# Delivering Prevention

## Selling vs. Giving Reassessed

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**Abstract**

This document presents the pre-analysis plan of a randomized control trial experiment that will be conducted in Salima district, Malawi. This research project has four main objectives: i) to investigate how discounts affect take-up of different preventive health products, ii) to investigate how willingness to pay for different products varies with prior exposure to discount, iii) to investigate how price anchoring and learning influence future willingness to pay, and iv) to investigate how they might spillover to different types of goods.

# 1 Introduction and conceptual framework

Millions of children in low-income countries die every year as a result of infectious diseases that could often be averted, including pneumonia, diarrhoea and malaria (UN Inter-agency Group for Child Mortality, 2018). This is the case even though households spend a high share of their budget in remedial care. Investing in preventive health care (such as adding chlorine to drinking water) would be a cost-effective way of mitigating those financial and life costs but, strikingly, take-up of preventive health care is pervasively low in developing countries – even when it is available at low cost. For example, it was estimated that only 19 percent of children in areas where malaria is endemic in Africa were protected by ITNs in 2007 (Noor et al., 2009). Similarly, at least 27 million children do not receive the basic package of immunizations each year, despite vaccination being one of the most cost-effective health products known (with an estimated cost of $13 per DALY saved) (Kremer and Glennerster, 2012). Furthermore, several studies show that, across disparate preventive products and contexts, small prices deter many from investing in prevention (Kremer and Glennerster, 2012).

This project studies whether a leading reason for the low take-up of preventive health care in developing countries is the fact that such goods are typically provided for free or at highly subsidized prices, framing what prices are deemed as acceptable by customers, and ultimately lowering willingness to pay for those goods. Fisher et al. (2019) find suggestive evidence in support of the idea that price anchoring might be important for several types of products. In their study, they observe lower purchase rates for three different curative, consumable health goods after a free distribution. It is not clear, however, how this finding can be extended to other types of goods, in particular to preventive health care, and how they might vary with the scope of learning for these products. Additionally, it's possible that such anchoring effects spillover to other goods that are not distributed at subsidized prices.

There is also reason to believe that learning about the benefits of prevention thanks to

subsidies can generate higher demand for prevention, rather than the opposite. However, such conclusion conflates alternative explanations. Discounts can lead to experimenter demand effects. Moreover, they leave households with more cash on hands, also an important constraint on future purchases. Beyond the immediate future, however, when all families are again equally constrained, framing effects might still be present, and ultimately lower future demand for prevention. Last, prior evidence is concentrated on few goods. In particular, Dupas (2014) finds that a one-time subsidy to purchase a mosquito bed net has a positive impact on willingness to pay a year later. Bed nets, the main product for which this question has been studied, are durable and are likely to be closer to an experience good. It is indeed easy for households to learn about their benefits upon using them for the first time. Most preventive health products, however, are closer to credence goods: with chlorine or micronutrient supplements, for instance, it is not immediately obvious what benefits are provided.

Our study design overcomes those limitations. We visit poor households in Malawi offering different preventive goods at randomly assigned discounts. We further vary how price composition is framed: by randomizing what the delivery fee was, as part of that full price, households effectively pay different prices for the same good – although with the same cash on hands by the end of that round. This generates variation in reference prices for the same good. We then revisit households a month later to elicit their willingness to pay for a range of preventive health care goods. Variation in discounts for soap and multivitamins attempt to replicate previous empirical evidence. Variation in delivery fees allows us to study framing effects without affecting liquidity constraints, and minimizes concerns with experimenter demand effects for future demand. The distribution of experience and credence goods - soap and vitamins supplements, respectively - allows us to understand how anchoring and learning effects vary with the type of good. Finally, eliciting willingness to pay for a larger set of goods, including experience and credence goods - allows studying the potential framing effects of discounts more broadly, understanding whether they spillover to other products. We

hope to shed light on potential behavioral challenges behind offering subsidized preventive health care in developing countries, to inform governments and international organizations about the full range of consequences of their programmatic choices.

Our choice of preventive health care – specifically vitamin supplement and soap - is no coincidence. On the one hand, they have been shown to be amongst the highest-return interventions to increase children's school attendance, grade progression and health status (Miguel and Kremer, 2004). On the other hand, previous studies have led to the pessimistic conclusion that it may be impossible to induce poor parents to systematically undertake those investments when products are offered at positive prices, even in the presence of information about the high health benefits or behavioral nudges to buy and use them (Miguel and Kremer, 2007). Indeed, several studies show that, across disparate products and contexts, small prices deter many from investing in prevention (Kremer and Glennerster, 2012). Understanding the reasons behind this suboptimal investment would significantly contribute both to the scientific understanding of constraints to take-up and to the important policy question of whether preventive health care always needs to be fully subsidized by the government.

# 2 Sample selection

Our Randomized Controlled Trial is conducted across 150 villages in Salima district, Malawi. Within each village, the survey team randomly selects 20 households to take part into the experiment. Our sample is built using a random walk approach: the enumerators assess the eligibility of every 5th or 4th house they encounter in the village while following a pre-determined path. If more than one caretaker is present in the household at the moment of the visit, one will be randomly selected to participate.

The households are considered eligible to participate in the experiment if there is at least one child aged 6 months to 12 years in the households.

# 3 Experimental Design

We visit 3000 poor households in Malawi offering different preventive goods at randomly assigned prices. The study will be conducted in two rounds.

## 3.1 Round 1

In round 1, the survey team visits 150 villages that have been previously selected and, in all villages, randomly identifies 20 respondents meeting the sample criteria described in the previous section. The respondent is then assigned to one of 8 treatment groups determined by the cross-randomization of two conditions:

1. Counter price: total price (in Malawian Kwacha) for which the household can buy the product that is offered, inclusive of the delivery fee;

2. Tag price (in Malawian Kwacha): actual price of the good, that is, the difference between the counter price and the delivery fee.

The following table summarizes the treatment conditions and the sample composition:[1]

Table 1: Experimental Design

| | | Tag | | | | |
|---|---|---|---|---|---|---|
| | | **330** | **270** | **210** | **150** | **90** |
| Counter | **330** | N=375 | N=375 | N=375 | N=375 | |
| | **270** | | N=375 | N=375 | N=375 | N=375 |

by randomizing what the delivery fee was, as part of that full price, households effectively pay different prices for the same good – although with the same cash on hands by the end

[1] the Counter price of MKW 330 has been calculated based on previous pilot results showing that MKW 330 is the average willingness to pay for the products that are offered

of that round. Inspired by Chetty (2009), this variation in how the price of the good is framed, might affect reference prices for those products, without influencing other important parameters determining future demand - such as cash on hands.

Additionally, the type of good offered to participants is randomized within each cell. Half of the respondents will be offered an experience good, i.e. 3 bars of soap, while the other half will receive a credence good, that is a 100ml bottle of Multivitamin Supplement.

Once the individual has been selected, she is asked to complete a short survey (see next session) and is offered the possibility of buying soap or vitamin supplements - depending on which good is randomly selected - delivered to their doors at either full or discounted price, according to the table shown above. At the end of the visit, independent of whether the participant had decided to purchase the product or not, the enumerator reveals more information about the composition of the price, i.e. how much of the counter price that was paid covered the price of the product (tag price), and how much was the delivery fee.

## 3.2 Round 2

In the second round, which takes place approximately 2-3 weeks after the first visit, the survey team revisits the same households and, before administrating a short survey, it elicits willingness to pay for a larger set of preventive health goods, which we categorize into "experience" and "credence" goods.

- Experience goods: soap, mosquito bednets, chiponde (supplementary feeding).
- Credence goods: multivitamin supplement, chlorine, waterguard, and deworming tablets.

To make our measure of willingness to pay as reliable as possible, we elicit it in an incentive-compatible way use the Becker-DeGroot-Marschak (BDM) mechanism. Moreover, the following measures are taken to mitigate all possible measurement concerns:

- After being explained how the game works, households are asked to state their maximum willingness to pay to receive a single dose of each product, taking into account

that **delivery is offered for free** during this second visit.

- Households are informed that only one predetermined good is actually sold in the end, but they learn which one it is only at the end of the experiment.
- At the beginning of the procedure, each respondent is shown a unit of each good to make sure that they don't perceive some goods as more likely to be sold than others.
- Given that respondent are likely to be unfamiliar with this type of game, we run a trial round with peanuts, to make sure that the rules of the game are clear before proceeding, and that participants understand that it's in their best interest to answer truthfully.
- We randomize the order in which the goods are presented.
- Finally, a price is randomly drawn for the good that we are actually selling - that is soap -, and if it is lower than the household's stated willingness to pay, the good is sold at that price. Otherwise, the household is not allowed to buy the product.

## 3.3 Research Questions

This design allows us to test the following main research questions:

1. For a given counter price in round 1 (hence keeping cash on hand fixed), does willingness to pay increases with the reference price (anchoring effect)?
2. For a given counter price in round 1, is the slope of willingness to pay with respect to reference price higher for credence goods (multivitamin supplement) than for experience goods (soap)?
3. Do reference effects spillover to goods that were not offered at round 1?
4. Do learning effects at least partly mitigate or even reverse the slope of willingness to pay with respect to reference prices (conditional on counter price)?

Additionally, we test the following secondary hypotheses:

5. For a given tag price in phase 1, does willingness to pay increases with take-up at phase 1 (positive learning effect)?

6. Is this effect stronger for soap (experience good), than for multivitamins (credence good)?

7. Does the introduction of a positive delivery fee trigger reciprocity? If yes, it could be either positive or negative depending on whether households perceive a lower tag price as a discount on the good, or instead as a positive price for the delivery service. While in hypothesis 1 we measure the impact of variation in reference prices, here we measure the effect of going from a zero delivery fee to a positive one.

# 4 Measures and Outcomes

The main measures that are collected during the two phases of the project are the following:

## 4.1 Round 1

- Socio-demographic characteristics,
- Education of the primary caretaker,
- Composition of weekly expenditures,
- Knowledge and beliefs about soap and multivitamin supplements:
  - Familiarity with the product,
  - Purchase frequency, price, source, and availability,
  - Knowledge of its function and usage,
  - Beliefs about effectiveness in preventing diseases,

  - Beliefs about price,

- Children's health measures,
- GPS coordinates,
- Purchase of good offered in phase 1.

## 4.2 Round 2

- Knowledge and beliefs about several preventive health products including soap, multivitamin supplements, deworming tablets, chlorine, waterguard, chiponde (supplementary feeding), and mosquito bednets:
  - Familiarity with the product,
  - Purchase frequency, price, source, and availability,
  - Knowledge of its function and usage,
  - Beliefs about effectiveness in preventing diseases,
  - Beliefs about price,
- Children's health measures,
- Willingness to pay for each of the preventive health goods mentioned above,
- Recollection of phase 1: good offered, counter, and tag price.
- Usage of good offered in phase 1 (if purchased),
- Purchase of good offered in phase 1 from other sources between the two phases of data collection,
- Robustness questions on spillovers (Knowledge of good and prices offered to friends and neighbors in phase 1).

# 5 Identification concerns

There are a few identification concerns and important details arising with our design that are worth emphasizing. Here, we describe the main ones, and the steps we take to mitigate them.

- **spillovers across households**: given that we randomize all the treatment conditions at the individual level, there exists a risk of households learning about other products from other study participants. In particular, the following could pose some identification challenges:

  - households might learn about benefits of a product without using it. This could in particular translate into higher willingness to pay for soap also for households that received vitamins in round 1.
  - household might learn about counter and tag prices experienced by other participants. This could in turn influence reference prices and trigger reciprocity, threatening our identification strategy.

  To mitigate these concerns, we collect gps coordinates data for every respondent. This allows us to exploit natural variation arising from randomization in the share of treated individuals within each cell. We can then control for the type of good and prices experience by other participants in the close proximity of each individual.

- **reference price**: as our design implies the presence of two prices - counter and tag price - and two goods for which reference prices might be already set by previous purchases, it could be not immediately clear how we vary reference. By randomizing what the delivery fee is, as part of that counter price, households effectively pay different prices for the same good – although with the same cash on hands by the end of that round. Thus, we instrument reference prices with variation in tag prices. Moreover,

at the end of round 2, we check whether individuals correctly recall counter and tag prices.

- **reciprocity and anchoring effects**: there are two possible reasons that might cause respondent to react to variations in tag prices:
  - introducing a delivery fee could trigger reciprocity, which could be either positive or negative depending on whether households perceive a lower tag price as a discount on the good, or instead as a positive price for the delivery service.
  - conditional on having a delivery fee, an increase in tag price pushes up the reference prices for the good, increasing willingness to pay in the following round.

  We test these two potential mechanisms separately, looking at the impact of introducing a positive delivery fee (anchoring + reciprocity effects), and then by estimating the impact of variations in reference prices conditional on having a positive delivery fee (anchoring mechanism).

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