosophy*. London: Palgrave Macmillan.
- Bohnet, I. (2016), *What works: Gender equality by design*. Cambridge: The Belknap Press of Harvard University Press.
- Bubb, R. and R. Pildes (2014), 'How behavioral economics trims its sails and why', *Harvard Law Review*, **127**(6): 1593–1678.
- Busse, M. R., C. R. Knittel and F. Zettelmeyer (2013), 'Are consumers myopic? Evidence from new and used car purchases', *American Economic Review*, **103**(1): 220–256.
- Caldwell, B. (2008), 'Hayek on mill', *History of Political Economy*, **40**(4): 689–704.

- Conly, S. (2013), *Against autonomy: Justifying coercive paternalism*. Cambridge: Cambridge University Press.
- Davis, L. W. and C. R. Knittel (2019), 'Are fuel economy standards regressive?' *Journal of the Association of Environmental and Resource Economists*, **6**(S1): S37–S63.
- Duncan, D., A. L. Ku, A. Julian, S. Carley, S. Siddiki, N. Ziropiannis and J. D. Graham (2019), 'Most consumers don't buy hybrids: Is rational choice a sufficient explanation?' *Journal of Benefit-Cost Analysis*, **10**(1): 1–38.
- Dworkin, R. (1985), *Law's empire*. Cambridge: Harvard University Press.
- Ebeling, F. and S. Lotz (2015), 'Domestic uptake of green energy promoted by opt-out tariffs', *Nature Climate Change*, **5**(9): 868–871.
- Environmental Protection Agency (EPA) (2010), Light-duty vehicle greenhouse gas emission standards and corporate average fuel economy standards. Retrieved from: <https://www.govinfo.gov/content/pkg/FR-2010-05-07/pdf/2010-8159.pdf>
- EPA (2015), Learn about the fuel economy label. Retrieved from: <https://www.epa.gov/greenvehicles/learn-about-fuel-economy-label>
- Frantz, R. (2020), Before Kahneman and Tversky, there was Friedrich Hayek. Retrieved from: https://cosmosandtaxi.files.wordpress.com/2020/02/frantz_ct_vol7_iss5_6-2.pdf
- Frantz, R. and R. Leeson (2013), *Hayek and behavioral economics*. London: Palgrave Macmillan.
- Gabaix, X. (2017), Behavioral inattention. National Bureau of Economic Research, No. w24096. Retrieved from: <https://www.nber.org/papers/w24096>
- Gabaix, X. and D. Laibson (2006), 'Shrouded attributes, consumer myopia, and information suppression in competitive markets', *The Quarterly Journal of Economics*, **121**(2): 505–540.
- Gayer, T. and W. K. Viscusi (2013), 'Overriding consumer preferences with energy regulations', *Journal of Regulatory Economics*, **43**(3): 248–264.
- Gillingham, K., S. Houde and A. v. Benthem (2019), Consumer myopia in vehicle purchases: Evidence from a natural experiment. National Bureau of Economic Research, No. w25845. Retrieved from: <https://www.nber.org/papers/w25845>
- Glaeser, E. (2006), 'Paternalism and psychology', *University of Chicago Law Review*, **73**(1): 133–156.
- Goldin, J. (2015), 'Which way to nudge? Uncovering preferences in the behavioral age', *Yale Law Journal*, **125**(1): 226–270.
- Goldin, J. (2017), 'Libertarian quasi-paternalism', *Missouri Law Review*, **82**(3): 669–682.
- Graham, J., J. B. Wiener and L. A. Robinson (2019), Co-benefits, countervailing risks, and cost-benefit analysis. Retrieved from: <https://cdn1.sph.harvard.edu/wp-content/uploads/sites/1273/2019/09/Graham-Wiener-Robinson-2019.pdf>
- Greenstone, M., C. R. Sunstein and S. Ori (2020), 'Fuel Economy 2.0', *Harvard Environmental Law Review*, **44**(1): 1–42.
- Hayek, F. A. (1945), 'The use of knowledge in society', *American Economic Review*, **35**: 519–530.
- Hayek, F. A. (2001), 'The road to serfdom', in M. Purdy and D. Banks (eds), *The sociology and politics of health*, 21–27, London: Routledge.
- Hayek, F. A. (2007), *The collected works of F. A. Hayek: The road to serfdom*, 71, Chicago: The University of Chicago Press.
- Hayek, F. A. (2011), *The collected works of F. A. Hayek: The constitution of liberty*, Chicago: The University of Chicago Press.
- Hayek, F. A. (2014a), *The sensory order: An inquiry into the foundations of theoretical psychology*. Chicago: The University of Chicago Press.
- Hayek, F. A. (2014b), *The collected works of F. A. Hayek: The market and other orders*, Chicago: The University of Chicago Press.
- Hertwig, R. (2017), 'When to consider boosting: Some rules for policy-makers', *Behavioural Public Policy*, **1**(2): 143–161.
- Karplus, V. J., S. Paltsev, M. Babiker and J. M. Reilly (2013), 'Should a vehicle fuel economy standard be combined with an economy-wide greenhouse gas emissions constraint? Implications for energy and climate policy in the United States', *Energy Economics*, **36**: 322–333.
- Knittel, C. (2019), Diary of a wimpy carbon tax. Retrieved from: <http://cepr.mit.edu/files/papers/2019-013.pdf>

- Kotchen, M. J. (2018), 'Which social cost of carbon? A theoretical perspective', *Journal of the Association of Environmental and Resource Economists*, 5(3): 673–694.
- Larrick, R. P. and J. B. Soll (2008), 'Economics: The MPG illusion', *Science*, 320(5883): 1593–1594.
- Mullainathan, S. and E. Shafir (2013), *Scarcity: Why having too little means so much*. New York: Times Books.
- National Highway Traffic Safety Administration (NHTSA) (2012), *Final regulatory impact analysis: Corporate average fuel economy for MY 2017 – MY 2025 passenger cars and light trucks*. Retrieved from: https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/fria_2017-2025.pdf
- Newell, R. G. and J. Siikamäki (2015), 'Individual time preferences and energy efficiency', *American Economic Review*, 105(5): 196–200.
- Nordhaus, W. (2015), *Climate change casino*. New Haven: Yale University Press.
- Pearl, S. J. (2015), *The collected works of F. A. Hayek: Hayek on mill*. Chicago: The University of Chicago Press.
- Pichert, D. and K. V. Katsikopoulos (2008), 'Green defaults: Information presentation and pro-environmental behaviour', *Journal of Environmental Psychology*, 28(1): 63–73.
- Potts, J. (2018), 'Governing the innovation commons', *Journal of Institutional Economics*, 14(6): 1025–1047.
- Rizzo, M. J. and G. Whitman (2019), *Escaping paternalism: Rationality, behavioral economics, and public policy*. Cambridge: Cambridge University Press.
- Sallee, J. M., S. E. West and W. Fan (2016), 'Do consumers recognize the value of fuel economy? Evidence from used car prices and gasoline price fluctuations', *Journal of Public Economics*, 135: 61–73.
- Sarin, N. (2019), 'Making consumer finance work', *Columbia Law Review*, 119(6): 1519–1596.
- Scheall, S., W. Butos and T. McQuade (2019), 'Social and scientific disorder as epistemic phenomena, or the consequences of government dietary guidelines', *Journal of Institutional Economics*, 15(3): 431–447.
- Schubert, C. (2017), 'Exploring the (behavioural) political economy of nudging', *Journal of Institutional Economics*, 13(3): 499–522.
- Stewart, R. B. and J. B. Wiener (2003), *Reconstructing climate policy: Beyond Kyoto*. La Vergne: AEI Press.
- Sugden, R. (2019), 'The community of advantage', *Economic Affairs*, 39(3): 417–423.
- Sunstein, C. R. (2015), John & Harriet: Still mysterious. Retrieved from: <https://www.nybooks.com/articles/2015/04/02/john-stuart-mill-harriet-taylor-hayek/>
- Sunstein, C. R. (2019), 'Rear visibility and some unresolved problems for economic analysis', *Journal of Benefit-Cost Analysis*, 10(3): 317–350.
- Sunstein, C. R. (2020), *Voluntary agreements*. SSRN. Retrieved from: <https://papers.ssrn.com/abstract=3543475>
- Sunstein, C. R. and L. A. Reisch (2014), 'Automatically green: Behavioral economics and environmental protection', *Harvard Environmental Law Review*, 38(1): 127–158.
- Vanberg, V. (2017), 'Editor's introduction', in V. Vanberg (ed.), *The collected works of F. A. Hayek: The sensory order and other writings on the foundations of theoretical psychology*, Chicago: The University of Chicago Press.