



## Analysis

## Altruism, moral norms and social approval: Joint determinants of individual offset behavior

Julia Blasch<sup>\*</sup>, Markus Ohndorf

ETH Zurich, Zurich, Switzerland

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## ABSTRACT

We provide a theoretical and empirical analysis of individual offset behavior, with environmental offsets as a specific form of voluntary public good provision. While existing theoretical models on the voluntary provision of public goods usually focus exclusively on single motivations for individual contributions, we explicitly account for various motivations in a unified framework, drawing on theories for public good provision such as pure and impure altruism, internalized norms and social approval. Such an approach is particularly useful when individual offset behavior is heterogeneous. The applicability of our theoretical framework is supported by data from a choice experiment on voluntary carbon offsetting in Switzerland and the USA. We find that willingness to pay for offsets mainly depends on an individual's internalized norms to avoid environmental degradation as well as partly on income. The probability to offset, instead, is better explained by an individual's expected social recognition for offsetting.

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## 1. Introduction

Over the last decade, carbon offsets have become well established as a means to reduce a household's carbon footprint from consumption. By use of voluntary carbon markets, individual consumers may neutralize environmental externalities related to emission-intensive consumption by purchasing carbon credits stemming from reduction projects. From an economist's point of view, the purchase of voluntary carbon offsets corresponds to an individual provision of a public good intended to neutralize a public bad.

While consumption-related carbon offsets offered to individual consumers are a relatively new phenomenon, the concept of offsetting is not. The US Environmental Protection Agency, for example, uses 'Wetlands Compensatory Mitigation' as a regulatory instrument to avoid the depletion of wetlands since the 1980s: developers inducing the

degradation of wetland areas are required to create or restore wetland areas of equivalent size elsewhere – or to pay a third party to do so (NRC, 2001). The fact that environmental offsets are now offered to individual consumers raises interesting research questions. While there is an extensive literature on the motivations for individual public good provision (Bergstrom et al., 1986; Cornes and Sandler, 1986; Andreoni, 1988, 1990) there is only little research on the motivations underlying an individual's neutralization of negative environmental externalities.

In the existing theoretical literature on the private provision of public goods, several underlying motivations for such contributions are proposed. One of these explanations is that individuals are *pure altruists* deriving utility from the aggregate level of the public good (Cornes and Sandler, 1985; Bergstrom et al., 1986; Andreoni, 1988). Alternatively, individuals may be *impure altruists*, deriving utility also from their own contribution to a public good (Andreoni, 1989, 1990; Harbaugh, 1998; Kotchen, 2005). The private utility is often referred to as 'warm glow' of giving (Andreoni, 1990) and can be related to psychological concepts such as self-reward, guilt reduction, or self-esteem (Meier, 2007). Such 'warm glow'-utility may be activated by internalized or moral norms. If an individual has developed an internalized norm and acts accordingly, she will experience self-reward. When not

<sup>\*</sup> Corresponding author at: ETH Zurich, Center of Economic Research, ZUE E14, ETH Zentrum, 8032 Zurich, Switzerland.

E-mail address: [jblasch@ethz.ch](mailto:jblasch@ethz.ch) (J. Blasch).

in conformity with this norm, she will experience an internal sanction in the form of a negative self-evaluation, feelings of guilt or bad conscience (Thøgersen, 2006). In economic terms, noncompliance with an internalized norm may result in disutility, sometimes also referred to as ‘cold-prickle’ (Andreoni, 1995). Models of public good provision taking such cost into account are, for example, presented in Brekke et al. (2003), Bruvold and Nyborg (2004), or Nyborg et al. (2006).

Another source of private utility from providing a public good may be *social approval* – an immaterial reward individuals receive when conforming to a social norm shared by a community of individuals (Bicchieri, 2006). Unlike internalized norms, social norms are sanctioned externally, i.e. in the form of social disapproval or ostracism (Thøgersen, 2006). Preferences for social approval (or for the avoidance of social disapproval) were incorporated into economic models of public good provision, e.g., by Holländer (1990), Rege (2004) or Bénabou and Tirole (2006).

In this paper, we explore if the above-cited motivations for public good provision are suitable to explain individual environmental offsetting and to what extent we find empirical evidence for the relevance of these motivations for an individual's decision to purchase an offset, and the associated willingness to pay. We hence first provide a theoretical framework for individual offset behavior and then test the hypotheses derived using data from a choice experiment on voluntary carbon offsetting.

For our theoretical framework, we draw on the existing theories of individual public good provision, as well as on previous theoretical contributions analyzing environmental offsetting. For example, Kotchen (2009) analyzes offset behavior of purely altruistic individuals. He shows that for the case of environmental offsets the results of pure altruism models slightly change, as direct provisions in equilibrium do not converge to zero when the economy grows large. Another theoretical contribution can be found in Lange and Ziegler (2012) presenting a model of offset behavior with impurely altruistic individuals. Lange et al. (2014) analyze the interrelation between offsetting and other climate protection activities.

However, neither the more general models of public good provision nor the theoretical contributions on environmental offsetting consider different motivations simultaneously within a unified framework. Yet, as individual offset behavior may be jointly driven by multiple motivations, the theoretical framework presented in this paper combines the different explanations for individual offsetting, which allows for both pure and impure altruism, internalized norms, as well as the need for social recognition. Such an approach seems particularly useful as the empirical evidence on environmental offsetting strongly suggests a great deal of heterogeneity among offset buyers.

Kotchen and Moore (2008), for example, observe electricity consumption of pro-environmental and conventional households before and after participation in a green-electricity program.<sup>1</sup> They report that while the pro-environmental households voluntarily restrained their electricity consumption before the introduction of the green-electricity program, they slightly increased their consumption after participating in the program, whereas the conventional households reduced electricity consumption only after participation in the program (reacting to the associated increase in prices). This difference in reactions to the purchase of offsets is explained by feelings of guilt related to the creation of environmental externalities. Also Jacobsen et al. (2012) and Harding and Rapson (2014) assess the behavioral response of households that participate in green electricity programs and find differences in behaviors that they relate to underlying motives for

participation in the program or to the households' self-reported pro-environmental and pro-social attitudes.<sup>2</sup>

The growing empirical literature on environmental offsetting suggests that the motivation for individual offset purchases may vary between different types of consumers. However, the simultaneous relevance of different motivations has not yet been analyzed systematically. We empirically test the predictions derived from our theoretical considerations using data from a choice experiment on voluntary carbon offsetting conducted in Switzerland and in the USA, as presented in Blasch and Farsi (2014). Using these data within a latent class analysis, we identify four different types of individuals differing in their motivations for offsetting, their observed probability to offset and willingness to pay (WTP). Across the different types of individuals, we find that WTP for carbon offsetting is mainly driven by internalized norms to avoid CO<sub>2</sub> emissions, and partly by income, whereas an individual's probability to offset seems to be largely influenced by the expected social (dis)approval for (not) offsetting, a result that is also in line with our theoretical considerations.

This paper is organized as follows: Section 2 sets up a theoretical model of impure altruism which incorporates internalized norms and derives results for an example specification. In Section 3, we extend the model to account for the motive of social approval. Section 4 provides the results from the empirical testing of our theoretical framework. Section 5 concludes.

## 2. Impure Altruism and Internalized Norms

The environmental psychology literature finds that internalized norms are one of the strongest influencing factors on pro-environmental behavior (Bamberg and Möser, 2007). We therefore extend a model of impure altruism (Andreoni, 1990) to reflect insights from the Norm Activation Model (NAM) of Schwartz (1968). According to Schwartz (1968), an internalized moral norm is activated if an individual shows both *awareness of the negative consequences (AC)* of own behavior and *ascribed responsibility (AR)* for these negative consequences.

### 2.1. Model Setup

Let there be a sufficiently large economy with  $N$  individuals that can consume two types of goods: a polluting consumer good  $x$  and a non-polluting consumer good  $y$ . As in Vicary (2000) and Kotchen (2009), consumption of the polluting consumer good  $x$  leads to some form of environmental degradation, i.e. it creates pollution at a constant rate  $\beta > 0$ . To neutralize the pollution, an individual may pay for activities which reduce pollution elsewhere. We denote all such voluntary provisions to offset pollution with  $z \in \mathbb{R}^+$ .

An individual's net contribution to pollution can thus be quantified as:

$$b = \beta x - z. \quad (1)$$

Hence,  $b$  is positive as long as an individual consumes a positive amount of the polluting good  $x$  and does not completely offset the resulting pollution  $\beta x$ . The net contribution becomes zero if  $z = \beta x$ , i.e. if the individual completely neutralizes consumption-related pollution

<sup>1</sup> In the empirical literature, the purchase of ‘green electricity’ provides an interesting example for voluntary offsetting, as the markup on the price of conventional electricity is typically used to replace fossil fuel energy by renewable energy generation, thus reducing CO<sub>2</sub> emissions from electricity consumption.

<sup>2</sup> Other recent empirical studies on voluntary offsetting have, for example, explored the determinants of carbon offset prices with respect to different offset (project) characteristics (Conte and Kotchen, 2010) or the influence of Al Gore's movie “An Inconvenient Truth” on carbon offset demand in the USA (Jacobsen, 2011). Furthermore, Conte and Jacobsen (2014) study the success of voluntary green electricity programs in the USA by identifying the conditions under which utilities offer such programs and what socioeconomic factors characterize consumers who participate in the programs.

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