

NUDGING EFFECTIVE CLIMATE ACTION

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Introduction

In 1991, economist Herman Daly argued for the creation of environmental macroeconomics. With the expanding scale of human economic activities, it was essential that the macroeconomic perspective become acquainted with a much larger picture of the environment and its resource supplies and limits. Today, climate change is a reality that impacts the functioning of the entire world economy, with some parts of the globe being more vulnerable than others. In many places, climate change is responsible for adverse shocks to supply potential, downward pressure on output, and upward pressure on prices.

Primarily, environmental macroeconomic policies are focused on facilitating the switch to a more renewable energy as the use of fossil fuels are by far the largest contributor to climate change (USEPA, 2022). However, there are quite a few problems in reaching a consensus for appropriate climate action. A healthy state of the climate can be considered a public good. At the scale of national macroeconomy, a pareto optimality is a state of resource allocation where no individual can be made better off without making someone else worse off. There is an inefficiency in the market provision of public goods such as the environment due to 1) unclear feedback of environmental consequences and 2) the problem of free riding, which can be understood by the age-old economic problem of the tragedy of the commons. When individual users have access to an open resource, there is an incentive to act within their own interests to maximize utility, but this can lead to the depletion of the resource which in-turn affects all individuals within the economy.

Currently, climate actions by governments involve either monetary incentives such as taxes on greenhouse gases or cap-and-trade policies where a performance standard is set with a fixed limit on pollution and market is created for the trading of emission allowances. While these actions are a positive direction for climate action, behavioral economics suggests that more progress can

be made by policy makers if they take into account that inducing change in individual behaviors translates into collective change on a macroeconomic front. Economists no longer assume humans to make decisions under strict rationality and self-interest. Instead, it is understood that decisions that drive the economy are made in the individual's psychological environment, which is dynamic and always responsive to the external stimuli. Individuals are constantly assimilating social cues to make the best possible choice and in reality, there are heuristics and biases that they rely on which can be far from rational.

It is therefore important to also consider climate change from a non-rational perspective to be able to identify the biases in humans that obstruct a collective action. Considering biases is helpful as it can also reveal the ways in which policies can be designed to be more accommodating of climate action. Understanding factors such as moral sentiments or simple indifference can help understand climate change as a global choice architectural problem and redefine it as an opportunity to make improvements to the structure under which global capitalism and human development can be sustained.

In my paper, I will use the MINDSPACE framework of behavior influence to discuss the heuristics that are problematic for climatic action, others that can be useful in designing green policies and discuss them with respect to environmental economics using concepts such as loss aversion and prospect theory to make suggestions on how climate action can be nudged. Finally, I will discuss integrated assessment models (IAM) in economics that examine policies around global warming to integrate the environment and economy into a single social welfare optimization decision-making framework.

Biases in human decision making.

In the book *Nudge: Improving Decisions About Health, Wealth, and Happiness*, economists Richard Thaler and Cass Sunstein make a distinction between ‘econs’, the rational man that neo-classical economics bases its assumptions on and ‘Humans’. Econs carefully weigh costs and benefits of alternatives while making decisions. They are deliberate, reflective, and analytical. Humans also consider cost and benefits but are bounded by their less than perfect understanding of probability theory and rational optimization and various other psychological factors. Humans can be emotional, reflexive, and short sighted. Psychologist Daniel Kahneman explains this as being a function of the automatic cognitive system which makes countless daily decisions based on heuristics and can be riddled with biases. If we consider the general population to be humans and not econs, it is important that we integrate these biases which are inherent in mortal imperfection while making macroeconomic evaluation on how the collective responds to climate action.

In their 2012 paper “*Influencing behavior: the Mindspace way*”, Dolan et al., draw on research done by Daniel Kahneman and present the mnemonic, MINDSPACE, which represents the nine most robust cognitive automations that influence our behavior. They are 1) Messenger, 2) incentives, 3) Norms, 4) defaults, 5) salience, 6) priming, 7) affect, 8) commitment, and 9) ego. This paper will focus on the biases of incentives, defaults, norms, and ego to discuss climate action.

a) Sanctions for non-cooperative behavior

As climate change is a faceless matter with no certainty of when the villain will take center stage, climate action faces a major problem of the present bias, which is categorized by Dolan et al. as an aspect of the incentive bias. Humans prefer smaller immediate payoffs to larger distant

ones. In the case of climate change, unless there is a major climate calamity happening at the moment, humans don't consciously consider how the short-term negative externalities of taking appropriate climate action such as paying green taxes can bring larger payoffs in the long run. This can also be explained by how people usually behave in a public goods dilemma. When the public goods dilemma is played repeatedly, participants tend to deflect from the cooperative action as they know that despite them cooperating others might not cooperate. This is especially true when the public good is the environment given that there are no short-term rewards.

However, research shows that punishment allows for an evolution of cooperation (Boyd & Richerson, 1992). If players are allowed to talk to each other during a public good dilemma, the cooperators usually get together to punish those that do not cooperate even at their own expenses so that the group as a whole can cooperate. Currently, under the article 6 of the Paris agreement, there is no penalty for non-compliance. One way to tackle the free rider's problem and the present bias could be for compliers to set sanctions for countries that do not maintain the carbon standards. On a national level, it would mean setting laws such as 'No plastic bag policy' where those that deflect are fined. This way, there is a cost to non-cooperation in the short term. This strategy also aligns with the prospect theory which says that gains and losses are evaluated differently. As losses cause a greater emotional impact, having a punishment creates greater incentive for countries to cooperate on climate action.

b) Switching to green defaults

The previously discussed idea of having sanctions works as seen in countries such as Bhutan with a strict authoritarian regime where the no plastic bag policy is strictly implemented but it then infringes on people's willingness to participate to begin with. In most countries, people

need to agree on the laws that are passed and as there are many that still deny climate change, it is difficult to impose strict sanctions. There would need to be an intrinsic motivation within the general public to tackle climate for such laws to be passed. Climate change activists around the world work very hard to achieve this end. However, when it comes to climate action, research shows that while information presentation can change people's perceptions on climate change (Clark et al., 2003), it is not correlated with taking actual action such as switching to greener alternatives (Bamberg, 2003). There exists a gap between rhetoric and reality.

Changing the defaults on the other hand provides a non-aggressive approach to ensuring cooperation. The default bias refers to the tendency to stick to whichever default is provided. Sticking to defaults saves time as people don't have to waste their cognition on considering the alternatives even if it might be more aligned to their personal utility. In a 2008 paper "*Green defaults: Information presentation and pro-environmental behavior*" Pichert et al. present two natural studies and two laboratory experiments to argue that changing defaults can be used to promote pro-environmental behavior.

The first natural experiment examined the German town Schönau where policymakers had switched to green defaults in 1998 after a citizens' initiative to establish green energy supply. The researchers found that after 8 years of its implementation, 1669 out of 1683 electricity meters in Schönau were still supplied with electricity traded by EWS (Electricity rebels) that sources out renewable energy. Most citizens of Schönau kept their green default compared to other gray default towns in Germany where about 1% make the switch to green energy.

The second natural experiment examined the German company Energiedienst GmbH which presented three tariffs for their energy grids. The company sent out letters to private customers where a green tariff was used as the default. Customers that wanted to switch to either

of the other two tariffs (an economic tariff that was 8% cheaper and a more expensive green tariff that was 23% more expensive) had to respond while those that wanted the default did not. Only around 4.3% of the customers switched to the economic tariff while 94% remained with the default option.

The natural experiments have their limitations as it is difficult to establish if consumers were really choosing the default. Some people could have simply not understood that they could switch. Moreover, for the town of Schönau, the active discussion of green energy could be the reason that people did not switch from the default. It is difficult to establish for sure that the default bias was at play here. So, the researchers followed up with two laboratory experiments.

The first experiment presented 225 young participants directly with the task of choosing between different electricity suppliers. The established a neutral condition and an implementation of a tradeoff in the other condition. The participants were given a short questionnaire. They were asked to imagine that they had to move into a new town and has to choose between two energy suppliers: one with green energy and another where they were not told where the energy was from but was more economic. Participants were told that one of the companies was the default energy provider. To test for default effects, the experimenters also had two version of the question. In the green condition, the green company was the default and the gray one was the competitor if they wanted to make a switch. Similarly, the roles were reversed in the gray condition. Further, they added a neutral condition where neither company was presented as the default and the participants could simply choose and not make a switch. Participants were also asked to give short statements explaining their choice.

The researchers found that in the green condition, the fraction of the participants who chose the green energy was 68%, 41% in the gray condition, and 67% in the neutral condition. In the

analysis of the reasons for the choices, majority of the participants cited both price consideration as well as environmental concerns. While the results of this experiment support the hypothesis that people are more likely to choose the green option when it is presented as the default, the researchers were not able to establish a large difference due to the defaults. The social desirability effect could have played a role in this, with participants wanting to appear more environmentally aware in the neutral and gray conditions. As it was a lab experiment, there is concern about the ecological validity of the results as participants may behave differently in a non-controlled environment where they would make such choices. The authors also suggest the possible role of authority wherein the participants might have interpreted the default as an implicit recommendation.

The second lab experiment further investigated the influence of defaults in the choice of electricity by examining the monetary value people attach to green energy. They examined willingness to pay (WTP) and willingness to accept (WTA). The defaults were what the participants were endowed with. The researchers hypothesized that peoples WTA would be greater than WTP, which implies that people want to be given more money than they would be willing to pay for switching to green energy. In lieu of what they expected, they found that once a green default is established, people are either reluctant to move away from this reference point or they demand a relatively large sum to do so.

While the results of laboratory experiments did not show strong differences, the statements that the researchers collected still give some interesting insights. A considerable number of participants stated that anticipated effort prevented them from switching, a tendency that supports the default option. Majority reported distrust of the non-default provider. Making the green option the easy option is a subtle yet effective tweaking of the choice design that can nudge people to make more environment friendly choices.

c)How perceived norm influences pro-environmental behavior.

Social norms are behavioral expectations, and they provide a template that people use to navigate the world. As humans take cues from what others do to create an understanding of what they should themselves be doing, norms have an impact on individual behavior. People tend to conform to the crowd even if it may not be utility maximizing for them to do so. The extent to which this conformation is automatic can be debated as following the group behavior might bring people direct pleasure. However, it is still something that a rational econ should not do if the payoffs of participating in confirmatory behavior is not utility maximizing to the individual. However, this non rational tendency can create very powerful impacts. People are always quick to jump on bandwagons. If small sustainable habits can be established as norms, the transition to a greener world would be smoother.

In the 2003 paper “crafting normative messages to protect the environment”, Cialdini presents a number of environmental experiments that he conducted to discuss how having norms and framing them the right way can bring about changes in behavior. He suggests using injunctive norms (that suggest what behavior is approved or disapproved of) and descriptive norms (suggesting what behaviors are typically performed) in line with one another for development of pro-environmental messages that are effective.

In one experiment, participants were given the opportunity to litter either in a previously littered environment after watching a confederate either litter or walk past the area. These conditions manipulated the perceived descriptive norm for littering in the situation. There results were consistent with their argument as there was more littering in the littered environment than in the clean environment. Moreover, most litters occurred when participants watched the confederate

litter. This suggests that if the government was systematic with trash collection and regular cleaning, people would follow the norm that they perceive and not litter.

In another experiment, the researcher created three different signs for hotel rooms. The first one simply asked the people to save the environment. The second said that most guests recycled their towels at least once during their stay (descriptive social norm). The last sign said that the most previous occupants had reused towels at some point during their stay (descriptive and injunctive). 35% recycled their towels when they had the first sign, 44% with the second and 49% with the third. Framing the recycling of towels as a social norm pushed more people to conform to the positive habit of recycling.

These experiments show that governments can alter the norms that are perceived by people by starting initiatives such as a strict city cleaning routine that will push people to also match the efforts that they think is normative. Moreover, framing environmental messages in public places to make them represent descriptive and injunctive norms can also nudge green behavior.

d) Ego: Relationship between self-identity and pro-environmental attitudes and behavior

People behave in ways that are consistent with their self-image. People often display behaviors that can protect their sense of identity, even if it is not utility maximizing. The perceived immediacy and personal relevance play a large role in human willingness to take action. When it comes to climate action, this means that an individual is more likely to take actionable steps when they consider themselves to be someone that cares for the environment. While some parts of our identity are uniquely individual to us, a lot of others are a result of our cultures and upbringings. In a community establishes itself as one that works consciously towards the protection of the

environment, those that live in the community and derive some of their identity as being a part of the group are eventually bound to act more climate friendly so that there isn't a mismatch in their real-life behavior and self-image.

In the 2016 paper "Self-Image and Environmental Attitude and Behavior", Fiorollo et al. developed a theoretical framework to discuss the relationship among self-image, pro-environmental attitudes, and behavior. They defined self-image as the individual's willingness to cooperate for the sake of the public good, environmental attitude as the individual's concern regarding waste prevention, and the environmental behavior as the individual's actual recycling behavior. Consistent with their hypothesis, the results confirmed a positive relationship among self-identity, pro-environmental attitudes, and behavior. Their findings support the idea those with well-defined identity about the environment will act accordingly. If governments are able to create a collective identity of being an environmentally aware country, people would slowly start acting that way. This has been seen in Bhutan, where the power of identity is seen to largely influence green behaviors. In 2016, during the birth of the royal prince, the government of Bhutan declared that the gift to the royal couple would be a plantation of 100,000 trees within an hour, to honor Bhutan's identity as a green nation. Ever since, tree plantation as a form of hobby has skyrocketed in the country. The government encouraged this further by declaring many areas in the country as tree plantation spots. By attaching a collective identity to a very good climate action, the government nudged green behaviors in individuals.

A global welfare optimization framework:

So far, this paper has given accounts of the role biases play in climate action and the ways in which governments can use choice architecture to influence individual behaviors that in turn influences the aggregate attitude and behaviors in the economy as a whole. Integrated assessment models (IAM) help in providing a framework of integration of economic activities with environmental activities. Economic IAMs are characterized by a representation of the climate system, the physical consequences of climate change and their relationship with the representation of the economy. The first IAM was the DICE (A Dynamic Integrated Model of Climate and Economy). It has now been updated to RICE (Regionally Integrated Climate and Economy) model which has a long-term objective to maximize welfare by evaluating the present value of social utilities that can be earned now and in the future. (Seo, 2017) Although such frameworks have been subject to criticism as the relationship between climate change and economic output is unambiguous at large, having the framework allows for evaluating how any change in climate policy can change output levels in the economy and vice versa.

Conclusion:

Climate change has the potential to bring turmoil to economies at unexpected times. It can be extremely difficult to bring an economy to its level of full employment and output in sudden times of crisis. This makes it important that policy makers take all the steps to transition the individuals in an economy into a more sustainable form of living. This paper suggests changes in choice architecture that can influence the psychological environment of individuals which will translate into behavioral changes for the aggregate.

Governments play a huge role in steering individuals towards greener choices so that the world can stand ready in the face of climate change. According to the porter hypothesis, strict environmental regulations can actually induce efficiency and encourage innovations that help improve commercial competitiveness. So, the positive externality to climate change could be that it causes knowledge spillovers and promotes sustainable innovation in outputs as well as policy designs that prepare economies during times of crisis. In the meantime, global welfare optimization frameworks such as the RICE can provide valuable insights that can help keep track of the impacts of climate change on economies to allow for more informed policies and regulations.

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