

## **“Behavioral Environmental Economics: Promises and Challenges”\***

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### **Abstract:**

Environmental issues provide a rich ground for identifying the existence and consequences of human limitations. In this paper, we present a growing literature lying at the interface between behavioral and environmental economics. This literature identifies alternative solutions to traditional economic instruments in environmental domains that often work imperfectly. But it also faces a set of challenges, including the difficulty of computing welfare effects, and the identification of a robust environmental policy based on context-dependent (socio-) psychological effects. We illustrate our critical discussion with two behavioral schemes that have been widely implemented: “green nudges” and “corporate environmental responsibility.”

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## 1. Introduction

Environmental economists have traditionally considered models with agents with unbounded rationality. Over the past 20 years in economics research, we have seen an increasing sophistication, and an expansion to models involving agents with human limitations. This has led to the development of new research fields like behavioral finance, behavioral game theory... This literature incorporates prospect theory, hyperbolic discounting, framing effects, other-regarding preferences and other deviations from homo oeconomicus. Our goal in this paper is to collect a growing literature on behavioral *environmental* economics, and present both what we know and avenues for future research.

Environmental issues provide a rich domain for this inquiry. Casual evidence suggests that the environment is often associated with strong moral feelings (guilt, shame, pride etc.), which may affect citizens' beliefs and attitudes toward green consumption, policies and politics. Many environmental issues are complex and have a public good nature. They also often have long term and global effects, increasing the scope for bounded rationality. Beshears et al. (2008) identify five factors that lead to bounded rationality: passive choice, complexity, limited personal experience, third party marketing and intertemporal choice. These factors are commonly found in environmental domains. Finally, environmental goods are typically public goods, and we know that socio-psychological factors play an important role in provision of those goods (Shang and Croson 2009).

There exist natural early connections between behavioral economics and environmental economics. Perhaps most significantly, the literature on environmental valuation using stated preferences (typically contingent valuation studies) has been influenced by research in psychology, behavioral and experimental economics (e.g. Bateman et al. 2002, List 2006, Carlsson 2010). These connections are also illustrated by numerous studies on the WTA/WTP discrepancy (Horowitz and McConnell 2002), or by the hundreds of experiments on public goods (Ledyard 1995). There also exists an influential and longstanding research on risk (mis-)perception in cognitive psychology (Ellsberg 1961, Kahneman and Tversky 1979, Slovic 2000), which has implications for the regulation of environmental risks (Johansson-Stenman 2008, Treich 2010).

The literature on behavioral environmental economics is not completely new; there is already a special volume in *Environmental and Resource Economics* in 2010 on this topic, and a handful of survey papers (Shogren and Taylor 2008, Gowdy 2008, Carlsson and Johansson-Stenman 2012, Hammitt 2013). This literature has often discussed how traditional policy instruments (like taxes), or traditional methods (like cost-benefit analysis), can be affected by behavioral concerns, including taxes crowding out public good contributions (Deci 1975, Benabou and Tirole 2006, Nyborg 2010), or the impact of hyperbolic discounting (Karp 2005) or reference dependent preferences (Munro 2009) on environmental policy.

This research which integrates human limitations into environmental economics is refreshing, and shows great promise. Scholars, policy makers and politicians have enthusiastically embraced this research. One reason may be the increasing awareness of environmental problems, and of the evident difficulty in solving these problems using traditional instruments. Another reason

may be the low cost of many behavioral interventions. An additional, more concealed, reason may be a general distrust in the market system and classical economics by individuals in these positions.

This paper is a summary and a reflection on the implications of bounded rationality and preferences beyond self-interest for environmental decisions and policy-making. We focus on pure “behavioral schemes,” namely on schemes that would be ineffective under unbounded rationality and unbounded self-interest. Thus we will not discuss traditional policy instruments like pigouvian taxes or pollution permits, nor environmental agreements. To make the discussion concrete, we focus on two behavioral schemes that have received wide political attention and that have been implemented in the field, namely “green nudges” (see section 2) and “corporate environmental responsibility” (see section 3). As we will show, these schemes use quite different channels for improving environmental decisions. Green nudges involve a “top down” approach which governments or quasi-governmental agencies use as a response to consumers’ bounded rationality. Corporate environmental responsibility instead involves a “bottom up” approach where firms respond to consumers’ preferences toward the environment. Hence, these schemes build on two central but fairly distinct parts of behavioral economics, namely bounded rationality and social preferences.

The discussion of the implementation and performance of these two behavioral schemes illustrates the high potential of this research agenda. But it also emphasizes the remaining challenges. We discuss the conditions under which these behavioral schemes may, or may not, form a robust basis for environmental policy making, particularly paternalism and context dependency. We conclude the paper with a brief summary and further open questions, and a presentation of some results in the field of environmental psychology (in addition to the research in general social and cognitive psychology traditionally used by behavioral economists) that may be useful for environmental economists in the future (see section 4).

## **2. Green Nudges**

### **2.1 The concept**

A nudge is any aspect in the framing of a decision problem that can affect people decisions without changing economic incentives. The concept has been proposed by Thaler and Sunstein (2008) in *Nudge: Improving Decisions about Health, Wealth and Happiness*. Thaler and Sunstein introduce the nudge concept using the “cafeteria example.” In this example, a director of a cafeteria can arrange the food display with healthy food at the front so that customers eat more healthfully. Importantly, a nudge changes the framing but does not change the set of choices. To clarify the concept, Thaler and Sunstein stress that putting fruits at eye level would be a nudge, but banning junk food would not, as this would change the set of choices.

Thaler and Sunstein (2008) present evidence in psychology and economics showing that people often make decisions that are bad for them, and that these decisions are strongly influenced by the framing. They emphasize that for any decision problem, there has to be a framing. Given that the choice of the framing is not neutral, and it is important that regulators think carefully about it. They recommend that the framing is chosen so that people can be better off. But who decides what is better off? In this sense, this form of intervention is paternalistic. But a nudge is a particular case of “libertarian paternalism”, where the word “libertarian” emphasizes that the freedom of choices

faced by the individual is preserved (Sunstein and Thaler 2003). A nudge is expected to have no effect on consumers with unbounded rationality, since the choice set and relative prices remain constant, a concept which was previously coined “asymmetric paternalism” (Camerer et al. 2003).

The nudge relates to many ideas previously introduced in for-profit marketing research. The novelty is that the nudge is selected by a “social planner,” and is carefully chosen in order to improve the welfare of consumers, not to sell them more products. Moreover, Thaler and Sunstein (2008, page 6) emphasize that the framing should alter people’s behavior “in a predictable way,” suggesting that the nudge should be based on sound scientific evidence that a change in the framing would have a specific effect.

## 2.2 Political and academic interest

Nudges have attracted a lot of attention in recent years. In the US, a memorandum was signed by President Obama in 2009 to “clarify the role of the behavioral sciences in formulating regulatory policy.” Cass Sunstein, one of the two fathers of the nudge concept, served as the administrator of the main US regulatory body, namely the Office of Information and Regulatory Affairs (OIRA) from 2009-2012. In the UK, David Cameron created the *Behavioral Insights Team* (or the “nudge unit”) within Prime Minister Services, which gathers a dozen of experts in behavioral sciences who have the mandate to elaborate and test the efficiency of behavioral instruments like nudges. The White House is currently building a similar team in the US (Thaler 2013). The European Commission has launched research programs to support research on behavioral economics and public policy. Several public documents on nudges have been produced by governments in countries like Australia, France and Switzerland, and by some organizations like OECD (CAS 2011, OECD 2012). Along similar lines, different research centers like the Center for Research on Environmental Decisions (CRED) at Columbia University in New York or the Behavioral Economics and Nature Network (BENN) at the Beijer Institute in Stockholm, have coordinated research networks specifically on these issues.

We can identify several reasons for the political and academic success of nudges. First is the low cost of those interventions. This is a major asset in periods of strong budget constraints of households or firms, compared to other standard forms of regulation like pigouvian taxes that can be costly and thus difficult to implement politically (consider citizens’ complaints about the high price of gasoline). Nudges have then been presented as a “real third way” to standard regulation (Thaler and Sunstein, page 255). Note that nudges also introduce a loophole to paternalistic regulation, a motive for regulation that has long embarrassed economists. Moreover, nudges are fairly easy to understand, and they do not seem to raise strong fairness concerns, as they are equally applied to all. Nudges are also particularly adapted to be tested through randomized field experiments, and many have been tested in developing countries (Duflo et al. 2011). Finally, and maybe most significantly, nudges perform well empirically.

## 2.3 Default options, and related schemes

One of the most compelling examples of a nudge is a default. In many situations, people do not actively or consciously choose, and this may lead to poor outcomes. Beshears et al. (2008) argue that one factor leading to bounded rationality is passive choice. Here, a choice is passive when people passively accept defaults rather than make an active choice. A nudge then consists of

choosing the specific default that may lead people to make a better decision for themselves. There is now strong empirical evidence that a default can have a dramatic effect on behavior. Madrian and Shea (2001) show that changing the default from non-enrollment to enrollment into a retirement plan changed average savings from 3.5% to 13.6% over 40 months. Other applications include portfolio investments, health, and organ donation (Johnson and Goldstein 2003, Choi et al. 2004, Thaler and Sunstein 2008), and have been reviewed elsewhere.

In the area of green energy, Pichert and Katsikopoulou (2008) show that significantly more participants in their experiment chose the green utility when it was the default than when “grey” electricity was the default. Many green nudges based on defaults already affect our daily lives; in some countries banks, electricity or phone companies send statements by email by default, requiring customers to opt-in to receive paper mailings. A striking example concerns a default introduced at Rutgers University which set printers to print both sides of pages. This default saved more than 7 million pages in one semester, or 620 trees (CAS 2011). Sunstein and Reisch (2013) provide several other examples of defaults in the context of green energy, paper savings and smart grids.

Defaults illustrate that small and apparently insignificant changes in the framing may have an important impact, and provide a poster-child example of how nudges can influence environmental outcomes. Related trivial schemes that change the presentation of a product, or its attributes, may also have significant effects. A recent field experiment indicates that reducing plate size reduces food waste significantly (Kallbekken and Saelen 2013). It has been shown that the most common US measure of fuel efficiency, namely the “miles-per-gallon” measure, is not intuitive (Larrick and Soll 2008). As a result, this measure may lead to a significant underestimation of the benefits of replacing most inefficient vehicles. Larrick and Soll suggest to supplement this measure with an alternative “gallons-per-mile” measure, as used in most European countries.

## 2.4 Social comparisons

An important second category of nudges concerns social comparisons. These nudges use social influences to affect individual consumption, typically by providing feedback information about self-consumption and others’ consumption. The effect of social influences has long been demonstrated by psychologists in laboratory experiments (Cialdini and Goldstein 2004). Similar effects have been more recently studied in the field (Shang and Croson 2009). Allcott (2011) examines a conservation program, run by a company called OPOWER. Using data on energy usage from 600,000 households, it is one of the largest randomized field experiments in history. OPOWER mails Home Energy Report letters that compare a household's energy consumption to that of similar neighbors. These letters include messages like: “Last month you used 15% less electricity than your efficient neighbors.” Allcott (2011) finds that the average treatment effects of OPOWER's conservation programs range from 1.4 to 3.3% of baseline usage, with a mean reduction in energy consumption of 2.0%. Moreover, the cost-efficiency of this conservation program compares favorably with other energy efficiency programs (Allcott and Mullainathan 2010).

The use of social comparisons can thus have a significant effect. A way of illustrating the size of this effect is to calculate the change in energy price that would induce the same change in demand. Allcott (2011) finds that the effect of social comparisons is equivalent to that of a short-run

electricity price increase of 11 to 20%, while Ayers et al. (2009) in a study of residential electricity consumption estimates this effect to be equivalent to a 17 to 29% increase in price. Ferraro and Price (2011) study household water use and find that, in the short run, the effect of social comparisons is equivalent to that which would be expected if average prices were to increase by 12 to 15%. Nudges based on social comparisons thus provide a powerful alternative to economic instruments, especially when demand is fairly unresponsive to price, as is the case for energy and water.

In a different context, Goldstein et al. (2008) examine the effect of signs requesting hotel guests' participation in an environmental program. For instance, one sign reads: "Almost 75% of guests who are asked to participate in our new resource savings program do help by using their towels more than once." They show that this sign leads to a significant higher towel reuse rate (44.1%) compared to a common sign referring to an environmental protection program but without reference to social comparisons (35.1%). In a subsequent experiment, the authors show that the nudge was even more effective when the sign provides information about the reuse rate of the guests who stayed in the exact same room. This suggests that the social comparison is more effective when the setting where the norm is formed is getting more comparable to the setting faced by the current decision maker.

## 2.5 Open questions

The use of nudges can clearly be effective, but also raises questions. One relates to whether nudges are purely behavioral or whether they also provide relevant information. A default may typically be viewed by consumers as a suggestion by a more informed social planner. But another way of reading nudges is not that they send new information, but they remind people of their existing norms/values (Nolan et al. 2008). This debate clearly depends on the specific nudge scheme under examination, and thus must be discussed on a case by case basis. One could legitimately argue, for instance, that social comparisons provide useful information about our own and others' energy use. On the other hand, it is difficult to argue that a two-sided printing default provides much additional information to users.

Another question relates to the manipulative nature of nudges. In the Goldstein et al. (2008)'s experiment, the 75% figure for towel reuse provided to hotel residents is untrue. The use of *deceptive* nudges raises moral issues, as well as reputational issues for future policies implementation. Where to draw the line to define the acceptable degree of manipulation? Thaler and Sunstein (2008) refer to the Rawls' publicity principle, that the government should not select a policy that it would not be able to defend publicly to its own citizens. This seems to be a sensible principle, but we do not think that it exhausts all the possible practical and philosophical questions that manipulative nudges may raise.

A key empirical question in this literature concerns how the consumers' response varies with a change in the nudge. For the sake of comparison, when a price of a good increases (e.g. because of a tax), it is natural to expect that demand for this good will decrease. Such an expected variation is crucial for designing policies and adjusting them over time, as illustrated by the empirical efforts to compute price elasticities in economic policy making. Unfortunately, changing the framing of a decision problem can hardly be expected to have such a systematic and quantifiable effect. The effects of nudges are difficult to anticipate. Brown et al. (2013) provide an example based on a thermostat default setting where the effect of a nudge is non-monotonic. Schultz et al. (2007)

identify an “anchoring effect” (also coined in this context a “boomerang effect”), in the sense that some households may actually increase, and not decrease, their energy consumption when they are informed that their baseline consumption is *below* the anchor provided by the average of their peer group. Interestingly though, it was shown that adding an injunctive message (conveying social approval or disapproval using for instance “smiley faces”) can mitigate the boomerang effect (Schultz et al. 2007, Allcott 2011). Yet, it seems difficult to precisely anticipate such effects for many possible policy interventions across various domains, and for every segment of the population concerned by the regulation. To illustrate, Costa and Kahn (2013) show empirically the role of ideology; political liberals (and/or environmentalists) are much more likely to respond to energy conservation nudges than are conservatives.

One final issue concerns the effect of nudges over time. Again, there is a large literature in economics about short term and long term price elasticities. But what do we know about the long term effect of nudges? There exist few studies on this question, and this is a ripe topic for future research. It is reasonable to anticipate that once a default has been changed and consumers have adapted behavior, the effect should persist. But this means that the effect of defaults may be “one shot,” in once the default has been selected, behavior cannot be further improved. Defaults also don’t work on everyone; Löfgren et al. (2012) shows that defaults for CO<sub>2</sub> offsets for air transport do not have effects on experienced consumers (i.e. environmental economists), and conclude that the effect of default options attenuate with experience. Intuitively, the long term effects should depend on the persistence of habits (which can be viewed as an expression of bounded rationality). If intervention changes habits, and these are long lasting, then the effects of nudges should persist.

In the domain of social comparisons, Allcott and Rogers (2012) study long term effects. They show that there is a pattern of “action and backsliding,” as consumers reduce electricity significantly within days after receiving initial reports, but these immediate efforts decay over time at a significant rate. After the first four reports, the reduction of emissions is about five times lower than after the first report. They conclude that people become accustomed, although not completely, to the repeated reminder letters. In their study on water demand, Ferraro et al. (2011) show that messages augmented with social comparisons may have a lasting impact, which can be detected more than two years after messages were sent.

## 2.6 The issue of paternalism

A final important consideration involves the paternalistic libertarian approach illustrated by green nudges. To illustrate, we first ask: what are the welfare effects of green nudges? We argue, as many other scholars before, that it is very difficult, if not impossible, to answer this question. The problem here is a general one: the welfare criterion is not clear when one evaluates a paternalistic intervention. Traditional welfare economics is based on a revealed preference argument. Preferences are estimated through the observation of choices made by consumers. In other words, the consumer is sovereign. But paternalism violates consumer sovereignty, and thus observed actions cannot be used to compute welfare. How to proceed then? In Thaler and Sunstein’s book, it is recommended that the regulator should influence consumers’ choices in a way that make consumers better off, “*as judged by themselves*” (Thaler and Sunstein 2008, page 5, italics in original). But, as Sugden (2009)

emphasizes, Thaler and Sunstein provide very little guidance about how to discover these consumer judgments.

This fundamental issue about welfare raises two (interdependent) questions, one practical, and one more philosophical. The practical question is how to recover “real” or “true” preferences. This is a longstanding theme, and no consensus has been reached (and probably will ever be reached). Some prominent scholars have argued that one may use one or a combination of several approaches, including structural estimations of behavioral economics models, carefully designed experiments, introspection, surveys, self-reported happiness, fMRI scanning and other methods (Kahneman and Sugden 2005, Beshears et al. 2008, Loewenstein and Ubel 2008).

To illustrate the related philosophical debate, consider the following situation. Assume that a decision maker accepts a default, or maintains a high level of energy consumption, because she believes that she will change behavior soon, but she keeps procrastinating and thus never changes behavior. In the language of economic models with hyperbolic discounting, this person exhibits a present-bias. The problem now is whether one should “purge” present-bias from these preferences in calculating welfare, as is done in some models of cigarette taxation for instance (Gruber and Koszegi 2004). This would arguably eliminate an important aspect of our personality (e.g. impulsiveness) and our hedonistic experiences, and it is not clear that this aspect should have no voice in welfare. In early work on self-control Thaler and Shefrin (1981) presented a model of two selves assuming that each had a valid contribution toward welfare.

In the same vein, it is well known that people often hold different beliefs about environmental risks than experts do. Should the regulator be populist and regulate according to the beliefs of people, or be paternalist and follow the experts? This is a difficult question, without a clear answer (Salanié and Treich 2009). One can further make the point that a nudge may introduce a negative feeling when it is implemented. For instance, a consumer may “feel bad” when realizing that she consumes more electricity than her neighbor. Should one account for this feeling in the calculation of welfare effects of green nudges, and if so, how?

We conclude with a critical argument which relates to the motivations of the regulator. We first observe that most discussions about paternalistic interventions assume, often implicitly, that the regulator is rational and benevolent. Yet, the regulator is a human too, and may display his own bounded rationality. There is empirical evidence of biased regulators in the context of environmental regulation (Viscusi and Hamilton 1999). Moreover, the regulator may be moved by different beliefs or moral values than those of the citizens (Carlsson et al. 2011) and/or may be primarily motivated by his political career. One may counter-argue that citizens should not elect a regulator motivated by different beliefs and values, or by opportunism. But there are imperfections in electoral mechanisms and many regulators are appointed rather than elected. We must also recall that we have assumed here that citizens are themselves boundedly rational; if they are not rational when they make consumption choices, why should they be rational when they vote? (Glaeser 2005). The point here is that political economy considerations are often important in (environmental) policy making, and these considerations may become especially problematic under policies that involve (even libertarian) paternalism. This point relates to Sugden (2009)’s interesting observation that Thaler and Sunstein (2008) in their book systematically put the reader in the mind of the regulator, not in the mind of the person who is nudged. This framing may lead the reader to accept naturally the

assumption that it is the other person who has bounded rationality, and that the regulator is in contrast fully rational and benevolent. In practice, this assumption is unlikely to be accurate. More generally, we refer to Saint-Paul (2011) for a critical discussion about the recent upsurge of paternalistic approaches in economics.

One might conclude from this critical discussion that we are skeptical about the use of nudges in environmental policy. This is not correct. Nudges have proven to be inexpensive and extremely impactful in improving environmental outcomes. They are also “safe bets,” even when the nudge does not work, very little is harmed (usually, behavior simply does not change). However, understanding the risks and concerns involved with any intervention is pivotal to ensuring its appropriate implementation, and we hope that this discussion has contributed to that understanding.

### **3. Corporate Environmental Responsibility**

#### **3.1 The concept**

The European Commission (EC 2011) has defined Corporate Social Responsibility as “a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis.” Similar definitions exist in various national and international documents. In this section, we focus on environmental concerns, so that we focus on corporate environmental responsibility (CER). The key words in the definition of the European Commission are “stakeholders” and “voluntary basis.” These words illustrate the principal mechanism under which CER operates: consumers or citizens (i.e. stakeholders) care about environmental goods, and firms provide these goods on a voluntary basis. This is consistent with economic approaches to CER (Besley and Ghatak 2006, Benabou and Tirole 2010). For instance, firms may decide to reduce their emissions of pollution in order to please their consumers. The fundamental behavioral aspect at the source of CER thus relates to people’s preferences toward the environment, and more generally to their willingness to pay to satisfy those preferences. This may lead them to consume green products, donate to green associations, invest in socially responsible funds, or boycott big polluters (see next section for a discussion of empirical evidence).

It is important to emphasize that CER is not compatible with the standard economic approach to solving environmental problems. This incompatibility is illustrated by the famous title of Friedman (1970)’s New York Times editorial: “The social responsibility of business is to increase its profits.” Friedman’s argument is one of task division. He argues that it is not the task of firms to address a market failure like environmental pollution. Firms have no competence, and no political legitimacy to do this job. Instead this is the task of the government by setting appropriate legislation to solve market failures (e.g. by setting a pigouvian tax). If consumers have unbounded self-interest and are not interested in paying a premium for environmentally friendly products, CER is expected to lead to reduction in profits which cannot be sustained under high competition. According to the classical approach, there is thus no justification for CER.

The modern approach to CER in economics however considers that CER may be justified in some situations where the government is unable to solve an environmental issue (for literature surveys, see Heal 2005, Kitzmueller and Shimshack 2012 and Crifo and Forget 2012). One common

situation involves information asymmetry between firms and the government; the government might not know what is necessary to internalize the externality. Another situation is related to political economy considerations. When there is lobbying or corruption for instance, the regulator may simply not want to implement an environmental regulation. Firms, which typically are not subject to periodic elections, can. A related problem concerns the global nature of environmental issues like climate change. In these settings local or even national governments cannot solve these issues, while multinational corporations might be more suited to the task. To summarize this approach, a possible justification of CER involves both a market failure and a “regulatory failure.” In this section we ask whether we can use another behavioral feature, citizens’ environmental preferences, to help solve environmental issues.

### 3.2 CER demand

Empirical evidence supports the idea that there is demand for CER. Consumers care about the environment and are willing to pay a higher price for products that generate less environmental harm (Cason and Gangadharan 2002). About 1 million US consumers pay a green premium in their energy bill (Bird et al. 2009), and the market for green products is predicted to grow significantly (Tolliver-Nigro 2011). Socially responsible investments represent more than 10% of investments in financial markets (Social Investment Forum 2010). Several big companies have faced boycotts because of their environmental impacts (Gupta and Innes 2009). Moreover, there exists ample evidence from psychology and in economics supporting pro-environmental, and more generally pro-social, behaviors. But the evidence shows that these behaviors are complex and volatile. Our general message in this part is that even if pro-environmental behaviors have been widely observed, it would be a mistake to believe that those behaviors are straightforward, and can be cheaply and easily levered.

It is now widely recognized that pro-social attitudes may have a myriad of motivations, including altruism, warm glow, inequ(al)ity aversion, preference for efficiency, reciprocity, conditional cooperation and many others. This literature has long demonstrated that contributions toward public goods are very sensitive to context effects (Ledyard 1995). In the domain of socially responsible investments, Chatterji et al. (2009) also distinguish different motivations, namely financial (believing that corporate social responsibility may increase performance), deontological (not willing to profit from unethical actions), consequentialist (rewarding good behavior) and expressive (expressing personal identity). Parallel research in environmental psychology identifies various other psycho-social determinants of pro-environmental behavior (Kollmuss and Agyeman 2002, Bamberg and Möser 2007, Swim et al. 2011).

Benabou and Tirole (2010) emphasize that self-image and social reputation may also contribute to demand for CER. People prefer to see themselves as “green” rather than “greedy.” In a field experiment, Bolderdijk et al. (2012) found that an economic appeal (e.g. “do you care about your finances?”) induces significantly less energy conservation than either ecological or neutral appeals. Social reputation is also important. Only 1% of charitable donations are anonymous (Glazer and Konrad 1996), and people donate much more when information about donation is public rather than private. Ariely et al. (2009) note that buying a hybrid car or installing solar panels provide more social prestige than indoor energy-efficient investments like water heaters, and thus the former

behavior is expected to be more prevalent. A recent field experiment by Della Vigna et al. (2012) empirically demonstrates the important role of social pressure in donations.

Many experimental results further illustrate the complexity of prosocial behaviors. For instance, Dana et al. (2007) show that when subjects are given the opportunity to know whether their actions are going to benefit or hurt others, they may take advantage of a “moral wriggle room” in order to make self-interested choices. There is also evidence of self-serving equity bias in experimental games of climate negotiations (Lange et al. 2010); participants tend to selectively support the equity principles that match their interests. This relates to the concept of “bounded ethicality” (Bazerman 2011) which suggests that individuals view themselves as moral, competent, and deserving, and that they often engage in unethical acts without their own awareness of doing so. Altruism is also context-dependent, individuals behave nicely toward others belonging to the same group but are often hostile toward those outside the group (Sherif 1967, Abbink et al. 2009). These observations have important implications for the success of CER strategies.

### 3.3 CER supply

Most, if not all, big companies now have a CER strategy. In 2010, almost two thirds of the biggest firms in developed countries have published a report on corporate social responsibility or on sustainable development (Crifo and Forget 2012). This includes firms like BP, Monsanto, Philip Morris or Heineken for instance, namely firms which are not usually presented as particularly socially responsible. There exist several forms of CER supply, including self-regulation (contributions to the environment without a direct link to consumers), the production of goods that are environmentally friendly, participation in voluntary programs established by a regulatory agency, and partnerships with environmental associations.

Again, the motivations underlying CER supply is not always clear. We have focused on the theory that firms want to please potential or actual consumers. But there exist more strategic theories. For instance, firms may use CER to preempt future environmental regulation, to set barriers to entry of potential competitors which do not yet possess innovative green technologies, or to collude with other firms (Lyon and Maxwell 2004, Glachant 2007). On a more positive side, CER supply may be a way to screen employees who may be more motivated, and more able to work in teams (Brekke and Nyborg 2008) or may reflect intrinsic preferences of firm leadership. Also, in line with the well-known Porter hypothesis, by focusing attention on resource use, CER may help reduce inefficiencies within organizations. In any case, if firms supply CER, this suggests that firms are better off by doing so. So, what is the link between CER and a firm’s performance? There exist literally hundreds of econometric studies on this link (see for instance the discussion and references in Ambec and Lanoie 2008 and Margolis et al. 2009). Often this link is found to be small but positive, although endogeneity is always a concern (firms with organizational slack can pursue CER policies).

A more troubling question is the link between CER and environmental performance. Unfortunately, and perhaps ironically, there exist few studies on this topic. The results so far are at best mixed. There is evidence that firms participating in a public environmental program pollute about the same as nonparticipants (King and Lenox (2000) in the Responsible Care® program and Videras and Alberini (2000) in the Wastewise program). Kim and Lyon (2011) show that participants in the voluntary 1605(b) program directed by the US Department of Energy increased emissions but

reported reductions, while non-participants decreased emissions over time. Along similar lines, Barla (2007) showed that ISO certification does not lead to a reduction in pollution.

Green advertising has increased tenfold in the last 20 years (TerraChoice 2009). But following previous observations, firms often mislead consumers about their real environmental efforts. This is called greenwashing. Over 95% of products surveyed by TerraChoice (2009) committed at least one of the “seven sins of greenwashing:” sin the hidden tradeoff, sin of fibbing, sin of no proof, sin of vagueness, sin of irrelevance, sin of lesser of two evils and sin of worshipping false labels. The behavior of firms may be subtle and perverse. General Electric “Ecoimagination” campaign advertises the company’s environmental performance, but this company has simultaneously lobbied to fight clean air EPA requirements (Delmas and Cuere Burbano 2011). In France, some green associations created in 2008 a Pinocchio Prize of Sustainable Development that delivers an award for “best” greenwashing practices.

### 3.4 Open questions

CER and more generally environmental disclosure of information has been called the “third wave” of regulation. It comes after the first wave of legal regulation and the second wave of market-based instruments regulation (Tietenberg 1999). However, its effectiveness is still to be determined. Firms engage in positive communication about environmental performance even though (or perhaps especially when) they demonstrate poor environmental performance. These strategies may ruin the CER movement in the long run, and this raises the question of how to best promote the disclosure of truthful and relevant information about CER performance.

There are several difficulties here, and we just name a few. First, environmental issues are complex and plagued with free-riding problems, so that the incentives for people to become informed about these issues may be limited. As a result, we cannot expect citizens to correctly assess the pertinence of the CER information disclosed. Second, CER efforts can have various possible social impacts (on CO<sub>2</sub> emissions, biodiversity, mortality, morbidity, governance, employment etc.), and evaluating and comparing these effects requires expertise. Just as the implications for welfare of bounded rationality and of bounded self-interest are by no means clear, the overall welfare impacts of CER efforts are extremely hard to compute. Finally, there are strong moral values involved. Think of the difficulty in evaluating Monsanto’s impacts on society for instance, a company which develops genetically modified organisms that may lead to reduced pesticides’ use.

There is also the question of who defines and evaluates the CER. Often, a group of firms sets its own standards of environmental responsibility. Examples include the Reporting Initiative or ISO environmental quality norms, as well as tools within industry groups such as the WBCSD, or sector-specific ones (e.g., the Cement Sustainability Initiative). Yet, even if firms in an industry credibly set what they want to measure and how, the impacts on other industries, populations and ecosystems are not necessarily covered by sector-specific rules, and therefore CER can hardly fully replace regulation.

Extra-financial rating agencies have also been involved to measure CER. One issue here is the potential conflict of interest between the raters and their customers (i.e. the firms), which has been well-recognized after the financial crisis. Since the evaluation methodology is the main competitive advantage of rating agencies, there is little incentive for transparency or clarity in the ratings. There

exist many CER rating agencies (KLD, EIRIS, Vigeo, SAM etc.), and international providers of financial services like Bloomberg have recently entered this market. In contrast we have seen little examination of the quality of the outputs of these agencies. In one of the first studies, Chatterji et al. (2009) show empirically that CER ratings provide good summaries of firms' environmental past performance but poorly predict future pollution and compliance violations. As an anecdote illustrating the last point, it is well known that BP was well-ranked by rating agencies before the 2010 Deepwater Horizon catastrophe. Alternatively, one may want the government, and not rating agencies, to evaluate firms' CER performance. But that is burdensome, and raises other conflicts of interest issues due political economy considerations like lobbying. And since moving away from governmental involvement was the original motivation for CER, reintroducing the government at this stage seems counterproductive.

#### **4. Environmental Economics and Environmental Psychology**

The new field of behavioral environmental economics combines the best of two disciplines: the normative power of traditional environmental economics together with a more realistic description of individual behavior from psychology (and from other human and social sciences). Environmental economists increasingly recognize the power of behavioral economics for their research. As an illustration of this, after the EAERE conference held this year (2013) in Toulouse gathering hundreds of environmental economists, a questionnaire asked participants: "What topics would you like to see addressed at next year's conference?". Participants were offered a long list topics, and the most commonly selected topic was behavioral economics.

Why do we see all this interest? We believe, like these participants, that behavioral economics offers new approaches to environmental problems. It provides organizing explanations to previously unexplained puzzles and, most importantly, raises new unasked questions and offers new mechanisms for testing.

In this paper, we have focused on framing effects and social preferences. These behavioral aspects have long been studied in psychology, and have also received attention in behavioral economics in the last two decades. We believe that new directions can also be found in a growing research field in psychology that focuses directly on environmental issues; environmental psychology which has developed since the 1970s (Gifford 2007). Research in this field published in specialized journals like *Journal of Environmental Psychology* or *Environment and Behavior* as well as in generalist psychology journals. As an illustration of the activity of this field, the American Psychological Association has released a report in 2009 on the "Interface between Psychology and Global Climate Change" (APA 2009) which summarizes many research outputs. We thus conclude this paper by identifying a handful of psychological concepts discussed in the field of environmental psychology that illustrate promising new directions integrating behavioral factors into environmental economics.

In psychology research, it is common to construct empirical measures that capture a specific attitude, which may be used to predict future behavior (Ajzen 1991). An important objective in the field of environmental psychology has naturally been to measure peoples' environmental attitude in a valid and reliable fashion. There actually exist dozens of measures of environmental attitude, and these measures have been extensively discussed in the literature (Hawcroft and Milfont 2010). Perhaps the most common measure is the New Ecological Paradigm (NEP), a measure of the

endorsement of “pro-ecological” world view developed by Dunlap and colleagues (Dunlap 2008). The measure is constructed from individual responses to 15 questions using a common Likert scale. It is used in cross-sectional studies to assess attitudes to environmental policy and pro-environmental behaviors. It is also used in before-and-after studies of the effects of some intervention or activity, such as the impact of educational programs about the environment.

An interesting and relevant concept for understanding environmental attitude is that of “moral licensing.” This concept suggests that generous behavior may give one a license to behave badly in the future, and conversely that previous immoral behavior may lead to subsequent pro-social behavior that helps to regain self-worth. Consumers are more likely to splurge on a frivolous purchase after they have been asked to imagine that they have contributed to a public good (Khan and Dhar 2007). Sahdeva et al. (2009) show that participants would donate more and pollute less after being primed by writing a story with negative traits. In the same vein, Mazar and Zhong (2010) show that people act less altruistically and are more likely to cheat and steal after purchasing green products than after purchasing conventional products. This topic belongs to the general theme of the moral roots of environmental attitudes (Feinberg and Willer 2013). It also relates to the topic of how the sense of self and identity connects to environmental behavior (Devine-Wright and Clayton 2010). Moral licensing is an important concern for environmental economists because it suggests that pro-environmental behavior is unsustainable, and that policy efforts to encourage this behavior may have negative offsetting effects in other domains. This topic is important if we are to understand the long-term behavioral effects of environmental interventions.

A related topic concerns sacred values, namely values that a moral community treats as having a transcendental meaning that precludes tradeoffs (Tetlock 2003). People feel offended when they face such “taboo tradeoffs” and may respond with moral outrage. Interestingly, Tetlock discusses whether and how changes in rhetorical framing may make tradeoffs more acceptable. This concept has its roots in sociology, especially in Durkheim’s work. It also strongly relates to Baron and Spranca (1997) concept of “protected values,” namely those values for which people resist tradeoffs. This topic is central, because environmental economists typically study trade-offs between the environment and other scarce resources (e.g. income). This field of sacred or protected values provides unexplored and important implications for which types of nudges or other schemes are likely to be effective.

Environmental issues are complex, and a further stream of research investigates how individuals think about complexity. Thinking about (complex) environmental issues may deplete our cognitive resources, which increases impulse behavior and makes self-regulation more difficult (Baumeister 2002). Most people do not have a clear understanding of environmental issues, and perceptions are strongly influenced by affect, imagery and values (Leiserowitz 2005). People do not understand dynamics or feedback effects and they have difficulties relating the flows to stock levels of pollution (Sterman 1989, 2008). People engage in cognitive dissonance, and thus deny environmental problems (Opatow and Weiss 2000). Relatedly, limitations in perceiving the direct immediate consequences of pollution may lead to minimizing the impact of individual behavior. This relates to the concept of “psychological distance” (Trope and Liberman 2010), which has been studied in the environmental field (Uzzell 2000). Also, some environmental or political lobbies attempt to manipulate people beliefs about environmental issues (Kuran and Sunstein 1999,

McCright and Dunlap 2003). The area of individual perceptions and cognitions around environmental issues is thus another rich area for further research.

Despite the numerous challenges, we conclude by (re-)emphasizing the promises of the research program combining knowledge in environmental economics and in environmental psychology. We believe that policy interventions which combine the two are especially powerful and need to be explored. For instance, economic incentives act in an economic way, but also send signals about the social desirability of the choices to be made. A green bonus/malus system aligns financial incentives, but also communicates social values that may in turn influence behavior through the framing of choices as either “good/clean” or “bad/dirty” (Hilton et al. 2013). As a result, such a green system can have complex effects, which involve both financial and behavioral dimensions (D’Haultfoeuille et al. 2014). In a literature survey about the contribution of psychology to climate change, Stern (2011, page 308) indicates: “By far the most efficient behavioral interventions in terms of reducing household carbon emissions have been those that combined financial incentives with nonfinancial incentives.” We urge researchers and policymakers alike to think broadly about the efficacy of any one of these interventions (economic, behavioral, psychological) but especially about their combination and potential synergies in our future explorations.

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