

# Consumers' willingness to pay for GMO products.

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## 1. Introduction

Since the first genetically modified food product was approved for commercial release in 1994, genetic engineering has been widely applied to multiple species of crops. By 2015, genetically engineered (GE) crops have been planted on 12% of the world's cropland. Moreover, 40% of all GE crops are planted in the U.S.<sup>1</sup> More than 90% of corn, soybean, and cotton planted in the U.S. are genetically modified<sup>2</sup>. Accompanied with the development of this technology, one thing that cannot be neglect is the constant worldwide debate regarding GMOs. From the scientists' perspective, GMO is environmentally friendly and has no negative effects on human beings. The National Academies of Sciences (NAS)'s report of 2016 stated their analyses of more than 1000 studies and confirmed the scientists' opinion. Even so, there are still a lot of consumers concerned about the environmental risk associated with GM food production and health concerns for GMO consumption (Costa-Font, Gil, and Traill, 2008).

Thus, clarifying what factors dominate consumers' purchasing decisions on GMO products could help the society have an objective perception on GMO. Understanding those factors could benefit the farmers who plant GMO and the companies who sell it. It would also have political implications and provide ideas of what kind of regulations should be applied to GMO products. In our study, we used Vickrey second price auctions (SPAs) to reveal consumers' willingness to pay (WTP). Second price auctions have proven to be an effective way to elicit values (Coppinger et al. 1980). Subjects bid for multiple rounds for different commodities. At the end, we randomly chose one of them as the binding round. Subjects had to pay for the commodity with real money if they won the auction in the binding round. Compared to contingent valuation surveys, real money incentive made it more reliable to observe consumers' true WTP (Breidert et al., 2006). Participants were asked to submit bids for both GMO and Non-GMO products in order to observe the differences between consumers' attitude towards them. We could easily find Non-GMO products because, by USDA standard, all organic foods are GMO-free. However, it is hard for us to find GMO products because in the U.S., there is no regulation for GMO labeling. We could only use conventional foods instead of GMO products. Since the main components of feed for livestock in the U.S. are corn and soy, it's likely that beef and milk are also influenced by genetic engineering. Concerned with realistic implications, our list is comprised of beef, canola oil, cotton ball, milk, plain yogurt and zucchini squash. For each product, subjects bid for both conventional and Non-GMO products.

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<sup>1</sup> National Academies of Sciences, Engineering, and Medicine. 2016. Genetically Engineered Crops: Experiences and Prospects. Washington, DC: The National Academies Press. doi: 10.17226/23395

<sup>2</sup> Seth J. Wechsler, Recent Trends in GE Adoption, <https://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us/recent-trends-in-ge-adoption.aspx>.

## 2. Experiment procedure

We recruited 174 grocery shoppers from Bryan and College Station ages 18 to 73. The recruitment flyer was posted on the Eagle, a local newspaper. The experiment was conducted over a 2 day-period in a conference room in Hyatt Place, a hotel in College Station. Around 57% of participants are females and 43% are males. Participants were randomly assigned into 8 sessions. For each session, they were randomly divided into 3 groups, so each group contained 6 to 8 bidders. During each round of the bidding procedure, they only competed within their own groups.

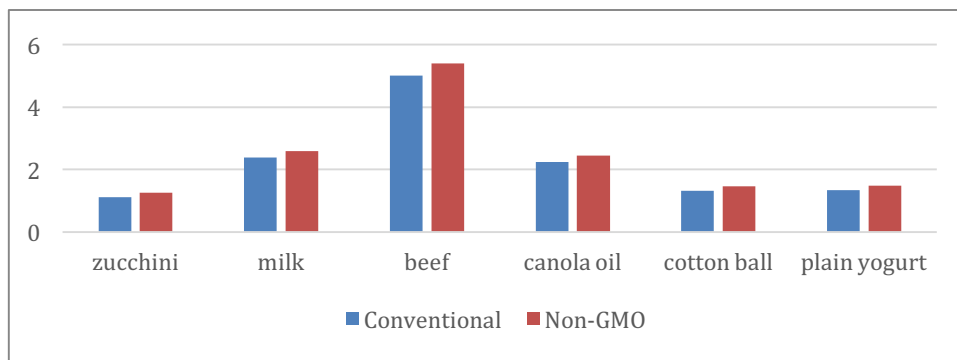
There were 29 rounds of bids in total; five of them were bids for cash vouchers, and the remaining bids were for real products. The bids for cash vouchers were a learning procedure. By repeating the bid on cash, subjects learned the mechanism of the second price auction. We added an information treatment into the experiment. It is a two-minute news video which justifies that GMO is harmless for human beings. Subjects bid two rounds for each product, before and after the news. The differences between two bids represented the information effect on consumers' WTP.

We only revealed basic information for each product: what the product is, the weight and if it is Non-GMO or not. The winner in each group paid for the binding product at the end.

## 3. Preliminary results

Consumer WTP measured by the bids in SPAs are shown in figure 1. Generally, consumers are willing to pay more for Non-GMO products.

Figure 1. Average willingness to pay.



The difference between consumers' willingness to pay for conventional and Non-GMO products are shown in the table below.

	Zucchini	Milk	Beef	Canola oil	Cotton ball	Yogurt
Non-GMO – Conventional	14.45%	11.47%	10.37%	10.75%	10.94%	12.37%
p-value	0.0579	0.0314	0.0936	0.1117	0.1676	0.1589

Regression models will be used to test the important factors that affect consumer WTP for GMO/non-GMO products, including age, gender, education level, knowledge on GMO, health condition, risk attitude, political attitude.