PES and crowding-out effects: A framed forest experiment in Tanzania

Long abstract

We test the role of pecuniary vs. intrinsic (altruistic) motivations in a framed field experiment (FFE) on the management of a common-pool forest in 15 villages in Tanzania. In each village, four groups (à eight persons) participate in the experiment. Each group is endowed with a stock of 80 cardboard trees. The experiment is (maximum) nine rounds long, which is made known to the participants. In each round, the participant privately decides how many trees to harvest, with approximately two trees (depending on stock size) being the sustainable level and five trees being the technical upper limit. The private benefit is TZS 100 per tree harvested. The forest grows by c. 20% between the rounds, and the new stock size is announced before each round. Taken together, the structure and payoff in the experiment create a collective action dilemma.

One of four different levels of PES payment is introduced randomly in each experiment, i.e., a payment for *not* harvesting the permitted five trees. The payments are 0%, 20%, 60% or 100% of the value of a harvested tree. If participants only maximise their individual payoff, the optimal strategy in the first two treatments is maximum harvest, while it is zero harvest with 100% PES treatment. With intermediate level of pay (60%), the optimal solution depends on several factors, including the strategy of others. However, in an earlier experiment, we found actual harvest levels in the zero payment case to be well below the maximum (the mean harvest was 47% of the permitted one).

The treatments are calibrated as such that at the low (20%) compensation is trivial and do not alter the strategy that maximises material payoffs. We can therefore test whether the introduction of a small payment lead to any crowding-out effects, i.e., higher harvest rates. More generally, the study aims to explore if policy makers should, as Gneezy & Rustichini (QJE, 2000) suggest in the title of their article, “pay enough or don’t pay at all”.

Fieldwork was conducted in September-November 2014. In addition to the experiments, a small survey of the participants was done, permitting analyses of external validity and of how the chosen strategy varies by age, gender, wealth and other individual characteristics.

Preliminary analyses reveal that participants harvest about half of the upper limit under 0% PES. 20% PES has a weak negative effect on harvest rates (c. 15% lower harvest rates compared with 0% PES), medium PES has a clear negative effect on harvest rates (c. -39%), while full PES has the greatest effect on harvest rates (c. -82%). Harvest rates in the four treatments are significantly different from each other. The direction and the ordering of results are as expected, but their magnitude are perhaps larger than one would expect.

As in a previous and similar study in Tanzania, the result indicate that women harvest more than men, and that age and harvest rates has a U-shaped relationship with 41 years as the

minimum, i.e., young and old participants tend to have higher harvest rates compared to the middle-aged. Furthermore, the effect of 20% PES is specific to male participants and better-off participants.

Results indicate external validity as stated forest use (times in the forest per week to collect forest products, relative forest use compared to others in the village, and commercial forest use) is strongly correlated to harvesting in the experiment. The clear difference between the PES levels furthermore indicates that the participants understand the experiment and are able to make informed decisions.

The results do not support the "crowding out of intrinsic motivation" hypothesis. If any, a "crowding in" effect is present (for men and the better off), as no and low PES payments are theoretical equivalents for a selfish payoff-maximiser. Still, increasing payments have clear negative effects on harvest rates. How much is "enough" therefore depends on policy objectives: pay little, get little; pay more, get more!

Short abstract (150 words)

The paper presents findings from framed field experiments conducted in Tanzania. The experiments have field context in sample, task, commodity and setting. The participants' payoffs depend on the number of trees harvested. Four levels of individual PES are tested in a between-group design: no (0%), low (20%), medium (60%) and full (100%) PES.

Results indicate that low PES has a weak negative effect on harvest rates (c. 15% lower harvest rates than no PES), while medium and full PES have clear negative effects on harvest rates (c. -39% and -82%). Harvest rates in the treatments are significantly different from each other. The results do not support the "crowding out of intrinsic motivation hypothesis". If any, a "crowding in" effect is present, as no and low PES are theoretical equivalents for a selfish payoff-maximiser. Increasing payments have clear negative effects on harvest rates: pay little, get little; pay more, get more.