Reference-Dependent Food Choice with Various Reference Prices

Understanding the reference price-dependent utility framework is important to study people's food consumption behaviors. In the literature on consumer economics, one of the major objectives of these studies is to understand consumers' preferences for different food products, food labels, and food with different attributes. Researchers have been widely using the willingness to pay (WTP) as a tool to demonstrate consumers' attitudes and valuations of food products. As a demand-revealing indicator, WTP expresses the maximum price consumers value for a certain product (Hensher 2010). Quantified consumers' preferences using WTP can offer valuable insights for policymakers and stakeholders in food markets on targeting specified consumers and promoting products with certain traits. Over the past few years, there is a growing number of studies showing that consumers' food purchase decisions tend to be reference-dependent, especially to the price attributes (e.g., Caputo et al., 2018, Lim and Hu 2022). Failing to account for such behavior may result in an incorrect estimation of consumers' preferences and have serious repercussions for policy recommendations.

In the literature on reference price-dependent food choices, researchers found that consumers tend to have multiple reference prices and the role of reference prices is subject to debate. On the one hand, motivated by Kahneman and Tversky (1979) and Tversky and Kahneman (1991), behavioral economics tend to use the prospect theory to explain the impact of the reference price on consumers' food valuation process. Differing from the neo-classical economic theories that assume that individuals' have an infinite ability to make utility maximization choices with full information and complete knowledge of their preference, behavioral economics suggests that individuals may identify a reference price and judge possible outcomes of purchasing food products in terms of gains and losses relative to the reference price to make a food consumption decision (e.g., Kai-Ineman and Tversky 1979). On the other hand, some studies suggest that consumers may treat reference prices as a food quality indicator (e.g., Hardie, Johnson, and Fader 1993). When the food product price is below certain reference prices, consumers tend to perceive it signals that the food product is low-quality and they are less likely to purchase the food product with a low price.

Despite the ambiguous roles of reference prices may play in explaining consumers' food choices, there is a limited number of studies systematically investigating how different reference prices may affect consumers' food choices. To fulfill the gap in the literature, we study three types of reference prices (i.e., the price is too expensive, too cheap, and a good bargain) and how these three different reference prices may affect consumers' food consumption decisions in various ways. The finding of the study will provide great insight into consumers' food purchase decision-making process and thus, help policymakers and stakeholders better design effective policies and marketing strategies to promote certain food consumptions.

Choice experiment and data

To study the reference price-dependent food choices, we use a strawberry choice experiment (CE) to understand consumers' food choices. The strawberries in the CE were described by price, the origin of the product, whether or not USDA organic labeled, whether or not certificated for Best Management Practice, and whether or not certified by the USDA for Good Agricultural Practices.

Then we used the fractional factorial design to generate 10 choice sets. In each choice set, there were three choice options included: two strawberry options and one no-buy option.

To study whether and to what extent that reference price may affect consumers' food valuation process, we elicit consumers' various reference prices using Van Westendorp's Price Sensitivity Meters, a method that has been widely used in marketing research to elicit consumers' price sensitivity. In particular, we asked three questions to recover at what price consumers would consider the product is too expensive (high reference price), too cheap (low reference price), and a good deal (middle reference price).

We distributed our survey through Qualtrics among a US representative sample. The eligible participants of the CEs were major adult household shoppers who purchased the strawberries in the last half-year as the survey is conducted. Besides the participants' choice behavior in the CE, both studies have collected participants' demographic information.

Estimation

To model participants' behavior in CEs, we follow the random utility framework developed by McFadden (1974). We define a consumer's utility to choose one alternative is $U_{ijt} = V_{ijt} + \varepsilon_{ijt}$, where V_{ijt} is the deterministic part of the utility for consumer i chooses product j in the choice set t and ε_{ijt} is the error term following a Gumbel distribution. Under the scenario that consumers are not reference price dependent, the deterministic part of the utility function is $V_{ijt} = \alpha P_{ijt} + \beta X_{ijt}$, where P_{ijt} is the price of the food product, X_{ijt} is the vector representing the attribute level of the food product, α captures consumers' sensitivity to prices, and β captures consumers' sensitivity to non-price attributes. To examine the effect of reference price on consumers' food evaluation, we define the deterministic part of the utility function as is $V_{ijt} = \alpha P_{ijt} + \gamma\, I_{P_{ijt}>0}(P_{ijt} - R) + \beta X_{ijt}$. The key variable of interest is γ, which denotes the effect reference price on consumers' utility function. In cases where the reference price has no effect, we should expect $\gamma = 0$. Otherwise, the reference price has a heterogeneous effect on consumers' food valuation depending on the magnitude comparison between α and γ.

Results

We find that consumers have various reference prices. In general, the distribution of consumers' different references price follows a normal distribution. In addition, various reference prices may have different effects on consumers' food valuation process. The low reference price tends to be used as a food quality signal. Consumers tend to be less willing to purchase food products when the food product price is lower than this reference price. Meanwhile, the bargain and high reference prices tend to be used by consumers as a reference point in prospect theory. Consumers become more sensitive to price as the price of the food products is getting higher than the reference prices. The results of this study shed light on significant pricing strategy implications for food companies. When companies intend to promote their food products by using a reference price approach, they should take into consideration not setting products' prices too low because it may trigger consumers to use the price as a food quality signal. A too-low price may backfire on the companies' intention to promote food products.