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**Cash versus In-Kind: Farmer Valuation of Seed Traits
and Differences in Willingness-to-Pay**

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Cash versus In-Kind: Farmer Valuation of Seed Traits and Differences in Willingness-to-Pay

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Motivation

- In several fields of economics (e.g., development and environmental), the valuation of new goods or services has many important implications.
- Typically, experimental methods have been used to elicit willingness-to-pay (WTP). Cash is often used as part of the experiment to make the decision-making process more realistic.
- However, in some cases, this form of remuneration may not be possible. E.g., the use of cash may disrupt existing relationships and may set an unsustainable precedent.
- This poses a problem: how should participants be compensated when cash payment is not feasible?
- Using a framed field experiment, we estimate WTP for improved varieties using in-kind payments consisting of common household items (e.g., soap, biscuits) and cash payments, and test whether WTP is significantly different between the two.

Background

- Empirically, there has been very little research on the differences between the use of cash and non-cash as compensatory mechanisms in experimental settings. Exceptions include Abramson et al. (2011) and Cook et al. (2012).
- The closest study to ours conceptually is Abramson et al. (2011). They found that when alternative forms of payment were allowed, demand for water services increased in Zambia. The implication here is that limited cash constrained demand, but when participants were allowed to pay for the service in other ways, demand increased.
- Our empirical application is the adoption of improved (hybrid) rice varieties with yield stabilizing traits by producers in 10 randomly selected villages in the Koraput district of Odisha (formerly Orissa), India. This builds on work by Lybbert (2006).
- Koraput is one of the poorest districts in one of the poorest states in India. Most of the agriculture here is done on a small scale, and the major crop is rice.

Conceptual Model

- A household consumes 2 goods and has an initial budget constraint at line AB (figure 1). A cash transfer leads to a shift to DC. An equivalent in-kind transfer can lead to a kinked budget constraint, with the exact shape dependent on the resale price of the in-kind good.
- Within this framework, consider two types of transfers: infra-marginal (IM) and extra-marginal (EM). IM transfers occur if the amount transferred is less than the quantity consumed in the absence of any transfer; EM transfers are the opposite.
- If resale is not frictionless, EM transfers will put households on a lower indifference curve than an equivalent cash transfer. This suggests that households will have a lower WTP if the in-kind payment results in an EM transfer.

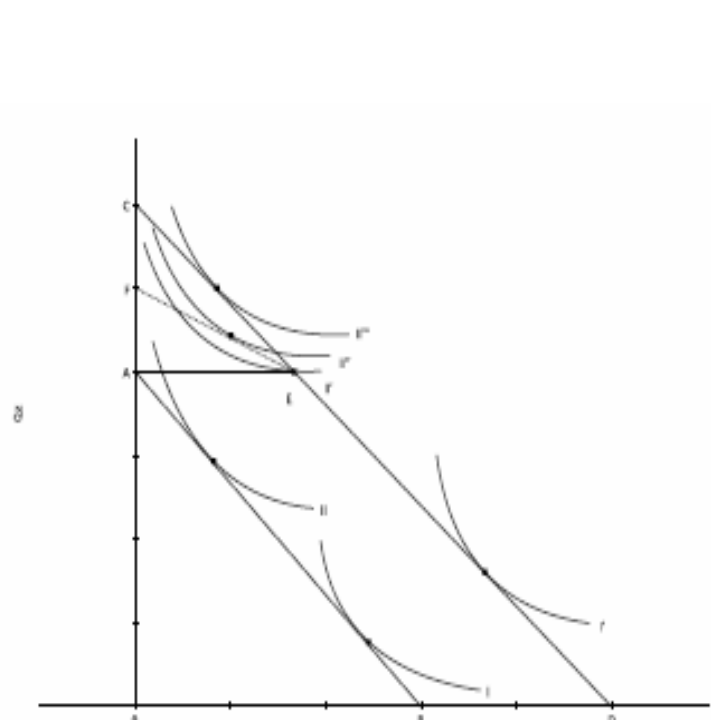


Figure 1. Comparing the effect of in-kind and cash transfers on consumption choices for intra- and extra-marginal households.

Data

- We had a total of 185 producers who were involved for a total of 555 (185*3) observations. We discarded 138 observations due to inconsistencies, leaving a total of n=417.

Table 2: Description of variables used in empirical analysis

| Variable | Type | Description |
|-----------|-------------|--|
| AB | Dummy | Equal to 1 if it is seed B |
| sC | Dummy | Equal to 1 if it is seed C |
| cash | Dummy | Equal to 1 if the participant is paid in cash |
| abc | Dummy | Equal to 1 if the order ABC is used |
| play | Dummy | Equal to 1 if the participant adopted in the preceding round |
| prearn | Continuous | Earnings for the preceding round in rupees |
| gameluck | Dummy | Equal to 1 if the participants draw for the payment of the EG gamble is high |
| gender | Dummy | Equal to 1 if the participant is a female |
| age | Continuous | Age of participant |
| education | Categorical | Education level of participant from 1 (lowest) to 7 (highest) |
| riskexp | Categorical | Index of participants risk exposure from 1 to 7 (highest) |
| EG | Categorical | Index of participants risk preferences from 1 to 6 (riskiest) |
| Land | Continuous | Amount of land (in acres) owned by participant |

- The key variables used in our empirical analysis are in table 2.
- WTP by seed variety ranges from 10 INR to 20 INR (figure 4).

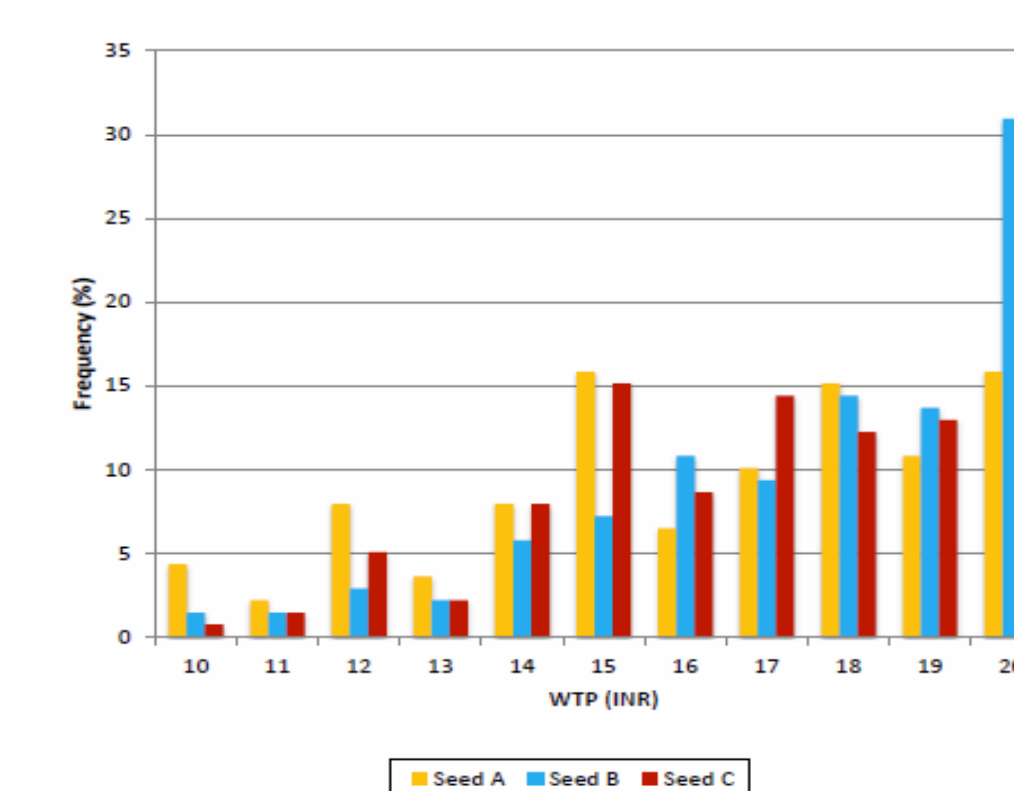


Figure 4. Willingness-to-pay by seed type

Experimental Method

- The experiment consisted of three parts: risk preference elicitation, seed valuation game, and survey.
- We used the Eckel-Grossman (2002) approach to elicit baseline level of risk preference. Participants were asked to choose one of six gambles that offered a 50% of a high payoff and a 50% chance of a low payoff (figure 1). Gambles increased in both risk and expected payoff, and the choices made were used to calculate a risk preference score from 1 (least risk loving) to 6 (most risk loving).
- The seed valuation game is based on Lybbert (2006). Participants were offered a chance to purchase a seed with a known payoff distribution (figure 2). The distributions were represented using a cloth bag with ten chips (green, black, and red), where each color corresponded to a color level. A harvest was realized by randomly drawing a chip.
- We used the Becker-DeGroot-Marschak (1964) mechanism to elicit WTP for three different seeds: baseline (A), low variance (B), and high variance (C). Each participant valued three seeds during four unpaid practice rounds and one paid "real" round. We presented one of two (randomly chosen) sequences: ABC or ACB.
- Lastly, participants were asked to complete a short survey to collect socio-demographic and household information.

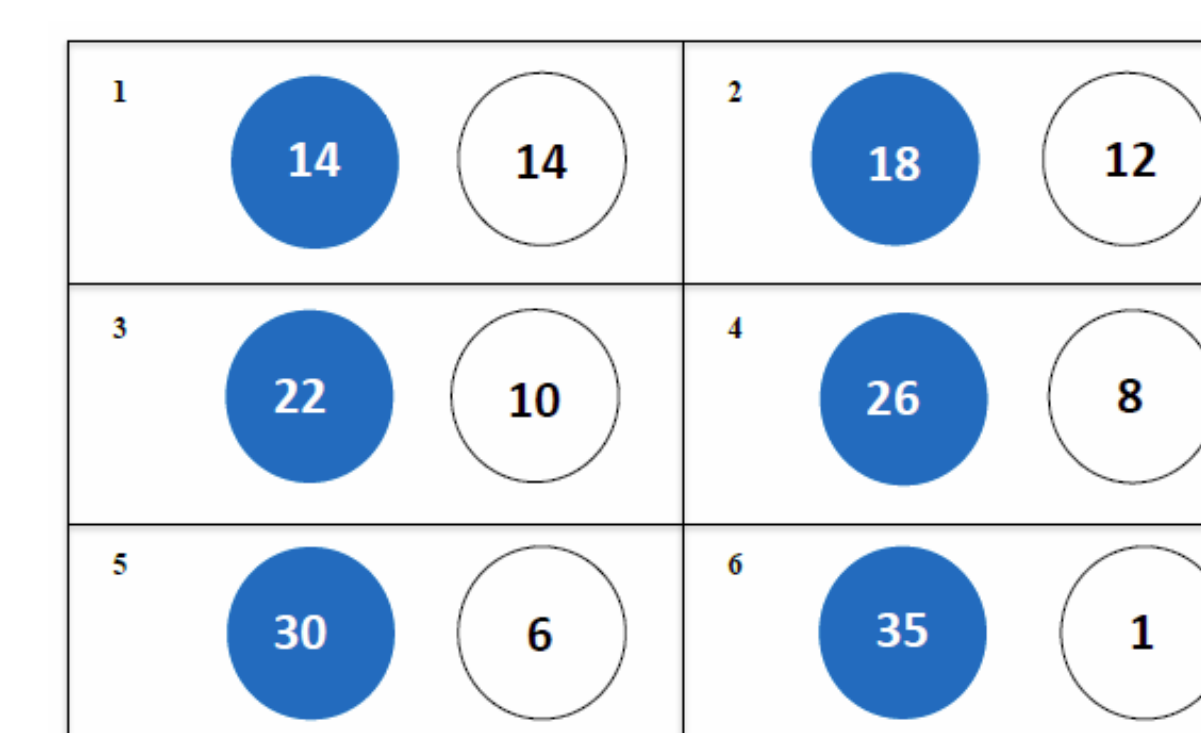


Figure 2. Visual representation of Eckel-Grossman gamble options given to participants where numbers represent payoffs.

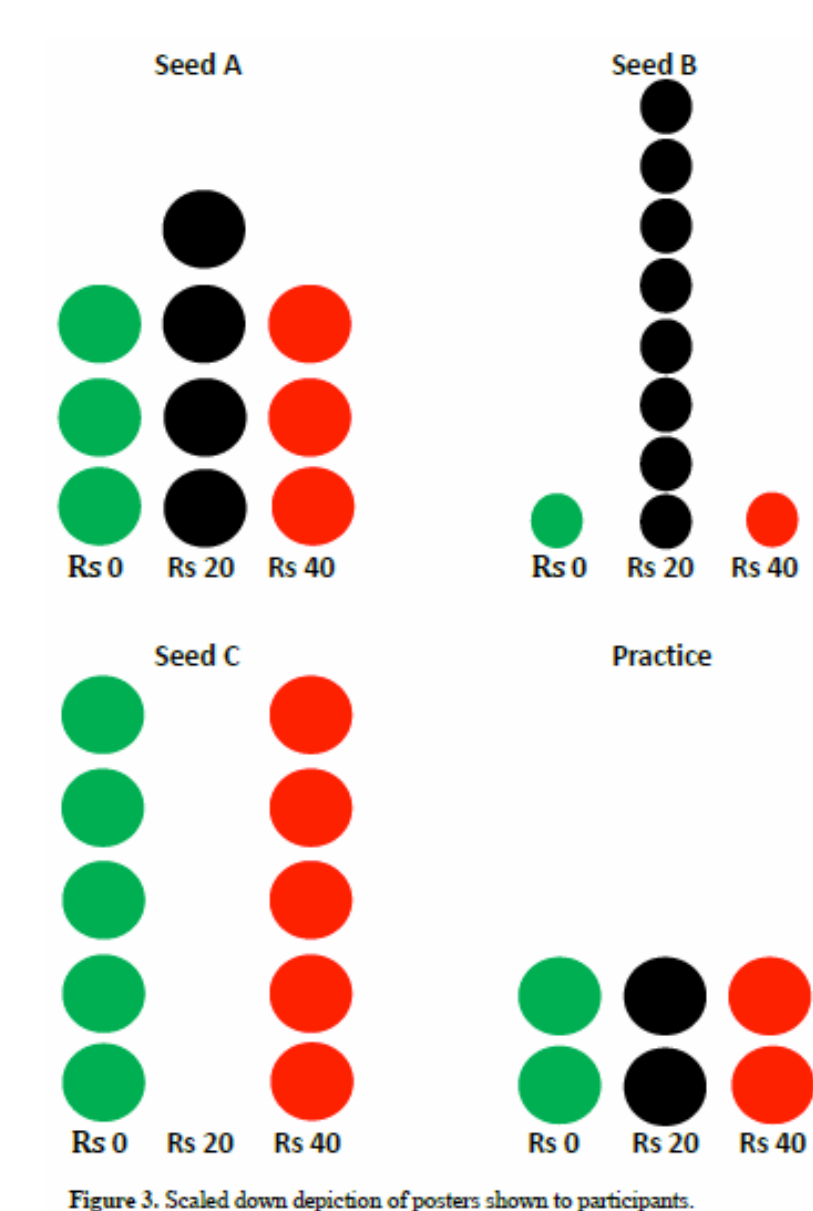


Figure 3. Scaled down depictions of pointer choices to participants.

Results

- Our main result is that producers are willing to pay **less** when they are paid in cash versus in-kind. Bids are higher by 1.18 INR, or 7%, when farmers are paid in-kind.
- We also find that producers are willing to pay a premium of 1.53 INR, or 9%, for a yield-stabilized distribution.
- Our result is similar to that of Abramson et al. (2011) in that we also find a higher demand for non-cash payments.

Table 3: Results of pooled Tobit regression with clustered standard errors

| Variable | Model 1 | Model 2 |
|----------------------------|----------------------|----------------------|
| AB | 17.372*** (0.512) | 16.990*** (1.254) |
| sC | 1.530*** (0.559) | 1.483*** (0.558) |
| cash | 0.806 (0.767) | 0.748 (0.760) |
| cash | -1.175** (0.471) | -1.092** (0.476) |
| abc | -0.416 (0.514) | -0.310 (0.459) |
| play | -0.844* (0.479) | -0.809* (0.476) |
| prearn | -0.011 (0.027) | -0.009 (0.025) |
| gameluck | 0.134 (0.421) | 0.241 (0.507) |
| gender | 0.498 (0.494) | 0.498 (0.494) |
| age | -0.009 (0.010) | -0.009 (0.010) |
| education | -0.014 (0.065) | -0.014 (0.065) |
| riskexp | 0.116 (0.099) | 0.116 (0.099) |
| EG | 0.006 (0.136) | 0.006 (0.136) |
| Land | -0.051 (0.113) | -0.051 (0.113) |
| No. of observations | 417 | 417 |
| No. of right censored obs. | 92 | 90 |
| No. of clusters | 12 | 12 |
| Log-likelihood | -922.869 | -915.451 |

Clustered standard errors in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

Conclusion

- We find that producers exhibit a lower WTP for improved rice varieties when they are offered in-kind payment as opposed to cash. There are at least three possible reasons:
 - The in-kind payments we offered may have been extra-marginal transfers;
 - These same goods are likely to be shared within a household – whereas cash may not be – and this may have affected bidding behavior;
 - Participants may have valued the goods less than the cash value assigned to them by us (we used local prices to assign values).
- Our results imply that when non-cash payments are used to elicit WTP for goods or services, the interpretation of the results may need to be calibrated to account for over-valuation. These results can be extended to other experiments, such as dictator or trust games.
- Extensions of this work include considering alternative in-kind payments (i.e., non-household items), different crop varieties (e.g., millets), and a greater variety of payoff distributions.