

# Understanding the Impact of Information on Market Efficiency and Consumer Well-Being

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T3: TEXAS A&M TRIADS FOR TRANSFORMATION  
A President's Excellence Fund Initiative

## Research Objective

The objective of our research is to understand the impact of information on markets, and identify strategies and policies that improve market efficiency, producer profits, and consumer well-being. Using T3 grant, we have conducted several market surveys and research projects. In this presentation, we will use our research on Genetically Modified Food Markets as the showcase of our collaboration, which combines the applications of economic modeling, statistical analysis, food economics, and marketing research.

## Effects of GMO labeling on the Food Markets

## Introduction



Genetically modified organisms (GMOs) are defined as organisms in which the genetic material (DNA) has been altered in a way that does not occur naturally by mating and/or natural recombination. GM crops are now grown in 28 countries on more than 180 million hectares, which is over 10% of the world's arable land, with the U.S. being the leading producer (75 million hectares).

On December 20 of 2018, the USDA announced the National Bioengineered Food Disclosure Standard, requiring food companies to disclose foods that have been genetically modified, or bioengineered, by January 1, 2022.

"This ensures clear information and labeling consistency for consumers about the ingredients in their food. The Standard also avoids a patchwork state-by-state system that could be confusing to consumers." – USDA Secretary, Sonny Perdue.

To evaluate the effect of GMO labeling on the food markets, we constructed a theoretical model that identify consumer decisions and firms' strategies, and conducted a nationwide survey on consumers' preferences for grocery products.

## Theoretical Model

Firm G has  $\alpha\bar{Q}$  of a GMO product and Firm N has  $(1 - \alpha)\bar{Q}$  of a non-GMO product.  $N$  consumers. Each buys at most one unit of the product. Consumers' valuation of non-GMO is  $v \in [0, V]$  with  $W(v)$ . The consumer preference parameter  $\lambda$  captures the difference in consumer attitudes between GMO and non-GMO, with  $\lambda \in [0, \bar{\lambda}]$  following  $F(\lambda)$ , such that the valuation for GMO is  $\lambda v$ . A consumer's utility from consuming a GMO product is

$$U_G = U(\lambda v - p_G),$$

and her utility from consuming a non-GMO product is

$$U_N = U(v - p_N),$$

Firm G's profit function is

$$\pi_G = N(p_G - c_G) \int_0^V \int_{1 - \frac{p_N - p_G}{v}}^{\bar{\lambda}} f(\lambda) w(v) d\lambda dv.$$

Firm N's profit function is

$$\pi_N = N(p_N - c_N) \int_0^V \int_0^{1 - \frac{p_N - p_G}{v}} f(\lambda) w(v) d\lambda dv.$$

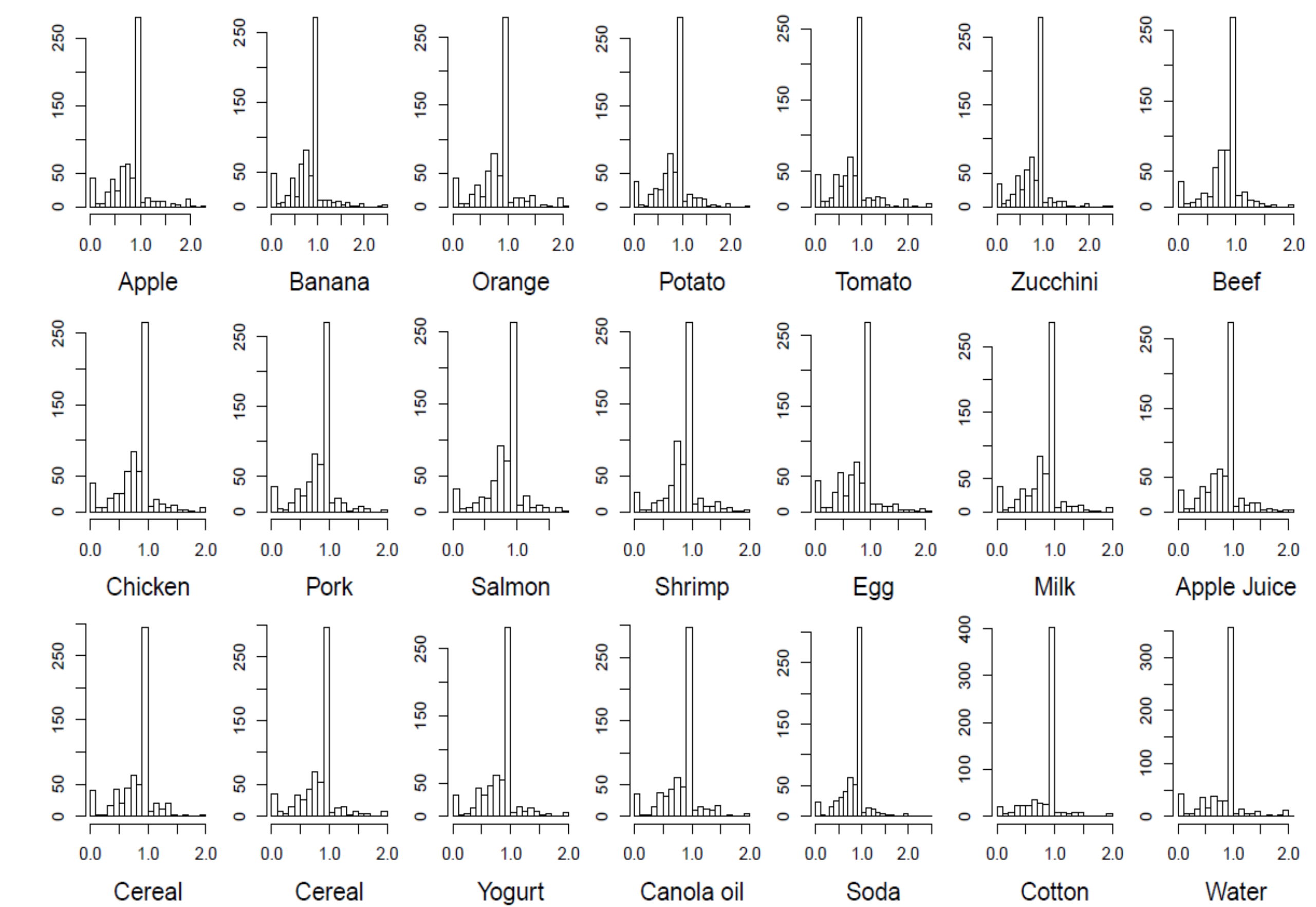


Figure 2. Distribution of differences in Consumers' WTP for GMO and non-GMO products

## Market survey

We conducted a nationwide online survey on consumers' preferences, perceptions, and willingness to pay (WTP) for 21 grocery products including apple, banana, orange, potato, tomato, zucchini, shrimp, salmon, beef, chicken, pork, soda, water, apple juice, orange juice, milk, yogurt, egg, cereal, cotton balls, and canola oil.

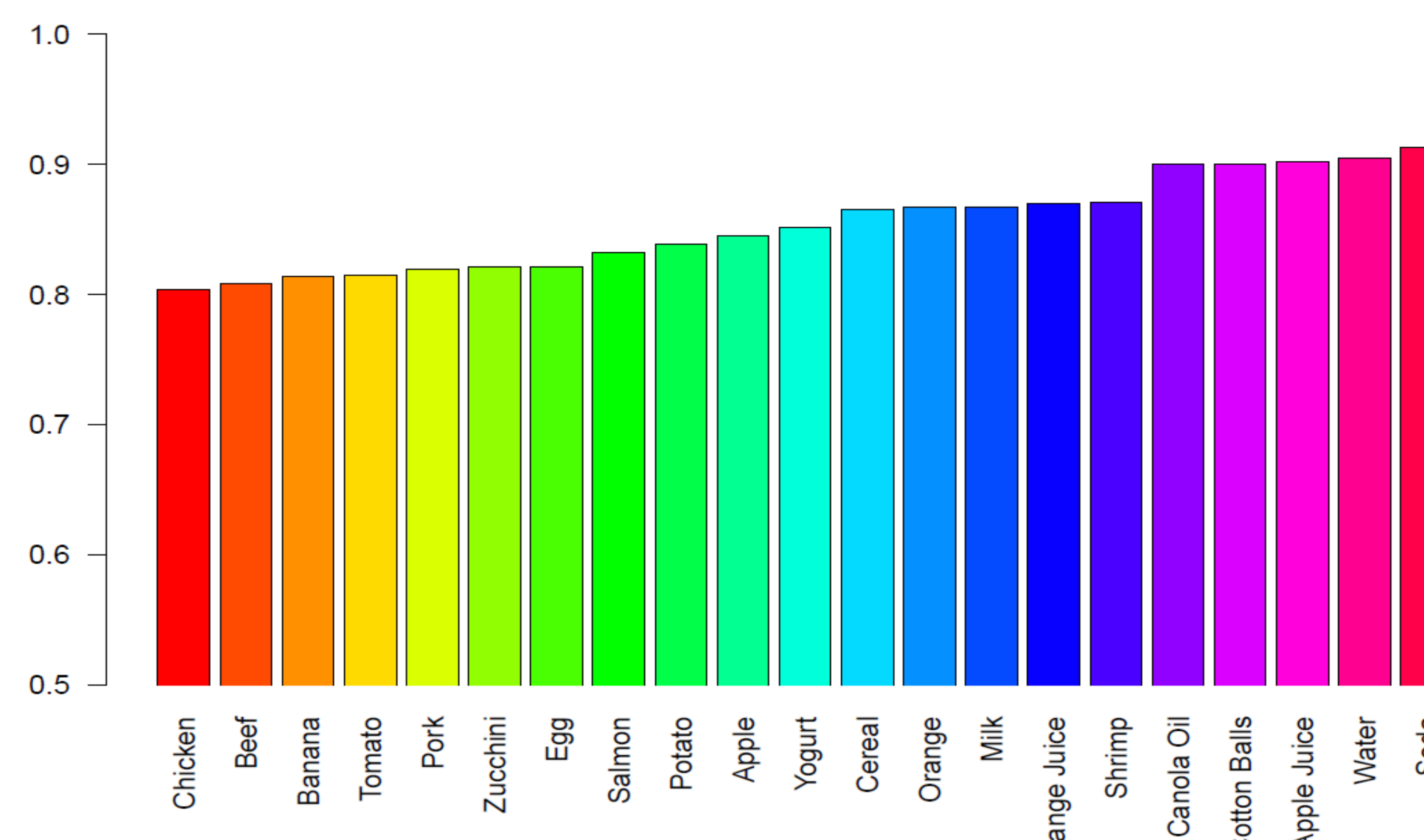


Figure 1. Consumers' average value discount on GMO products calculated as (WTP for GMO)/(WTP for non-GMO),

## Main Findings

- In general, consumers are willing to pay less for GMO products compared to non-GMO products.
- For products in competitive markets with sufficiently low market prices, GMO producers will not be worse off from complying with the GMO labelling rule.
- Many non-GMO producers will benefit in profits when GM products are labeled.

## Ongoing Research and Future Collaborations

- We have a pipeline of research projects, such as,
- Eliciting information from sensitive survey questions
  - The market for academic journals and its impact on knowledge dissemination
  - Investigating the spillover effect of product harm crisis: the role of design and functionality similarity
  - Evaluate the effect of trade policies and tariffs on consumer markets
  - Understand the impact of Covid-19 on food bank donation and volunteering

Thank you!