The value of cultural heritage in the experience economy: Evidence from heirloom rice in the Philippines

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Abstract

The Cordillera Administrative Region in the Philippines is home to terraced rice embedded in centuries of cultural heritage. However, weak market incentives threaten sustained production, jeopardizing indigenous communities' rich cultural heritage. Previous research has suggested demand-side policy interventions as a potential avenue for the preservation of cultural heritage and *in situ* biodiversity of crop genetic resources. To guide these interventions and drawing inspiration from the experience economy, we staged an experience with urban consumers, offering them the chance to actively participate in the preservation of cultural heritage through the purchase of heirloom rice. Participants first self-selected into one of two initial market segments by choosing white or brown rice as a benchmark. Subsequently, each market segment was invited to (i) identify their preference between their benchmark and heirloom rice, and (ii) bid to upgrade their non-preferred to their preferred rice through a Becker-DeGroot-Marschak (BDM) auction. The sample was randomly split between a control group and two treatment groups. For the latter, we staged consumer experiences ("experience treatments") focused on rice terrace preservation through gain- and loss-framed narratives. In each market segment, a sub-segment of consumers switched to the heirloom rice market segment. Although white rice consumers were more reluctant to transition to heirloom rice, they positively responded to the gain-framed experience of cultural heritage preservation by paying the highest price premiums for heirloom rice. These findings can help policymakers and value chain actors devise policies that support market strategies aimed at preserving indigenous communities' cultural heritage and *in situ* biodiversity of rice genetic resources in the Philippines.

Keywords: indigenous communities; cultural heritage; biodiversity; genetic resources; experience economy; willingness to pay.

1. Introduction

Although increasingly recognized as the emerging staple of the Global South, rice has long been a traditional dietary mainstay in the Asia-Pacific region. While the exact origin of rice domestication remains contested, it is believed to have originated approximately 8,000 years ago in parts of the Yangtze River valley in China (Callaway 2014). Beyond serving as a staple, rice has defined the cultural and economic identities of Asia-Pacific populations, especially in rural communities. In various other regions of the Global South such as in sub-Saharan Africa (SSA) where dietary patterns are evolving due to rapid urbanization, the popularity of rice keeps soaring, with recent observations there uncovering significant pockets of cultural heritage associated with rice (Britwum and Demont, 2021a, b; Demont et al. 2017). Cultural heritage embodies culture, values, and traditions passed down from earlier generations within indigenous communities (Britwum and Demont 2022a). Even though the relationship between cultural heritage and rice preferences is a relatively recent area of study within SSA (Britwum and Demont, 2021a, b, 2022b; Demont et al. 2017), Southeast Asia has long exemplified this linkage. In parts of Japanese, Sichuanese, Thai, Sri Lankan, and Filipino regions, rice cultural heritage is deeply ingrained (Concepcion et al. 2006; Fuller 2011), with this profoundly shaping food environments, occasions, types of dishes, and even how they are consumed (Brulotte and Di Giovine 2016; Custodio et al., 2021).

Food cultural heritage offers a potential pathway towards enhanced food security and rural economic livelihoods through commodification of the cultural heritage construct (Britwum and Demont 2022a), although this has not received widespread attention in the literature. This raises a pertinent question about the role of policy in boosting economic benefits for rice varieties embedded in cultural heritage, supporting food security, and preserving indigenous

communities' agricultural heritage. With respect to commodification, establishing a premium based on cultural heritage can be contextualized within two significant perspectives: the experience economy, and gastronomic systems research. In their seminal paper on the *experience economy*, Pine and Gilmore (1998) underscored the substantial transitions that economies undergo with respect to economic value, beginning from raw commodities to goods, services, and ultimately experiences. In the "experience economy," experiences stand as a unique offering, distinct from both goods and services and require meticulous design and "staging" to elicit a premium. In the realm of gastronomic systems research, findings suggest a hierarchical framework that explains three tiers of individual food choice: occasions, dishes, and ingredients (Cuevas et al. 2017). This "gastronomic system" has been found to be contextualized by culture, socioeconomics, and the food environment and determine the uptake of new food products (e.g., heritage food) in consumers' diets.

Given this background, this study examines the case of heirloom rice from the Cordillera Administrative Region (CAR), an indigenous community in the Philippines. The region boasts the *Ifugao* rice terraces, a world-famous UNESCO-heritage site with a 2,000-year history of rice cultivation, although the precise age of the terraces is a subject of debate (Acabado et al. 2014). These terraces are home to the cultivation of hundreds of rice varieties and landraces, specifically long-season varieties that are cultivated once a year (Glover and Stone 2018). The varieties are passed down to successive generations as "heirlooms" (Cuevas et al. 2021). Given the rich heritage of rice culture in the region, rice landraces from the CAR are now being marketed domestically on a limited basis and exported as niche rice products. Despite their cultural significance, however, heirloom varieties encounter considerable constraints on both supply and demand fronts. The production of these varieties tends to be more expensive,

incurring high labor costs due to the topography and terraced nature of the production process (Bairagi et al., 2021), and they exhibit lower productivity. Additionally, the varieties are primarily found within CAR and contiguous regions, and despite being marketed as premium rice, they are limited in availability in urban retail spaces. In response to these concerns, some farmers have embraced more modern varieties; however, such shifts in varieties have the potential to jeopardize the rich cultural heritage associated with rice cultivation on these terraces (Ngidlo 2014; Britwum and Demont 2022). These factors collectively pose an existential threat to the *in situ* biodiversity of these indigenous rice genetic resources (Bairagi et al. 2021).

Given limited availability of traditional heirloom rice in the Philippines outside of the CAR, evaluating preferences for and valuation of this niche product in urban centers is a vital step in assessing its market potential within the domestic market. Exploring export markets can admittedly serve as an alternative marketing channel for heirloom rice. However, previously exported quantities were considered insufficient to enhance market shares, further underscoring the need to concentrate on enhancing the competitiveness of heirloom rice within domestic markets (Bairagi et al., 2021). Even though categorized as a "niche" product, heirloom rice faces competition domestically, as it joins an array of options already familiar to Filipino consumers. In particular, white rice, frequently associated with premium quality (Custodio et al., 2019), holds a prominent place among these options. On the other hand, brown rice is widely recognized for its nutritional benefits either as a substitute for or blended with white rice by Filipino consumers (Mojica and Reforma 2010) and is among the most prevalent varieties of specialty rice (Selvam et al. 2017). For heirloom rice, cultural heritage can thus be an important differentiating attribute, which, if valued by consumers, could yield tremendous economic benefits. Bairagi et al. (2021) proposed several policy interventions that focus on the demand-

side of heirloom rice: (i) implementing a two-tier marketing system with a focus on both retention and expansion, (ii) prioritizing distribution channels that cater to high-end consumers, (iii) adopting marketing strategies centered around gastronomic systems, and (iv) encouraging private sector investments and advertising. Additionally, they emphasized that "proper information framing will be necessary to create demand and support the valorization of heirloom rice to preserve cultural heritage and in situ biodiversity of rice landraces in the Philippines" (p. 257).

Our study builds on these recommendations and extends them by generating further insights into demand-side expansion of heirloom rice with a two-fold objective. First, we test consumers' preferences for, and valuation of heirloom rice from the CAR. This involved both raw and cooked rice to afford a spectrum of sensory evaluations by consumers. The second objective explores the impact of cultural heritage narratives, specifically, through gain and loss-framed experiences via visual and auditory information on valuation of heirloom rice. Information framing has been explored in several consumer studies to determine its influence on food attribute preferences (for example, Nayga et al. 2006; Zhang et al. 2022; Lagerkvist et al. 2024). While either gain-framed or loss-framed informational treatments has been found to be more impactful depending on the domain being considered, e.g., loss-framed in the case of food safety (Britwum and Yiannaka 2019), gain-framed for preventative health behaviors (Gallagher and Updegraff 2012), gain-framed for food attribute preferences (Dolgopolova et al. 2021), and gain-framed for fruit intake among children (Binder et al. 2020), no study, to the best of the authors' knowledge has investigated the influence of framing on preferences related to cultural heritage as a credence attribute in a food item. With respect to preservation in a social context, a somewhat related study that investigated the impact of gain and loss-framed information on

willingness to reduce climate impacts of future generations through taxes did not find significant effects between the two types of information (Svenningsen and Thorsen 2021). Drawing insights from the experience economy (Pine and Gilmore 1998), we further innovate on the classic "information treatment" by "staging" an experience ("experience treatment") whereby consumers were invited to be actively involved in the preservation of cultural heritage through the purchase of heirloom rice.

Considering recent trends of indigenous farmers in the CAR transitioning away from traditional heirloom varieties to modern varieties, strategies including information that can be utilized to stage experiences and boost price premiums can help promote heirloom rice and the preservation of cultural heritage of indigenous communities (Mourato and Mazzanti 2002). Such insights can ultimately contribute towards improving both upstream and downstream value chains of heirloom rice, first, by enhancing market shares, and consequently retaining production interests, thereby preserving the cultural heritage associated with these landraces. Additionally, depending on the informational impacts on preferences and valuation of heirloom rice, consumers could be a potential entry point for agricultural policy targeted at preserving cultural heritage and *in situ* biodiversity of rice genetic resources in the CAR.

The study's goals are accomplished by revisiting a dataset from auction experiments conducted in 2015 in Manila, Philippines (Cuevas et al. 2018). Given recent insights into cultural heritage, exploring substitutability between popular rice varieties and heirloom rice can yield broad implications for rice value chains for varieties cultivated in the CAR and other indigenous regions.

2. The case of heirloom rice in the Cordillera Administrative Region

The CAR cultivates hundreds of heirloom rice varieties, although productivity has been less than optimal. Production data, for example, show a steady decline in harvested rice in the CAR from 2018 to 2022, falling from an estimated 418,000 MT to 338,067 MT, respectively (Philippines Rice Research Institute 2022). The production challenges in the region, which has spanned several decades prompted a transformative development initiative by a consortium of organizations in 2014, which included the International Rice Research Institute (IRRI), the Philippines Rice Institute (PhilRice) and the Department of Agriculture to help address and mitigate some of these issues. Together, they established the Heirloom Rice Project (HRP) with the goal of enhancing productivity across the broader rice value chain in the CAR. In light of this objective, an important strategy entailed examining the market potential of heirloom rice as a unique, culturally significant product. Such downstream market initiatives represent a promising avenue to grow the market shares of heirloom rice in both domestic and export markets (Glover and Stone 2018; Bairagi et al. 2021). Furthermore, the success of downstream market initiatives can help unravel a piece of the puzzle regarding preservation of cultural heritage associated with rice terraces in the CAR. This is especially noteworthy, given the potential of agriculture to either endanger or enrich cultural heritage (Daugstad et al. 2006), a duality the CAR aptly exemplifies: on one hand, the ancient rice terraces hold profound cultural significance, and on the other hand, the cultivation of modern varieties poses a risk of eroding the cultural heritage of local genetic resources. While it is clearly essential to expand the appeal and market reach of locally produced heirloom varieties from the vantage point of culture, very few studies have investigated preferences and valuation of culturally significant agricultural heritage products.

Baigari et al. (2021) examined valuation of heritage farming by investigating Filipino consumers' WTP for heirloom rice. Although WTP estimates were consistent with prices for premium rice, these estimates were below prevailing market prices for heirloom rice, possibly mirroring the limited market success of local heirloom varieties. Their study, however, did not offer cultural heritage as a premium credence attribute of heirloom varieties, a gap this current study addresses. Wendin et al. (2020) noted a substantial interest in heritage cereals among Swedish consumers. In particular, *spelt* was popular and widely recognized by the majority of their study sample, given its longstanding history as a traditional staple cereal spanning centuries. Younger consumers were found to display greater levels of awareness of heritage cereals than older consumers, though the former were also more price sensitive and less willing to pay premiums for them. Balogh et al. (2016) explored Hungarian consumers' valuation for a traditional food product, focusing on a product deeply rooted within Hungary's gastronomic heritage: the Hungarian *mangalitza salami*. While noting price premiums for the *mangalitza salami*, considerations like certification were deemed essential, particularly for consumers less acquainted with the product. In SSA, consumers with genealogical or cultural ties to ancient rice domesticators demonstrated preference for locally bred rice varieties that shared characteristics with the original African rice variety, *Oryza glaberrima*, domesticated over 3,000 years ago. This was observed among consumers who featured cultural heritage in Senegal (Britwum and Demont 2021b) and the Gambia (Britwum and Demont 2021a).

Regarding the promotion of foods with cultural heritage, branding and presentation play a vital role. Branding can take various forms, including labeling, place branding, and geographical indicators (Baigari et al. 2021). Alternatively, cultural heritage as a construct can be staged as a presentation; in this study, presentation of cultural heritage was approached within the

framework of the experience economy, where heirloom rice was presented as a premium product through the staging of an experience. To provide additional context, Pine and Gilmore (1998) argued that unlike the transaction of goods or services that are external to the buyer, experiences are inherently personal and have the potential to create impressions that resonate with one's emotions, intellect, or even on a spiritual level. They further asserted that staging an experience actively involves individuals in a manner that leaves a lasting and memorable impact. The conundrum, however, is how policy can be used to simultaneously promote cultural heritage as a premium attribute to consumers using insights from the experience economy, while also ensuring its preservation in the traditional terraces of indigenous peoples.

In the experimental design (described in Section 3.3), staging experiences of heirloom rice involved presenting information about the cultural heritage of the CAR rice terraces visually and auditorily, providing a sensory experience through cooked rice, and actively involving consumers in the preservation of cultural heritage. The overarching hypothesis is that by offering heirloom rice through an experience, rice consumers would perceive themselves as custodians of the rice terraces in the CAR and would consequently be inclined to pay price premiums as a means of contributing to the preservation of the terraces. The extent to which consumers see themselves as guardians of cultural heritage will likely vary across different rice consumer segments, in particular brown rice and white rice consumers, and remains a research question the study seeks to answer. Non-hypothetical experiments were consequently designed to test this hypothesis among urban rice consumers in Manila, Philippines. Findings can help inform agricultural policy regarding rice terraces in the CAR and other indigenous communities, by illuminating downstream preferences and how they can be leveraged in preserving the cultural

heritage and *in situ* biodiversity of heirloom rice and other agricultural products with substantial cultural importance.

3. Materials and Methods

3.1 Sampling

Research assistants recruited rice consumers who were 18 years or older to participate in an experimental auction. The experiments were conducted in October 2015 in the *Filipino* language at a large supermarket in Metro Manila, Robinsons Place Pioneer Supermarket. Shoppers were approached by research assistants and asked whether they were willing to participate in a market research study and receive one kilogram of rice. Those who consented were directed to a booth set up by the research team for the experiments within the supermarket. A total of 136 shoppers participated in the experiments over a four-day period.

3.2 Products

Three rice types, white jasmine rice, premium brown rice, and heirloom rice, were used in the experimental auctions. Except for white rice, both brown and heirloom rice were unpolished. White and brown rice were purchased from the supermarket where the experiments were conducted, whereas heirloom rice was sourced from the Rice Terraces Farmers' Cooperative, a rice cooperative in the CAR. Given limited supply of any one heirloom variety to last the entirety of the experiments, three types of heirloom varieties were used that are being cultivated in the CAR: *Ulikan red rice*, *Mina-angan*, and *Tinawon Imbuucan*.

We first segmented the market by inviting consumers to self-select into white and brown rice market segments. White rice remains popular among Filipinos (Rice Today 2013) and perceived to have a quality finish. Since both rice types are considered superior for different

characteristics by both market segments, they were used in the study as a benchmark against which heirloom rice was compared.

3.3 Experimental auctions

We first invited each market segment to identify their preference between their benchmark (white or brown rice) and heirloom rice. We then endowed participants with their non-preferred rice type and invited them to bid to upgrade their non-preferred into their preferred rice product through a Becker-DeGroot-Marschak (BDM, Becker et al. 1964) auction. In other words, rather than fixing the endowment, our novel endow-and-upgrade mechanism allowed the upgrade (and hence the endowment against which the upgrade was evaluated) to be self-selected by participants. This enabled measuring WTP along the entire spectrum of upgrading "regimes": white to heirloom rice (Regime 1), heirloom to white rice (Regime 2), brown to heirloom rice (Regime 3), and heirloom to brown rice (Regime 4). This approach produces a more complete distribution of valuation among a heterogeneous population of consumers spread across multiple market segments. Regimes 2 and 4 reaffirm the existing market segments, while Regimes 1 and 3 represent a switch to a third market segment focused on heirloom rice. It was explained that bids would be submitted to exchange an endowed non-preferred rice type for the participant's preferred. The participant's best interest to bid their true value was carefully explained, in order not to overpay, or lose their preferred rice, as they would be bidding against a randomly drawn amount in an envelope. The experiment proceeded as follows.

Step 1: A participant was presented with white rice and brown rice, from which they chose their preferred benchmark. Uncooked versions of both rice types were placed in bowls, and participants were asked to examine each, including their texture and aroma. Prior to making their choice after examining the uncooked rice, they tasted the cooked versions of both white and

brown rice, cleansing their palate with water in between tasting. After tasting, participants made their selections between white rice and brown rice. This helped segment the market into white and brown rice consumers.

Step 2: For each market segment, the chosen rice from Step 1 served as the participant's benchmark rice. Next, they were told of another rice type, heirloom rice from the CAR. One of three types of heirloom varieties was randomly selected and presented to the participant: *Ulikan red rice*, *Mina-angan,* and *Tinawon Imbuucan*. Participants were randomly assigned to one of three information treatment groups, control (no information), gain-framed, or loss-framed information. Gain and loss-framed information were conveyed as a visual and auditory experience regarding heirloom rice. For the visual experience, participants viewed a picture featuring four panels (see Appendix) that showcased a rice terrace from the CAR, a farmer carrying a bundle of rice sheaves slinging over their shoulder, another farmer tending to bundled rice harvests, and a consumer examining a panicle of rice. Research assistants either staged the gain-framed or loss-framed experience with participants (auditory experience), depending on their randomly assigned group. The auditory gain- and loss-framed experiences staged with participants were as follows:

Gain-framed information*: If you consume heirloom rice, farmers will continue using the terraces thereby preserving both the rice terraces and the associated cultural heritage.*

Loss-framed information*: If you do not consume heirloom rice, farmers will stop using the terraces thereby losing both the rice terraces and the associated cultural heritage.*

Control group*: No information on heirloom rice was provided and no experience of cultural heritage preservation was staged.*

Step 3: After the experience treatments, participants inspected the heirloom rice, both in its uncooked form by examining its texture and aroma, and a sensory evaluation where they tasted the cooked version of heirloom rice. After the sensory evaluation, a participant was asked about their preference between their benchmark (white rice or brown rice, depending on the market segment) versus heirloom rice. To situate their consumption intentions within the gastronomic system, participants were asked to identify the occasions during which they planned to consume their preferred rice, and the types of dishes they would be preparing based on their chosen rice. These responses were captured through a survey that presented the gastronomic system for rice consumption in the Philippines (Cuevas et al. 2017), from which participants checked options that corresponded with their preferences.

Step 4: The participant was endowed with their **non-preferred** rice from Step 3 and stated their WTP a price premium to exchange their non-preferred endowment to their preferred product. For example, if they preferred heirloom rice in Step 3, they were endowed with white rice or brown rice (depending on the market segment determined in Step 1) and asked to submit a bid to upgrade the endowed white or brown rice to heirloom rice.

Step 5: Having submitted their bids to exchange their non-preferred (from Step 4) to their preferred rice, a sealed envelope with a randomly pre-determined price premium was drawn from a pile of envelopes. If the participant's bid was higher than or equal to the randomly drawn amount in the envelope, they paid the random amount and were presented with their preferred rice. If on the other hand their bid was lower than the random amount, the participant received their endowed rice from Step 4. They were then thanked for their time.

4. Data and Descriptive Statistics

Table 1 shows variables and demographics used in modeling participants' WTP. An approximate third of all experiments took place in the morning. Rice auction studies in SSA have shown that time of auctions (mornings or afternoons) can influence price premiums (Demont et al. 2012; Demont et al. 2013b). With respect to considerations that influenced rice purchases, the majority of participants, at 92%, indicated they were mostly driven by quality, with only a few (18%) considering price (affordability) as the most important consideration. While this reveals the largely middle-class shoppers who patronize shopping malls in the Philippines, the overwhelming preference for quality in tandem with high levels of education among our sample of participants also exposes the wide income variability between urban and rural Philippines (Chua et al. 2015). To provide additional insights into WTP price premiums across various generational segments, dummy variables were created to classify participants into several generational classifications, from Silent Generation (born on or before 1945) to Generation Z (born on or after 1997) (Pew Research Center 2019). The majority of participants were Millennials (born between 1981–96), followed by Generation X (born between 1965–80) who made up 32% of respondents. Average monthly income translated to approximately US$1,925.

< Table 1 >

5. Model selection

The auction procedure as narrated involved two key decision-making processes: first, participants determined their willingness to exchange their endowed non-preferred for their preferred rice after self-selecting into a market segment (white and brown rice), and subsequently, submitted WTP bids to exchange the endowed for their preferred rice type. However, considering that participants endogenously determined the endowment by choosing

the upgrade, it was essential to correct for potential self-selection bias if it was confirmed to prevent inaccurate estimates. This called for the use of multi-stage models such as the Endogenous Switching Regression (ESR) model or the Heckit method (Heckman 1976; Lokshin and Sajaia 2004; Wooldridge 2010). These models are employed when the selection process is related to the outcome, and in this case, WTP price premiums. Specifically, they are well-suited for datasets exhibiting correlation in the error terms between the selection and outcome equations. The selection equation can be modeled using a binary model such as the Probit model. It is crucial in these models to include at least one exclusion restriction in the selection equation to address endogeneity concerns and ensure consistent parameter estimates, with this achieved by introducing instrumental variables in the selection equation.

For this study, the use of multistage models was rather complicated by the double endogenous benchmark situation. The ESR model, which further splits the outcome equation into two regimes, based on selection or non-selection of a particular rice type appeared better suited for our dataset. Considering the double endogenous benchmark procedure which involved three rice types, white, brown, and heirloom, each of which could be selected (as benchmark), an avenue to overcome the three-way selection was to split the selection equation between heirloom rice, and white/brown rice as a composite dummy, while controlling for either brown rice (or white rice) in the selection and outcome equations. In the ESR, this would split the outcome equation across two regimes, heirloom rice, and white/brown rice. Despite the arguments in favor of multistage models, we did not ultimately utilize them in the analysis, for two key reasons. First, we were guided by studies that indicate the suitability of instrumental variable regressions for larger sample sizes, or highly robust instruments (Boef et al. 2014; Lenaerts et al. 2021), neither criterion our data nor sample size closely met. Secondly, there was little evidence

to suggest correlation between the error term of the selection equation and the outcome equation.[1] Given the size of the study sample, and the tenuous evidence regarding the suitability of multistage models, the dataset was analyzed using Ordinary Least Squares (OLS). This was evidently nuanced, given the experimental procedure, and is elaborated in greater detail in the sub-section below.

5.1 Ordinary Least Squares Regression

In adopting the OLS model, it was imperative to consider and incorporate variables that reflected the entirety of the experimental process, encompassing both selection and outcome phases. Recall that participants were initially presented with the choice of the more commonly available white or brown rice. Subsequently, they made a further selection between their preferred rice from this initial stage and heirloom rice, with bids submitted to exchange the benchmark from the latter stage to their preferred rice. Since OLS constrains the dependent variable to be continuous, submitted bids were used. However, it should be noted that per the auction design, bids did not reflect a distinct product, given that any of the three rice types, white, brown, or heirloom were bid on contingent on whether they were chosen as final preferences. To better calibrate the relationship between the initial and final choices, four categories or regimes were established based on initial preference between white or brown rice. The regimes were categorized as follows:

[1] We used the same set of covariates in equation 1 (without the Regimes categorization explained in the OLS subsection) in the ESR model with exclusion restriction imposed on *hired cook*, which was significant in the selection equation but not the outcome equation. For the ESR model, p-values for the correlation coefficients between upgrade and non-upgrade regimes and the outcome equation were 0.942 and 0.620, respectively. For the Heckman selection model, p-value of the Inverse Mills Ratio (derived from the cumulative distribution function of the error term of the selection equation and a crucial diagnostic tool in multistage models) was 0.676. A statistically significant IMR in the outcome equation suggest a relationship between the selection procedure and outcome variable.

Regime 1: White rice consumer who upgrades white rice to heirloom rice

Regime 2: White rice consumer who upgrades heirloom rice to white rice

Regime 3: Brown rice consumer who upgrades brown rice to heirloom rice

Regime 4: Brown rice consumer who upgrades heirloom rice to brown rice

In addition to these segments, participants were randomly assigned to one of three experience treatment groups in a "between-subjects" approach. Thus, to properly capture price premiums within each segment, it was essential to account for the treatment received and its impact on participants' bidding behavior. The regimes were subsequently interacted with the experience treatments to reflect this. This was modeled as follows:

$$\begin{aligned} bids = {} & \beta_0 + \beta_1 Regime2 + \beta_2 Regime3 + \beta_3 Regime4 + \beta_4 Loss\ trt \\ & + \beta_5 Gain\ trt + \beta_6 Regime2.Loss\ trt + \beta_7 Regime3.Loss\ trt \\ & + \beta_8 Regime4.Loss\ trt + \beta_9 Regime2.Gain\ trt \\ & + \beta_{10} Regime3.Gain\ trt + \beta_{11} Regime4.Gain\ trt + \boldsymbol{\alpha}'\mathbf{Y} + \varepsilon \end{aligned} \quad (1)$$

where **Y** is a vector of other relevant explanatory variables, **α** a vector of associated parameters to be estimated, and ε the error term. The vector of explanatory variables incorporated experimental relevant factors such as timing (morning), and individual factors such as affordability as an essential consideration when making rice purchases and other variables detailed in Table 1.

6. Results

6.1 Preference for, and propensity to upgrade white, brown, and heirloom rice

As was explained in the earlier section on Materials and Methods, Filipino consumers are generally more familiar with white rice and brown rice, the former more so than the latter. Table 2 shows a summary of participants' preferences for white and brown rice and their propensity to

exchange these for heirloom rice. Despite the popularity of white rice (Rice Today 2013), approximately 53% of participants self-selected into the brown rice market segment versus 47% in the white rice market segment. Within the two market segments, the majority of rice consumers (34% and 32%) preferred the benchmark and submitted bids to upgrade heirloom rice to the benchmark, confirming their market segments. However, both segments featured small sub-segments of consumers (13% and 21%) willing to switch to the heirloom rice market segment with white rice consumers being more reluctant than brown rice consumers. This suggests that brown rice consumers may be more open to adopting heirloom rice than white rice consumers.

< Table 2 >

Table 3 further disaggregates the four consumer rice segments × regimes by experience treatment, with the goal of assessing how preferences for heirloom rice are influenced by both oral and visual information presentations.

Recall the cultural heritage experience was staged to participants in the gain-framed and loss-framed treatment groups only. While just about 7% of participants in the control group were willing to upgrade white rice to heirloom rice (Regime 1), this proportion more than doubled for such participants in both the loss-framed treatment and the gain-framed treatment groups. For white rice consumers, staging cultural heritage preservation through a visual and an auditory experience encouraged greater willingness to trade-off their preferred rice for heirloom. In this instance, both types of information appeared persuasive.

Regarding brown rice, between 20% to 22% of consumers who had this initial preference were willing to exchange it into heirloom rice (Regime 3), which was generally consistent across all three treatment groups. Consistent with the conclusions drawn from Table 2, brown rice

consumers appeared more amenable to substituting their preferred product for heirloom rice, and in this case, staging cultural heritage preservation as an experience did not substantially influence preferences. Similarly, the cultural heritage experience had little influence on dissuading consumers from switching back to their benchmarks (Regimes 2 and 4). Among consumers in Regime 2 (who preferred white rice over heirloom rice), approximately 37% of them were in the control group with a somewhat similar proportion in the loss-framed treatment group. The proportion of participants in Regime 2, at approximately 29% was slightly lower for those in the gain-framed group, but generally comparable to the other two groups. The proportion of consumers in Regime 4, who would rather have brown rice than heirloom rice was between 29% and 35% at the highest.

Overall, the findings suggest framing cultural heritage as an experience can act as a persuasive nudge for white rice consumers more so than brown rice consumers. However, regardless of presentation and framing, appealing cultural heritage to consumers who are strongly attached to brown rice or white rice is unlikely to substantially alter their preferences for heirloom rice.

< Table 3 >

6.2 Eating occasions and rice preferences

As explained in the experimental auctions' section, participants were requested to identify eating occasions for their preferred type of rice and any accompanying dishes; this offered contextual insights into the positioning of the rice products in the gastronomic system (see Cuevas et al. 2017 for in-depth description and discussion). Table 4 displays the percentage distribution of eating occasions that were identified for each of the three market segments: the self-selected market segments of white and brown rice, and the market segment of heirloom rice (following

the switch from the initial benchmarks). Each of the three rice products were mentioned nearly equally to be consumed during breakfast. *Merienda*, a generic term for snacks in the Philippines received the least mentions, with white rice appearing more suitable than brown or heirloom rice for this eating occasion. White rice was relatively more likely to be consumed during lunch or dinner, whereas heirloom rice was more likely to be reserved for special occasions. This suggests a perception of uniqueness or a "prestige status" for heirloom rice, enhancing its suitability in menus for special events. More meat options were listed to accompany dishes during lunch or dinner, although other types of protein choices were identified for breakfast. Pieced together, Table 4 shows the potential for heirloom rice to be mainstreamed into typical eating occasions in the Philippines, suggesting a general intention to incorporate it in or pair it with traditional dishes, confirming earlier findings by Cuevas et al. (2017).

< Table 4 >

6.3 Willingness to Pay Price Premiums, by Regimes

Prior to presenting regression results, a summarized description of price premiums for the four regimes is presented, displayed in Figure 1. There was greater heterogeneity in upgrading "away" from the (white and brown rice) market segments and towards the new market segment focused on heirloom rice (regimes 1 and 3), than upgrading "towards" the (white and brown rice) market segments (regimes 2 and 4), again confirming the existence of the two initial segments. Participants switching to the heirloom rice market segment (regimes 1 and 3) were willing to pay higher premiums to exchange their benchmark for heirloom rice, than those who preferred to exchange heirloom rice for their benchmark. Regime 1 recorded a higher median than the remaining three, with median bids being similar overall for regimes 2, 3, and 4. The relatively

lower spread of bids posted by brown rice consumers in Regime 4 indicates they were more aligned in perceiving heirloom rice as a close substitute and consequently discounted it less, than those in Regime 2 who submitted higher bids for white rice. While these findings mask the impact of experience treatments on behavior, it illustrates a divide between consumers who value the cultural heritage of heirloom rice and are willing to be indirect custodians through consumption (regimes 1 and 3), versus consumers who are generally hesitant about adopting heirloom rice (regimes 2 and 4). For those willing to upgrade, the heterogeneity in their bids may also have reflected other external influences such as the experience treatments, which may have prompted a more active assessment of the value they placed on heirloom rice vis-à-vis their benchmark. On the other hand, sticking to one's original market segment could arguably be viewed as requiring less of a cognitive effort in placing a value on a more familiar product relative to heirloom, a likely outcome of the more coalesced discounts of heirloom rice in regimes 2 and 4.

< Figure 1 >

6.4 Regression results

OLS regression results are displayed in Table 5. Two models were estimated; Model 1 is a parsimonious model that includes treatment dummies, dummies for regimes, and interactions between treatments and regimes. Model 2 incorporates all the variables in Model 1 along with additional explanatory and demographic variables. Robust standard errors are employed to improve statistical inference (the null hypothesis of homoscedasticity was rejected). Due to the complexity of the experimental procedure, caution is advised in the interpretation of the results in Table 5, as the dependent variable reflects price premiums associated with three rice types: white rice, brown rice, and heirloom rice.

Significant coefficients were somewhat similar in magnitude and particularly in direction for variables that were common in both models. The three regimes (2, 3, and 4) as standalone variables (without interaction with experience treatments) were not statistically significant, suggesting no fundamental differences in premiums across regimes. The experience treatment was found to significantly boost participants' bids for heirloom rice relative to the control group in the white rice market segment (Regime 1, as indicated by the standalone dummy for gain-framed experience treatment), especially when it was gain-framed. The interaction effects between regimes and experience treatments need to be interpreted as being relative to the untreated group in Regime 1 (white rice consumers who switch to heirloom rice). The interaction between regimes and loss-framed treatment was not significant, implying that loss framing did not fundamentally affect price premiums across regimes. However, gain framing significantly drove a wedge in the bids between the control group in Regime 1 and all other regimes as suggested by the similar, significantly negative coefficients of the interaction terms. This suggests that white rice consumers willing to switch to heirloom rice respond significantly more strongly to gain-framed treatment than other consumers.

To interpret these results more meaningfully, price premiums for all four regimes were subsequently estimated using results in Table 5 (from Model 2) across the three information treatment groups. Consistent with the econometric results in Table 5, we found that the sub-segment of white rice consumers willing to switch to the heirloom rice market segment following their exposure to the gain-framed experience treatment distinguished itself from all other regimes through their highest price premiums, averaging PhP 92.55 (US $2.03) (Table 6). This was significantly higher than the PhP 31.65 (US $0.69) premium among consumers in the control group, suggesting that presenting visual and auditory information about active consumption

consideration and the preservation of terraces had a stronger persuasive effect than the potential derelict of the terraces from non-consumption (premiums were not statistically different between control and loss-framed treatment groups). While at odds with the ambiguous persuasive effect of gain or loss-framed information regarding climate preservation and potential impacts on succeeding generations (Svenningsen and Thorsen 2021), this finding aligns with the telling impact of gain-framed information on behavioral intentions in other domains including health, nutrition, and general food attributes (Gallagher and Updegraff 2012; Binder et al. 2020; Dolgopolova et al. 2021). For the other regimes (2, 3 and 4), no significant differences were found in the premiums resulting from different information framings and experience treatments. Altogether, information that highlights the potential extinction of the cultural heritage associated with heirloom rice through non-consumption might have a moderate to slight impact on brown rice consumers. For white and brown rice segments who were unwilling to upgrade to heirloom rice (Regimes 2 and 4), they discounted heirloom varieties between PhP 35.55 (US $0.78) to PhP 47.55 (US $1.04). For these segments, neither gain-framed nor loss-framed treatments had any discernible impacts on their discounts.

Only a few socio-economic determinants were statistically significant (Table 5). Those who prioritized affordability in their rice purchases were generally willing to pay lower premiums. Generational differences were also observed. Relative to Millennials, consumers who were categorized under the Silent Generation or Baby Boomers were less likely to pay high price premiums. This is consistent with similar findings from Africa that younger consumers tend to be more likely to upgrade and pay for rice with preferred quality attributes (see Demont and Ndour 2015).

< Table 5>

< Table 6 >

7. Policy recommendations

Findings from our study suggest varied perceptions and valuation of heirloom rice among consumers. This diversity in attitudes raises important policy considerations for the revitalization of heirloom rice within the downstream segment of the value chain. To mitigate the supply challenges of heirloom varieties which are already tethering on the edge of extinction, or its substitution with modern varieties which threatens to weaken cultural heritage, policies that focus on the demand-side and highlight the value of these varieties are warranted (Bairagi et al. 2021). The goal of amplifying value is to create and expand a market segment and generate price premiums for heirloom rice, increase financial incentives, and expand economic opportunities for traditional heirloom farmers.

Nevertheless, eliciting price premiums for heirloom varieties will require careful consideration by value chain actors and policymakers; although heirloom rice has been promoted as a niche product, its market segment is complex and different consumer segments may view its uniqueness differently. Our findings show some distinct consumer constituents: (i) consumers open to adopting heirloom rice who may be more inclined to trade-off "quality finish," for which polished white rice is held as the exemplar, in favor of rice embedded in a rich cultural heritage, and (ii) consumers who, while open to heirloom rice, view them as possible substitutes in terms of value. To cater to these varied consumer groups, emphasizing the intrinsic and extrinsic features that matter to them, such as quality finish and nutritional advantages, is essential. However, to enhance its market appeal, positioning heirloom rice as a premium cultural heritage product within the broader gastronomic system is crucial. For policymakers, this would entail offering incentives to promote key investments within the value chain, such as milling,

packaging, and labeling (e.g., Geographical Indications). With respect to the finish of heirloom rice, quality assurance mechanisms such as third-party inspections should be considered. Given its appeal to relatively affluent consumers, initiatives that enhance distributional and supply chains between the CAR and urban centers are warranted.

Ultimately, promotional campaigns that marketers can expand upon to foster a sense of experience among consumers might be more impactful than a conventional marketing effort. Bairagi et al. (2021) proposed positioning heirloom rice in a "culture-specific gastronomic system" to enhance its suitability in rice-based diets. Findings from our gastronomic survey indicate the appropriateness of heirloom rice for special occasions, allowing for their incorporation into cultural diets like *paella* or festive dishes such as *lechon*. Integrating this into promotional campaigns as part of demand-side policies can thus enhance adoption of heirloom varieties in consumers' diets. Moreover, staging the experience of cultural heritage preservation in promotional campaigns could resonate with certain segments of potential heirloom consumers. To improve the entire heirloom rice value chain, however, supply-side interventions are also essential. If the goal is to especially preserve cultural heritage by promoting traditional heirloom varieties over modern varieties, it would be beneficial to implement producer incentives such as input subsidies or other forms of income support, specifically for traditional heirloom farmers in the CAR.

Finally, given the likelihood of adulteration for niche attributes, certifying the authenticity of heirloom rice should be a considered policy goal to safeguard consumer trust. This is especially meaningful given the existence of hundreds of heirloom rice varieties and can be accomplished through channels such as Geographical Indications, certification, or labeling schemes that engender consumer trust in the varieties.

8. Conclusion

Despite the notable heritage of the Cordillera Administrative Region (CAR) in the Philippines, marked by its world-renowned *Ifugao* rice terraces, production efforts for heirloom rice varieties have been stymied by social and economic pressures in the region. With the Philippines being a significant player in both rice production and consumption, understanding preferences for heirloom rice within the domestic market can help guide policy in revitalizing the floundering heirloom rice industry, the success of which can inform strategies to effectively market heirloom varieties within and beyond domestic markets. In addition, the success of heirloom varieties on the downstream segment of the rice value chain through price premiums would incentivize local farmers towards continued production, preserve the cultural heritage and *in situ* biodiversity of rice genetic resources, and ultimately strengthen economic resilience in the CAR.

Despite staging preservation of cultural heritage as a visual and auditory experience inspired by insights from the literature on the experience economy, preference for heirloom varieties was fragmented over different consumer constituents. The white rice consumer market segment is predominantly characterized by a hesitant group that is less inclined to embrace heirloom rice, along with a smaller subset that places a high value on heirloom rice, as reflected in their willingness to pay price premiums. On the other hand, within the brown rice market segment, consumers are generally more open to adopting heirloom rice but do not assign significantly higher value to it compared to brown rice. Even though cultural heritage can still be presented as a niche credence attribute associated with heirloom rice, the market prospects of heirloom rice may be reminiscent of the organic attribute which appeals to a very specific segment of consumers willing to pay price premiums for them. The goal then for value chain actors is to expand the consumer segment willing to substitute or incorporate heirloom rice into

their diets on one hand, and willing to pay premiums for them on the other. This would involve implementing a segmented marketing strategy with the goal of expanding market share by tapping into the white rice market segment and enhancing the perceived added value of heirloom rice among brown rice consumers. Although staging positively framed preservation experiences could address certain aspects of this challenge, additional factors beyond cultural heritage preservation—for example, emphasizing the health and nutritional aspects of heirloom rice, and ensuring a quality finish—would be necessary to enhance its perceived value. The insights from our study may inspire policymakers around the globe in their efforts to improve the food security, livelihoods, resilience and equity of indigenous agricultural communities through policies and market strategies that actively involve consumers in the preservation of cultural heritage and *in situ* biodiversity of crop genetic resources.

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LIST OF TABLES AND FIGURES

Table 1. Variable definition and descriptive statistics

Variable	Description	Mean (Std Dev.)
Morning	1 if field experiment was conducted in the morning; 0 otherwise	0.32 (0.47)
Affordability	1 if subject prioritizes affordability when purchasing rice; 0 otherwise	0.18 (0.39)
Quality	1 if subject prioritizes quality when purchasing rice; 0 otherwise	0.92 (0.27)
Primary shopper	1 if subject is the primary household shopper	0.82 (0.38)
Weekly purchase	1 if household usually purchases rice on a weekly basis; 0 otherwise	0.60 (0.49)
Higher education	1 if subject has at least tertiary education; 0 otherwise	0.94 (0.24)
Housewife	1 if subject is a housewife; 0 otherwise	0.09 (0.28)
Silent Generation	1 if subject belongs to Silent Generation; 0 otherwise	0.04 (0.21)
Baby Boomers	1 if subject belongs to Baby Boomer Generation; 0 otherwise	0.21 (0.41)
Generation X	1 if subject belongs to Generation X; 0 otherwise	0.32 (0.47)
Millennials	1 if subject belongs to “Millennial” Generation Y; 0 otherwise	0.43 (0.50)
Female	1 if subject is female; 0 otherwise	0.57 (0.50)
Household size	Number of individuals in the household	3.99 (2.14)
Monthly income	Average monthly household income in 1,000 Philippine Pesos	87.89 (70.16)

Note: The average exchange rate at the time of the auctions was US$1 = PhP 45.66.

Table 2. Preferences for white rice and brown rice versus heirloom rice, by market segment

Market segment	Proportion	Auction	Proportion
White rice	47.06%	Regime 1: Upgrades white rice to heirloom rice	13.24%
		Regime 2: Upgrades heirloom rice to white rice	33.82%
Brown rice	52.94%	Regime 3: Upgrades brown rice to heirloom rice	21.32%
		Regime 4: Upgrades heirloom rice to brown rice	31.62%
N	136		136

Table 3. Preferences for white rice and brown rice versus heirloom rice, by market segment and experience treatment

Market segment	Auction	Proportion
	Control Group	
White rice	Regime 1: Upgrades white rice for heirloom rice	6.52%
	Regime 2: Upgrades heirloom rice for white rice	36.96%
Brown rice	Regime 3: Upgrades brown rice for heirloom rice	21.74%
	Regime 4: Upgrades heirloom rice for brown rice	34.78%
n = 46		
	Loss-framed experience	
White rice	Regime 1: Upgrades white rice for heirloom rice	15.56%
	Regime 2: Upgrades heirloom rice for white rice	35.56%
Brown rice	Regime 3: Upgrades brown rice for heirloom rice	20.00%
	Regime 4: Upgrades heirloom rice for brown rice	28.89%

n = 45		
	Gain-framed experience	
White rice	Regime 1: Upgrades white rice for heirloom rice	17.78%
	Regime 2: Upgrades heirloom rice for white rice	28.89%
Brown rice	Regime 3: Upgrades brown rice for heirloom rice	22.22%
	Regime 4: Upgrades heirloom rice for brown rice	31.11%
n = 45		

Table 4. Occasions when rice is planned to be consumed, by market segment

Market segment/Occasion	Breakfast	*Merienda*	Lunch	Dinner	Special occasion
White rice (n = 64)	54.69%	7.81%	89.06%	76.56%	17.19%
Brown rice (n = 72)	54.17%	1.39%	79.17%	65.28%	18.06%

Heirloom rice (n = 47)	55.32%	2.13%	78.72%	63.83%	25.53%
Dishes	Tapsilog, Tocilog, Daingsilog, Arroz caldo, Champorado, Nilaga, Hotdog, Ham and eggs, Steamed/fried fish, Sardines, Corned beef, Silog meals, Giniling, Daing na bangus, Longganisa, Tuyo, Mushroom, Fish-Daing, Bacon	Namamahaw, Chicharon	Braised pork, Braised beef, Braised chicken, Risotto, Roasted chicken, Sinigang, Nilaga, Tinola, Ginisang gulay, Kare-kare, Gulay, Chopseuy, Beef tapa, Ginisang ampalaya, Grilled fish, Soup, Monggo, Adobo, Ginataang, Fried meat, Pinakbet, Caldereta, Menudo, Vegetables	Braised pork, Braised beef, Braised chicken, Risotto, Roasted chicken, Chicken, Fish, Chopseuy, Sinigang, Nilaga, Adobo, Adobong baboy, Meat, Pork adobo, Igado/ diningding/ dinuguan, Pinakbet	Paella, Lechon, Sugpo, Stuffed meat, Alimasag na may gata, Steak, Kare-kare, Mechado, Chicken, Curry /Caldereta, Fish

Notes: Multiple occasions could be mentioned per participant, so percentages do not sum to 100%.

Table 5. Regression results of willingness to pay premiums

Variable	Model 1	Model 2
	Coefficient (Robust Std error)	Coefficient (Robust Std error)
Constant	15.000 (6.531)**	31.650 (17.099)*
Loss-framed trt	16.429 (8.712)*	9.656 (13.341)
Gain-framed trt	58.750 (22.551)**	60.895 (25.719)**
Regime 2	8.118 (7.570)	6.007 (10.935)
Regime 3	11.000 (10.115)	10.379 (11.965)
Regime 4	18.750 (11.521)	15.897 (14.398)
Regime 2 x loss-framed trt	–5.484 (11.617)	–0.604 (16.294)
Regime 3 x loss-framed trt	14.238 (22.821)	22.462 (25.228)
Regime 4 x loss-framed trt	–23.255 (14.953)	–17.722 (18.889)
Regime 2 x gain-framed trt	–62.637 (23.357)***	–63.001 (27.843)**
Regime 3 x gain-framed trt	–50.750 (25.025)**	–55.206 (25.760)**
Regime 4 x gain-framed trt	–74.286 (24.653)***	–71.535 (28.176)**
Morning		–2.948 (5.626)
Affordability		–10.839 (6.344)*
Quality		–8.436 (8.444)
Primary shopper		9.724 (9.988)
Weekly purchase		4.143 (5.530)
Higher education		3.898 (7.523)
Housewife		6.500 (10.199)
Silent generation		–36.783 (8.655)***
Baby boomers		–13.727 (8.129)*
Generation X		–10.494 (6.744)

Female		–5.229	(6.575)
Household size		–1.181	(1.447)
Monthly income		–0.040	(0.057)
N =136			
R^2	0.1883	0.2953	

Notes: *** significant at 1%, ** significant at 5%, and * significant at 10%. Standard errors in parenthesis. Regime 1: upgrades white rice to heirloom rice; Regime 2: upgrades heirloom rice to white rice; Regime 3: upgrades brown rice to heirloom rice; Regime 4: upgrades heirloom rice to brown rice

Table 6. Estimated price premiums for rice

Market segment/Regime	Control group	Loss-framed message	Gain-framed message
White rice consumer			
Regime 1 (upgrades white rice to heirloom rice)	31.65 [A]	41.31 [A]	92.55 [B]
Regime 2 (upgrades heirloom rice to white rice)	37.66 [A]	46.71 [A]	35.55 [A]
Brown rice consumer			
Regime 3 (upgrades brown rice to heirloom rice)	42.03 [A]	74.15 [A]	47.72 [A]
Regime 4 (upgrades heirloom rice to brown rice)	47.55 [A]	39.48 [A]	36.91 [A]
N	46	45	45

Note: Values with the same letters in each Regime are not significantly different from each other at the 5% level. Price premiums are in Philippines Pesos (PhP).

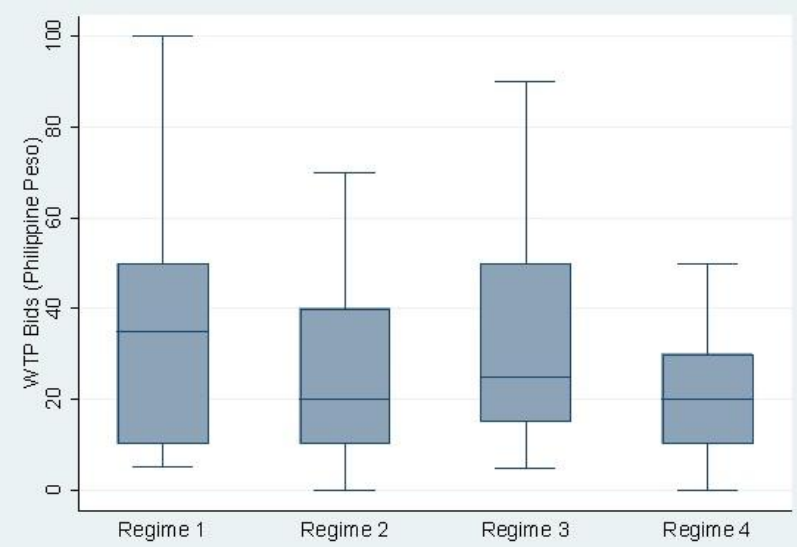

Figure 1. Willingness to Pay premiums across the four regimes and two market segments

Note: Regime 1: upgrades white rice to heirloom rice; Regime 2: upgrades heirloom rice to white rice; Regime 3: upgrades brown rice to heirloom rice; Regime 4: upgrades heirloom rice to brown rice

APPENDIX

Figure 2. Visual used to support the staging of the cultural heritage preservation experience