



## Analysis

Investing in Climate Change Adaptation: Motivations and Green Incentives in the Fiji Islands<sup>☆</sup>Salvatore Di Falco<sup>a,\*</sup>, Sindra Sharma<sup>b</sup><sup>a</sup> University of Geneva, Switzerland<sup>b</sup> Ramphal Institute, London, UK

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## ABSTRACT

We investigate the interplay between individual's intrinsic motivation and green incentives on stated climate change adaptive behavior. Using experimental and survey data in the Fiji Islands, we find that intrinsic motivations favoring pro-environmental [beliefs] positively influence the intention to adapt. Moreover we find that green incentives crowd-in intrinsic pro-environmental motivations and further facilitate the uptake of adaptive investments. Demographic factors of ethnicity, occupation, participation in and access to credit also influence cognitive and behavioral constructs to varying degrees.

## 1. Introduction

With the proliferation of climate change impacts, the urgency of adaptation becomes ever more clear.<sup>1</sup> This is especially the case in the developing world where climate change poses a very real threat to development with the ability to reverse current progress in eliminating extreme poverty and exacerbating economic, political, and societal pressures (Watkins, 2007; IPCC, 2012; Fankhauser and Stern, 2016; Tol, 2018). Facilitating adaptive responses is therefore of paramount importance. In this paper we investigate the role of intrinsic motivation<sup>2</sup> and green incentives<sup>3</sup> on stated climate change adaptive investment behavior. More specifically, we study how internal motivating factors can interplay with green incentives in the context of adaptive investment to climate change by addressing two related research questions. First, *What are the intrinsic motivations of climate adaptive investments under different incentive conditions?* We address this question within the theoretical framework of the Theory of Planned Behavior (TPB). A key

aspect of this theory is that intentions are the most proximal determinants of behavior. Intention in turn is influenced by activity specific attitudes, subjective norms (referring to significant others expectations regarding the behavior), and perceived behavioral control (referring to one's perceived ability to perform a given behavior). Second, *Do green incentives (extrinsic motivation) strengthen or undermine intrinsic motivations in relation to the uptake of climate adaptive investment<sup>4</sup> behavior?* Incentives, in this paper, are represented by environmental conditionality<sup>5</sup> and pecuniary reinforcements such as a lower loan interest rate for adaptive investments within a microloan scheme. We hypothesize that green incentives, if congruent with internal drivers of behavior, will crowd-in and thus strengthen intrinsic motivations thereby increasing the probability of selecting adaptive investments. The use of pecuniary incentives to affect behavior has come under scrutiny in recent decades (Kamenica, 2012). Monetary incentives have been found, at times, to be detrimental to inducing the desired behavior (Markowitz and Shariff, 2012; Frey and Oberholzer-Gee, 1997). More

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<sup>1</sup> For a recent review of the evolution of the economics of climate change, see Vale (2016).

<sup>2</sup> Intrinsic motivation is our internal driver of behavior. It reflects our internal beliefs.

<sup>3</sup> Refers to positively incentivizing agricultural practices that do not degrade natural ecosystems and are climate change adaptive. For instance this includes planting mangrove seedlings for mangrove regeneration and storm surge protection.

<sup>4</sup> Climate adaptive investments are those that increase resilience.

<sup>5</sup> Condition on the loan that relates to the fulfilment of certain environmental criteria

recently, in fact, internal or psychological motives that are not driven by a monetary reward have been found to be powerful drivers of behavior.<sup>6</sup> Fig. 1 reports a simple diagram describing the process we aim to assess.

It should be emphasized that the adaptive response we seek to examine in this paper is not only a process that allows individuals to buffer against the private costs of climate change (Mendelsohn, 2000; Zilberman et al., 2012; Di Falco, 2014). It has, also, a public good connotation via its positive impact on the ecosystem.<sup>7</sup>

Our key results are as follows. We found that a positive set of intrinsic beliefs regarding the environment, favorably influenced self-reported behavioral intention. More importantly, we found that environmental conditionality on loans crowded-in intrinsic motivations and increased the probability of selecting climate change adaptive investments. Thus, green incentives, if congruent with internal drivers of behavior, could crowd-in intrinsic motivations. Demographic factors of ethnicity, occupation, participation in and access to credit also influenced cognitive and behavioral constructs to varying degrees.

To the best of our knowledge, these findings are novel and contribute to two general strands of literature. First and most obvious the growing literature on the barriers and drivers to adaptation to climate change (e.g., Deressa et al., 2009; Di Falco et al., 2011; Brick and Visser, 2015; Carleton and Hsiang, 2016). Unlike the existing literature this paper addresses the behavioral drivers of climate adaptive behavior and its interplay with financial incentives. The second strand of related literature is on green microfinance (Forcella and Hudon, 2016). As microloans form the basis of our experimental model our finding also expands this literature by providing evidence showing that microloans attached with environmental conditionality as an incentive mechanism can guide people towards making adaptive investments.

## 2. Background on Incentives and Intrinsic Motivations

Insights from cognitive neuropsychological studies have been able to map the neural circuitry that is activated in incentive-driven behavior. Such studies have shown that negative and positive incentives can result in slightly different activation pathways (Knutson et al., 2000). Studies have shown that a complex and often non-additive relationship exists between material and psychological incentives. Gardner and Stern (1996) for instance found that there is a possibility that creating large incentives could be detrimental to behavioral change in the long run by undermining people's intrinsic motives for action. Such incentives could potentially lead to a conditioned dependency on immediate rewards that may inhibit sustained and voluntary behavioral restraint when the reward schema is removed.

Contextual inference theory also attempts to explain incentive anomalies. This theory suggests that people take cues from their surrounding environment as to what the appropriate response should be when faced with uncertain stimuli – essentially converting environmental cues into heuristics for action (Kahneman, 2011; Kamenica, 2012). Kamenica (2012) suggests that less money and fewer options should be considered in incentive design. Smaller and simpler choice sets are more attractive to individuals than excessive choice sets because you can easily identify the utility of a decision. By offering too great a monetary incentive one may crowd-out intrinsic motivation as people become suspicious or complacent of the reward (Kamenica, 2008).

In their motivations based theory, Bénabou and Tirole (2006) show how intrinsic (or internal) motivations can be crowded-out by extrinsic ones (such as monetary rewards). Three different types of motivations

are present in their utility function. These are: intrinsic, extrinsic and reputational motivations. Intrinsic motivations can be explained as our internal drive to perform an activity or task. Intrinsic motivations are reflective of our internal beliefs and its study has been related to cognitive dissonance theory which suggests from that people have an inner need to ensure that their beliefs and behaviors are consistent. Inconsistent or conflicting beliefs leads to disharmony, which people strive to avoid (Festinger, 1962). Intrinsic motivation does not depend on the rate of external rewards and punishments (incentives) but is driven by our own belief systems. Extrinsic motivation on the other hand comes from influences outside of the individual.

Both intrinsic and extrinsic motivations vary independently of each other; hence it is possible for extrinsic motivation to crowd-out intrinsic motivation through the over-justification effect.<sup>8</sup> Markowitz and Shariff (2012) note why this effect is important when looking at climate change adaptation. In a review of the literature regarding climate change and moral judgment, they found that an important barrier to public action on climate change is that it may often fail to activate our moral intuitions, which are important in forming relevant actions. They note that in using economic incentives as a mechanism to motivate behavior, you can create conflict between two values, namely: materialism and environmentalism. They also warn that the focus by policy makers on the framing of responses to climate change in economically beneficial terms can actively inhibit the development of intrinsic, non-materialist motives (such as being true to one's values, beliefs, virtue, and affiliation) to respond to the problem.

Reliance on extrinsic incentives to stop over harvesting can potentially crowd-out pre-existing intrinsic drivers of that behavior, which are formed by an individual's held beliefs. If and when the extrinsic incentive is removed, the motivation to continue performing that behavior for its own sake is also removed. Thus, as economic incentives and benefits for climate adaptive behavior changes over time, the focus on extrinsic motivators for individuals may be counterproductive in the long run. So the issue is that incentives may not be a sustainable solution for long run climate change adaptation and environmentally protective behavior. The final type of motivation in Bénabou and Tirole's (2006) utility function is that of reputational motivation which refers to concern for one's reputation. Reputational motivation varies with the public visibility of one's behavior.<sup>9</sup> If the behavior is invisible to others then it is assumed that reputational motivation is lacking. Their two player principle-agent game shows that the information the principle holds regarding the agent's ability or regarding the task at hand does have an effect on the efficacy of the extrinsic reward. Using Cooley's concept of the 'looking glass self', the agent uses the principal's perspective in order to learn about his or her ability. They show that successful incentives would provide the agent with hidden information about themselves that increases their confidence or perceived ability to perform a task (Bénabou and Tirole, 2006). By introducing extrinsic incentives (such as monetary rewards) we alter the motivation sphere in such a way that it can change the meaning attached to a behavior. For an intrinsically motivated person extrinsic incentives thus may conflict with the intrinsic in such a way that it negatively affects one's desire to engage in the behavior. The framing of the incentive in the private or public domain could in addition impact on one's moral reputation which further influences behavior. Bénabou and Tirole (2002) show that when an individual lacks self-confidence in their own ability to perform a task, then offering an economic reward can be counterproductive. His perception of his own ability may be further lowered by the incentive. Thus the likelihood of undertaking the task, when a

<sup>8</sup> Which refers to the observation that an expected external incentive can decrease a person's intrinsic motivation to perform a task.

<sup>9</sup> It could be argued that the Grameen microfinance model has traditionally relied on the reputational aspect as an incentive against defaulting (McDonnell, 1999).

<sup>6</sup> See for instance Allcott (2011).

<sup>7</sup> It could be defined as 'green adaptation.' For adaptive responses that may fall somewhere in between the private and public good nature see Tompkins and Eakin, 2012.

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