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Demand and Willingness to Pay for Cultivated Beef, Farm Raised Beef, and Plant-Based Alternatives:

Evidence from a Large Sample of U.S. Food Buyers

Hanbin Lee (hblee@ucdavis.edu), Daniel A. Sumner (dasumner@ucdavis.edu), and Robin Goldstein (rgoldstein@ucdavis.edu) Department of Agricultural and Resource Economics, University of California, Davis

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Department of Agricultural and Resource Economics, UC Davis

Introduction

- Plant-based foods have always been alternatives to animal-based foods. The trade-off has been a traditional question in food demand economics.
- What is new, then? Alternatives to farm animal products gained attention as they better mimicked the taste and texture and protein appeal of farm-animal-based meat.
- Also, recently, sales of plant-based alternatives may have plateaued.
- Also, cultivated meat has gained attention over the past few years, but no commercially significant products have yet emerged.

Objectives

- Examine the demand for cultivated beef given farm-animal and plant-based alternatives.

Survey overview

- A nationwide one question survey, collected from US internet users (Google surveys administered the question)
- Collected in October and November 2022
- Information about 110,000 respondents to surveys that were available to the representative sample and garnered voluntary response to a survey that took seconds for response by someone using a web-search.
- Compared to the population, our sample has
 - More females
 - Fewer 25 – 44 aged people
 - More 55 – 64 aged people
 - Slightly fewer people from Northeast and South
 - Slightly more people from Midwest and West

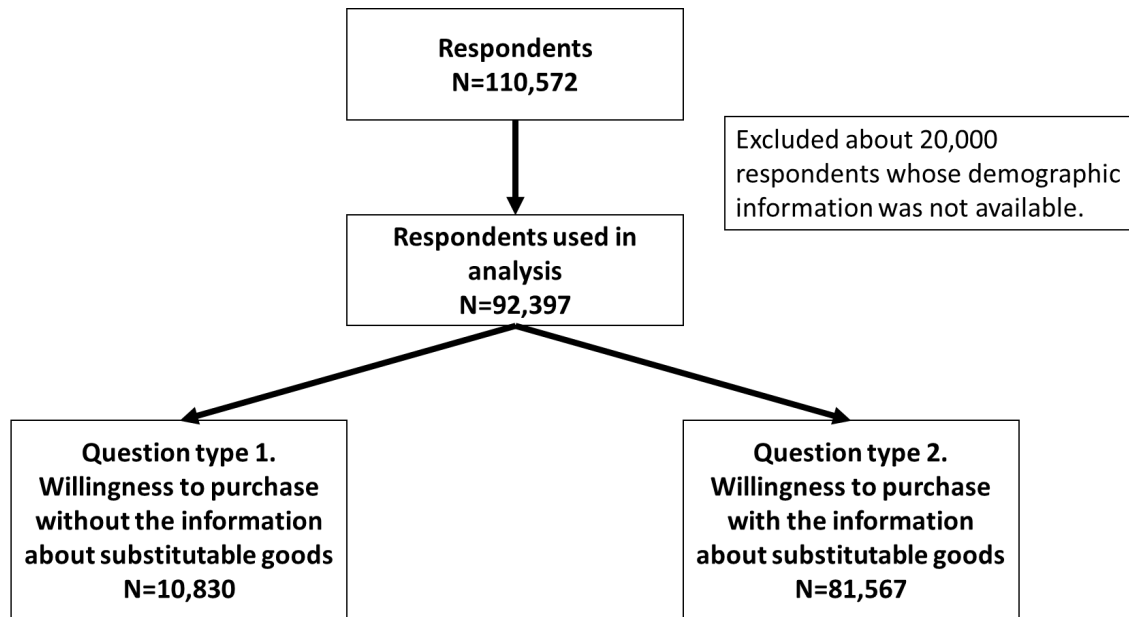


Figure 1. Survey overview

Question type 1

- Question: Would you buy the pictured product for the listed price?
 - Three potential responses
 - Yes
 - No, too expensive
 - No, don't want this product
 - We repeat this for three products (cultivated beef, plant-based alternatives, and farm-raised beef) for four potential prices for each.
 - About 900 each for 12 sets for about 10,830.

Please complete the following survey to access this premium content.

Imagine you're shopping for food, and you see this 1-pound package for \$5.00. Would you buy it?



- Yes, I'd buy it for \$5.00
- No, too expensive
- No, don't want this product

⌵ Select an answer

SUBMIT

OR

↺ Show me a different question

↺ Skip survey

Google

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Figure 2. An example of question type 1

- We use a multinomial logit model to examine the relationship between respondent choices, presented prices, and respondent characteristics.
- The probability of choice to purchase falls as price rises.
 - When presented price rises by \$1 per pound,
 - Cultivated
 - About 1% lower probability of choosing “Yes”
 - About 3% higher probability of choosing “No, too expensive”
 - About 2% lower probability of choosing “No, don’t want this product”
 - Plant-based
 - About 2% lower probability of choosing “Yes”
 - About 2% higher probability of choosing “No, too expensive”
 - Little change in the probability of choosing “No, don’t want this product”
 - Farm-raised
 - About 3% lower probability of choosing “Yes”
 - About 5% higher probability of choosing “No, too expensive”
 - About 2% lower probability of choosing “No, don’t want this product”

- Demographics affect the probability of choice to purchase.
 - Little effect of gender
 - Fewer older respondents say yes to cultivated or plant-based
 - Little effect of region (Northeast, Midwest, South, and West)

Question type 2

- Assess choices in pairwise comparisons with different pairs of prices for each alternative.
- We devoted 81,567 respondent observations.

Imagine you're shopping for meat, and you see these two 1-pound packages. Which package, if any, would you buy?

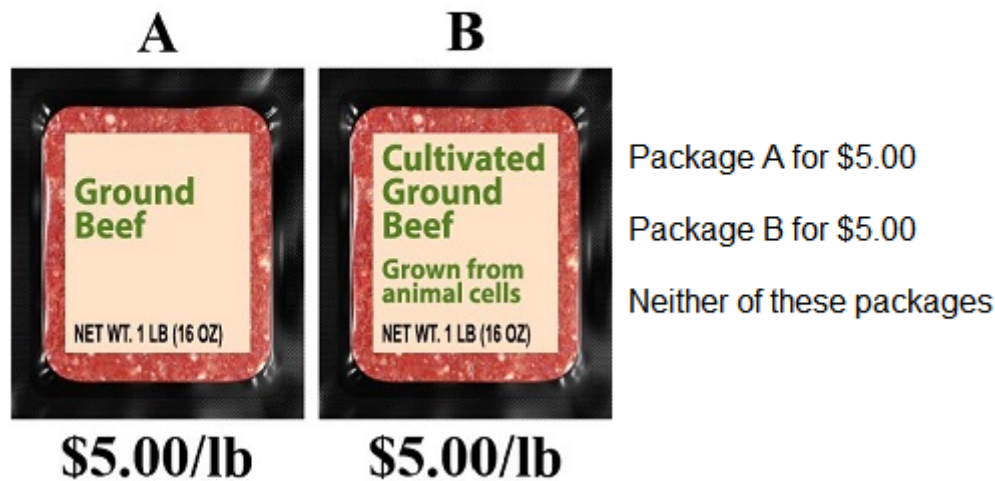


Figure 3. An example of second type question

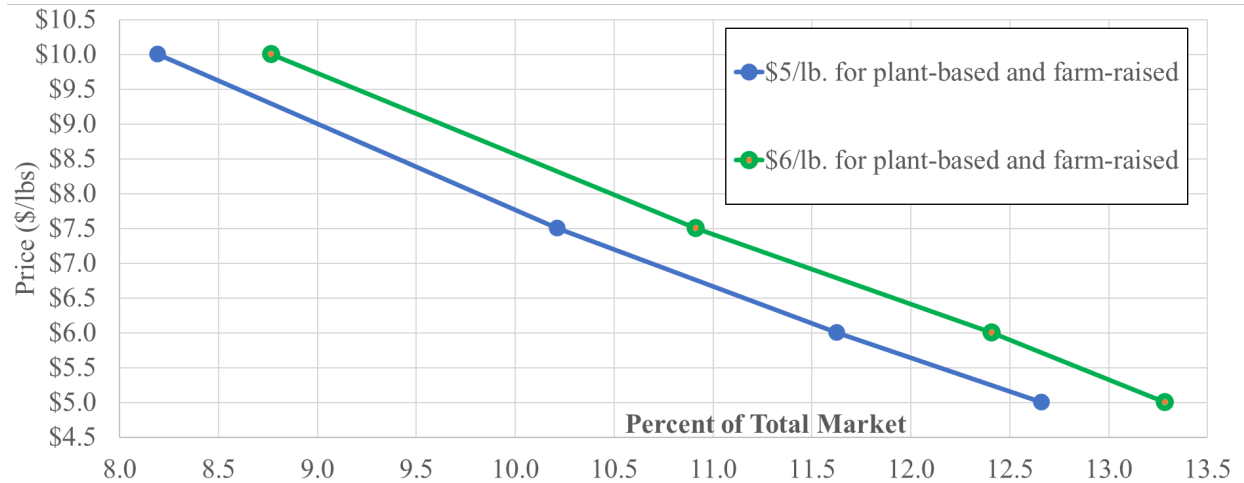
- We use a multinomial logit model and a random coefficient logit model to estimate willingness to pay for each product and project market shares of each product.
- Willingness to pay is estimated based on parameter estimates from choices as prices of each product varies.
- Individual choices and therefore implied WTP vary. The WTP rises as the percentile of buyers rises. Implied WTP is in the potential market price range only for the highest 15% of potential consumers of cultivated beef.
- For traditional farm-raised beef, the implied WTP is above current market price for less 75% to 80% of potential customers.

Table 1. Implied Willingness to Pay (\$/lb.)

	85th percentile	90th percentile
Cultivated	\$5.18/lb.	\$7.27/lb.
Plant-based	\$5.89/lb.	\$8.05/lb.
	30th percentile	25th percentile
Farm-raised	\$6.58/lb.	\$4.71/lb.

Table 2. Projected market shares by product

	All products are priced at \$5/lb.	\$5/lb. farm-raised, \$10/lb. cultivated & plant-based
Cultivated	12.7%	8.7%
Plant-based	13.7%	9.4%
Farm-raised	53.7%	59.8%
None of the three	19.9%	22.1%

**Figure 4. Implied Demand curves for cultivated beef**