Behavioral Economics applied on Environmental Issues

**Introduction**

*Behavioral economics is about understanding economic behavior and its consequences. It’s about understanding why someone buys a hotdog, goes to work, saves for retirement, gives to charity, gets a qualification, sells an old car, gambles on a horse race, cannot quit smoking, etc. It’s also about understanding whether people make good or bad choices, and could be helped to make better choices.* [Edward Cartwright]

In this canon behavioral economics, a subfield of the discipline economics, is discussed. Behavioral economics gained importance over the last decades, because it provides insights into the way people make decisions about their actions. Since individuals do not always act according to standard economics theoretical models, behavioral economics is aimed at bridging this gap between theory and reality, leading to more realistic explanations and predictions of human behavior.

In this canon, first some terms are explained in order to provide background knowledge of economics, which is required to understand what behavioral economics is about. Subsequently, an example of the tragedy of the commons in the context of the environmental issue of global warming is provided. With this, it is illustrated how standard economic theory fails to explain human behavior, while behavioral economics can provide an explanation of behavior and can also be used as an instrument of policy makers.

**Definition of key concepts**

In this section, some key concepts and terms are explained in order to provide basic background knowledge of economics.

Economics - Microeconomics

Economics is a social science concerned with the factors that determine the production, distribution, and consumption of goods and services. Economics is focused on behavior and the interaction of economic agents as well as how economies work as a whole. Generally, economics is divided into macro- and microeconomics. Macroeconomics focuses on economies as a whole, while microeconomics focuses more on individual actions of individuals, households, or firms.

One important assumption in standard economics is rationality. Rational choice theory assumes that people’s behavior is solely based on their self-interest; people know everything, including all options available, that influences their decisions and people always decide consistent with their stable preferences. Rationality is also an important assumption in utility theory, which is a theory to explain the choices individuals make. It implies that individuals value a good or service based on the satisfaction they derive from it. It is not always possible to exactly measure utility from all possible outcomes, but individuals are capable of ranking them from best to worst. This implies that individuals have a complete overview of all possible options: they are able to indicate which good or service they prefer over the other. Furthermore, with regards to the same good or service it holds that more is always better. Next to this, people prefer to consume a variety of goods and services over more of the same good or service.

Game theory

Game theory analyses multi-person decision problems, which are called games. A game is a situation in which at least two individuals with (partially) diverging interests interact with one another. Here, the payoff of one player does not only depend on the player's own actions but also on the other players’ actions. The task of game theory is to model and to solve such games. To solve a game means to determine how a rational player would act in that specific game. The most famous application of game theory is the prisoner's dilemma, which is a dilemma concerning cooperative behavior: Two (or more) rational individuals might not cooperate, even though it would be best for both of them to do so. This dilemma will be further explained in this canon.

Behavioral economics

Mounting evidence for descriptive failure of the rational choice model used in standard economic theory inspires behavioral economics. Behavioral economics has the goal of improving economic analysis by incorporating more realistic assumptions about human behavior. While main assumptions of standard economic theory are that agents act rational, components of behavioral economics are agents with bounded rationality, bounded willpower and bounded self interest. People do not act rational, but as human beings guided by intuitions and emotions. In particular, behavioral economics studies the effects of psychological, social, cognitive, and emotional factors on the economic decisions of individuals and institutions. Thus, it entails a broader perspective on human decision making with a close interaction between theory and evidence. However, it is noteworthy that behavioral economics does not dispense with rational choice theory completely; it does deviate from rational choice theory in varying degrees. Until now, behavioral economics is not a unified theory, but more a collection of several models explaining specific behavior. Behavioral economics has gained importance, especially during the last decades. Currently, it plays an important role in informing policy makers about the consequences of certain policies.

**Behavioral economics and environmental issues**

The insights of behavioral economics can be used to describe problems occurring in environmental contexts caused by human beings. Moreover, it can help to explain why these problems arise and provide possible solutions for them. This can be used as a source of information for policy makers facing decisions affecting the environment.

Tragedy of the commons

Since behavioral economics can attribute to insights in environmental policy issues, the following section will give an example of the tragedy of the commons, which is an application of the prisoners dilemma. The tragedy of the commons came into discussion after publication of the article “The tragedy of the commons” written by Garrett Hardin in 1968. Since then, it has been used as a framework for societal problems.

The tragedy of the commons can be explained by a simple example: imagine a large pasture that is open to everyone. Every herdsman will try to get as many cattle as possible on the pasture, because more cattle means more revenue, so more gains by profit. Thus, on the one hand, there is extra utility: more sales from the additional animal. However, on the other hand, there is a reduction in utility. This is a consequence of overgrazing created by adding more and more animals to the pasture. Too many animals grazing means that the grass cannot grow fast enough to recover. Since all herdsmen share the reduction in utility, the individual loss will never be larger than the individual gain in utility by adding another cattle. Therefore, every herdsman will increase the number of animals until the whole pasture is overgrazed and not useful for any of the herdsman. The tragedy is that pursuing your own interest will ruin all, including yourself. Therefore, freedom in the commons does not work. This example shows that if people act rational, there is not always a maximization of overall utility. Here, rational acting individuals will destroy the environment.

Other examples of the tragedy of the commons are: overfishing in the ocean, depletion of oil and gas reservoirs, and pollution by different agents. An application of the tragedy of the commons will be explained in the next section: climate change.

Application example for the tragedy of the commons: climate change

In this section, an example is given how the tragedy of the commons can be applied in a real live context: the case of global warming. A closer look reveals that individual agents do not act according to the predictions of the model: people sometimes cooperate to counteract global warming. To explain this cooperation, other concepts than rationality are needed. Behavioral game theory would be suited for that. Before explaining this with behavioral economics, the problem will be lined out.

Global warming or climate change is an international environmental problem. It is mainly caused by the emission of greenhouse gases in the atmosphere. Greenhouse gases are produced by the use of fossil fuels, deforestation, farming and agriculture. Consequences of climate change are, among others, melting of the polar ice shields and a rise of the sea level. In some regions extreme weather events and rainfall are becoming more common while others are experiencing more extreme heat waves and droughts. These changes also affect the living and surviving situations of humans and animals.

The issue of climate change can be modeled with the help of game theory, in particular by the tragedy of the commons model: every individual on the world would be better of if global warming would be addressed by collective action. At the same time would everyone prefer that all others address the problem while self staying apart from doing anything. Translating this into the tragedy of the commons: every herdsman prefers that all the others address the problem by not having an additional animal while self adding an animal. The reduction of greenhouse gasses bears costs for individuals since it requires changes of behavior: e.g. reducing meat consumption or using less energy might be inconvenient for the individual. So the rational choice would not cooperate.

However, it is observed that many individuals cooperate and aim to reduce global warming. This is observed on a micro- as well as on a macro level. Individuals adjust their behavior and act more environmentally friendly, they travel less by plane and car, reduce their energy and water consumption, or buy environmentally friendly produced products. Next to individuals, states also engage in cooperative behavior, by making for example contracts with other states, like the Kyoto protocol, in which they commit themselves to certain environmental aims. This is thus not in line with standard economic theory.

Explanation of cooperative behavior with behavioral economics

While the cooperation in this case cannot be explained with standard game theoretical models, explanations with help of behavioral game theory is needed and possible.

First, the structure of the problem in itself provides an incentive to establish cooperation, because everyone would be harmed the most by collective inaction. Collective inaction would lead to severe economic and ecologic harm in the long run which is far higher than the benefit of an individual in the short term.

Furthermore, while the standard economic agent purely is aimed at maximizing his own utility, in the case of slowing down global warming, the effect will be on future generations and thus is not in the self-interest of an actor today. However, there are behavioral models in which it is assumed that individuals are not solely self-interested, but also take the effects of their actions on others into account. For example models based on inequality aversion. One of these models is the “Equity, Reciprocity, and Competition model” (ERC) by Bolton and Ockenfels (2000). Here, utility is calculated using the relative share of the total payoff. If a person cares about an equal distribution, he cares about how close his payoff is relative to the social reference point of an equal share: the individual dislikes a situation in which his income is very different from an equal division. If people care about the share of the future generations in this model, people want to be as close to an equal share as possible. In particular, it could be assumed that an individual cares about the living conditions of his children and grandchildren as much as he does about his own living conditions. Therefore, he gains utility from the fact that he can contribute (reduce emissions) to improve the living conditions of future generations.

Moreover, behavioral economics also takes the impact of emotions into account. Even in the case that it would be unlikely that oneself, or one’s direct surrounding (like children and grandchildren) gets affected, it can be argued that, for example, feeling empathy for people in more affected countries can affect one’s own behavior. This could be reinforced by guilt, by means of the guilt aversion model. Guilt causes a negative affective state that occurs when a person realizes or believes that he or she has compromised his or her own standards of conduct (Khatri and De Sousa, 2016). If people in countries who are less affected by climate change feel guilt for the countries who are more affected, individuals in the less affected countries will address the problem, because not addressing the problem will cause a feeling of guilt, which people try to avoid.

Behavioral economics also suggests that social norms have impact on behavior. Social norms are formed by beliefs about what other people typically do in a social group and helps individuals to form beliefs about what is socially accepted and unaccepted behavior. (Lapinski and Rimal, 2005) So, if someone assumes that it is unaccepted social behavior not to protect the environment and accepted social behavior to do so, it is quite likely that he adjusts his behavior accordingly. Social norms have a stronger effect when people can identify themselves with the group of people acting according to these social norms. For example, if households are informed about the energy consumption of their neighbors and their own relative to the neighbors, and they observe that it is socially accepted behavior to consume less energy, they lower their consumption which leads to overall reduced energy consumption.

Finally, people are not very likely to switch from a given default option. Default options are pre-set options that take effect if nothing is specified by the decision maker. So, for example, if consumers can choose to purchase energy that comes from renewable (“green”) sources and the default option is “yes”, they are more likely to buy the green energy, even if it is more expensive. Contrary to that if they have actively to decide to buy energy from renewable sources, less consumers do.

To sum it up, there are numerous behavioral economics based explanations of the cooperative behavior in the context of global warming. To summarize, the previous part outlined explanations by inequality aversion, emotions, social norms and default option. These outlined can be considered as a selection of potential behavioral economics explanations, there are possibly more.

Possibilities of policy makers taking behavioral economics into account

The behavioral economic concepts explained above can also explain the cooperative behavior of individuals in the context of global warming. Applying these behavioral insights about human behavior allows for a richer, more realistic and more effective policy analysis. Contrary to a policy maker, inspired by the standard economic model, the behavioral economics inspired policy maker takes into account that people are not totally rational, but only partly. Policy makers consider that people’s behavior is not solely influenced by information, but also by the intentions of a person. Furthermore, behavioral economics models give insights in how to use insights in order to achieve environmentally friendly actions.

In this section, some policy advice is given where policy makers can use behavioral economics to change people’s behavior. Bearing in mind the before outlined behavioral economics explanations of human actions, possible options could be: increasing the degree of inequality aversion, increasing guilt aversion, focusing on social norms and use suitable default options to preserve the environment.

Based on principles of behavioral economics, social norms and inequality aversion, it can be stated that people generally want to behave as average and in accordance with social expectations. Research, specifically focused on energy consumption, has shown that social comparison can result in people changing behavior towards the average (Nolan, Schultz, Cialdini, Goldstein, and Griskevicius, 2008; Allcott, 2011). However, when consumers change behavior to act more in line with the average, this could have both desired and undesired effects. When the average becomes known to households, some households observe that they do not act like the others, or, like the social norm, since they use a higher amount of energy. On the other hand, others feel good about their behavior because of their lower use. Households experiencing that they do not act as the norm will change their behavior to act in accordance with the social norm. Therefore, people with a relatively high use will decrease consumption while households with a relatively low use will increase consumption. This unwanted effect is known as a boomerang effect. If this undesired change in behavior is present, this weakens the positive effect.

This can be further explained by a study of Schultz, Nolan, Cialdini, Goldstein, and Griskevicius (2007). They have shown that social norms can be of great importance in achieving the desired results. The levels of energy consumption of almost 300 households were monitored and communicated over several weeks. Households were provided with information about their energy consumption, as well as the average level of energy consumption in their neighborhood. However, not all 300 households received this information in the same manner. The results in behavior change of the groups turned out to be quite different. Households that only received straightforward information turned out to be as expected. Both groups changed their energy usage towards the average level. Households with above energy usage, lowered their energy use while households below the average started to increase their energy consumption: the boomerang effect indeed turned out to be present. On the other hand, the results of the households that received an additional picture in their letters did not show a boomerang effect. Households that received a frowning face in their letter, lowered their energy usage in the following weeks, just as the similar households that only received the straightforward information. However, households that received a smiley face did not adjust their energy consumption upwards, towards the average level. The smiley face was experienced as an appreciation of their relatively low energy consumption, encouraging them to keep up this environmental friendly behavior. The results of these studies on energy consumption are likely to be translated to similar situations, such as waste production. Small adjustments in the policy implemented can lead to better and more desired results.

Next to using social norms, there are other possibilities for policy makers. For example feelings of guilt towards other countries could be increased. This can be done through messages from the countries that are affected the most. They can send messages to the world where they say they believe that other countries will change behavior. Therefore, other countries would feel more guilt when not reducing their emissions. Another example is changing the default option into a green option for lots of different situations. For example, if individuals are searching for a traveling connection within their own country (or within Europe) the first option presented to them could be a train connection instead of a flight connection. These were just some suggestions of how behavioral insights could be used for policymaking, but there are a lot more options.

That behavioral economics can provide valuable insights is a known fact in politics. For example, the OECD (2012) lines out, that “Insights from behavioral economics are likely to benefit particularly environmental policy because many of the choices that have significant environmental implications are the outcome of a complex set of motivations. Indeed, such environment-related decisions often require careful consideration between external (e.g. financial), internal (e.g. intrinsic motivations) and social (e.g. norms) factors.” Further specified questions in which field experiments should be conducted to learn about the behavior of individuals in a specific situation and create policies according to these insights. Examples for this are questions such as: *Can “referencing” and peer pressure complement “hard” environmental policy instruments? Can governments facilitate bottom-up collective action in the management of natural resources? Do different policy measures have an effect on the way in which people consider the environmental good to be conserved?* *Do preferences for fairness affect the acceptability (and costs of enforcement) for different policy types?* (OECD, 2012)Also the fact that several European governments employ so called “Behavioral Insights Teams” shows that the importance of behavioral economics for policy making is noticed and that it insights are being used in practice.

**Conclusion**

The aim of this canon was to give an insight into behavioral economics. It was described where behavioral economics can be placed in the disciple of economics. Furthermore, some general terms were clarified which are necessary background knowledge for understanding the content of this canon. Second, an example was given of a basic economic situation, the tragedy of the commons, lined out in the context of an environmental issue. It was shown how standard economic theory fails to explain the actions of individuals and lined out how these actions could be explained while using behavioral economics. Additional to providing a better explanation of individual behavior, behavioral economics can also be used by policy makers to nudge people to preferred actions, for example acting more in a way that is not increasing global warming. This has been outlined in the last section.

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**Interesting articles to read**

* Brown, G., Hagen, D.A. (2010) [Behavioural Economics and the Environment](http://search.proquest.com/openview/ad1dcbc41c85d8f954a429bc4ca82d5b/1?pq-origsite=gscholar). *Environment and Resource Economics.* 46. 139-146.
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