

# Incentives and norms: theory and evidence from CO2 abatement

Bruno Lanz\*      ◦ Hiroaki Sakamoto†

## 1 Background

There is a well-established tradition that places self-interest at the heart of economic analyses. It has long been argued, however, that effective institutional design and economic policies should leverage preexisting norms to achieve social goals while simultaneously guiding individuals' self-interest towards the same objectives. In this paper, we experimentally and theoretically examine how incentives and norms interact in facilitating prosocial behaviors in the context of CO2 abatement.

## 2 Contributions

Our paper contributes to the broad literature of human behavior and policy design. In particular, this research is closely related to the following strands of literature:

*Motivation crowding.* Previous studies have examined the net effect of extrinsic incentives on prosocial behavior alongside preexisting norms. We conduct experiments where the same action is driven by purely intrinsic motivation (i.e., norms), purely extrinsic motivation, or a combination of both. This unique experimental design allows us to clearly separate intrinsic and extrinsic motivations, offering a better understanding of how the two types of motivation interact.

*Contextual inference and self-image concerns.* Experiments on prosocial behavior typically examine the effect of incentives on effort while keeping the prosocial implications of the effort constant. In our experiments, we also do the opposite, showing how varying degrees of prosocial context influence effort while keeping the associated economic incentive fixed. This approach provides deeper insights into how contextual cues, although irrelevant to welfare, are used to infer the norms operating in a specific context. These norms, in turn, influence behavior through concerns about self-image. Incorporating both contextual inference and self-image concerns allows us to explain nuanced behavioral patterns.

*Incentives and moral appeals.* Prior research has shown that non-pecuniary interventions, such as moral messages and verbal approval, consistently facilitate prosocial behavior. While we confirmed similar results when the decision context was unambiguously prosocial, our findings also indicate that moral reminders can discourage effort in ambiguous decision contexts where both economic incentives and moral reminders are simultaneously provided. This highlights a potentially conflicting relationship between incentives and moral appeals, suggesting that “pulling forward” and “pushing from behind” simultaneously may be counterproductive.

---

\*Department of Economics and Business, University of Neuchâtel, Switzerland.

†Graduate School of Economics, Kobe University (sakamoto@econ.kobe-u.ac.jp).

### 3 Methods

To quantify how incentives and norms interact, we develop a controlled experimental setup centered around a computerized real-effort task. In this task, participants sequentially press “a” and “b” on their keyboard for five minutes to determine their score.

In the control group, the score has no impact on the outcome of the experiment. In the incentive-only treatment, participants receive monetary rewards based on their score, but the effort is not associated with any prosocial cause. In the norm-only treatment, participants can voluntarily provide effort for CO2 abatement. In the norm-and-incentive treatment, we introduce monetary incentives for CO2 abatement.

Additionally, we manipulate norms along two dimensions. First, we introduce a high-abatement group and a low-abatement group, where the same effort (clicking keys) is more strongly associated with the norm (CO2 abatement) in the former than in the latter. Second, we design a moral reminder related to CO2 abatement to reinforce the preexisting norm to behave prosocially.

To gain a deeper understanding of the mechanisms underlying our empirical findings, we also provide a theory that aligns closely with our experimental settings. Building on a signal-extraction model with self-image concerns, we develop a model of prosocial behaviors that incorporates a new dimension: the individual’s perception of the decision-making context. By explicitly considering this element, we provide a unified framework that can explain the nuanced behaviors observed in our experiment.

### 4 Results

Even in the absence of explicit incentives, individuals are willing to make a voluntary effort towards CO2 reduction. However, they seem indifferent to the actual amount of CO2 reduction achieved. This strongly suggests that the observed prosocial motivation is shaped by certain injunctive norms that emphasize the intrinsic value of effort, rather than its outcomes.

Consistent with the other studies, we found that the norm-based intrinsic motivation is undermined by the presence of extrinsic incentives. But we also found the converse: the extrinsic motivation is undermined by the introduction of prosocial meaning. The effectiveness of price-based policies (like Pigouvian pricing) may be diminished when they are ‘contaminated’ with a prosocial context.

While offering moral reminders, thus amplifying preexisting norms, facilitates prosocial behaviors, it can backfire when combined with monetary incentives. However, solely relying on a norm-based approach will not be efficient, not only in terms of scalability, but also in terms of resource allocation. In the absence of monetary incentives, individuals with high abatement costs exert essentially the same effort as those with low abatement costs. Moral suasion will fail to mitigate—and may even exacerbate—this allocative inefficiency.

We found that the interplay between incentives and norms is much more nuanced than previously documented, and its nature crucially depends on how the decision context is perceived by individuals.