

## The Stigma Effect of rBST Labeling on Milk

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Ideally, product labeling allows consumers to make better informed decisions and sellers to set their products apart from competing merchandise. Problems can arise, however, when the label on a product suggests that competing products are less healthy or safe, as is the case with milk that is labeled “hormone free.” The hormone in question is rBST, recombinant bovine somatotropin, a synthetically produced version of bovine somatotropin, which is a normal growth hormone in cows. rBST is commonly used as a supplement in the dairy industry to increase the amount of milk a cow can produce. Labeling some milk products as “hormone free” may stigmatize conventionally produced milk (frequently produced with rBST), which could reduce consumer purchases of conventional milk and possibly of milk in general.

Consumer perceptions of the desirability of rBST have become even more relevant because large fluid milk processors, retailers, and restaurants including Wal-Mart, Kroger, Dean Foods, and Starbucks recently have begun requiring suppliers to stop using rBST. Whether their decisions were made in response to consumers or for

some other reason remains unclear. What is clear, however, is that consumers are purchasing less conventionally produced milk and more alternative products, mainly organic and rBST-free milk, which they view as safer and therefore more attractive even though, in the case of rBST, studies have shown that the synthetic hormone does not pass into milk and that its use poses no threat to human health.

This shift away from conventional milk to alternatives that are labeled as rBST-free is likely to have a significant impact on fluid milk processors and dairy farmers. Estimates of the number of U.S. producers using rBST vary significantly—from 15% for Wisconsin herds to as much as 44% in herds in New York and Texas. According to Monsanto, the producer of rBST, 17% of dairy farmers nationwide use rBST to some degree and their herds accounted for 33% of all dairy cows in the U.S. If retailers continue to pressure farmers to stop using rBST, dairy producers using rBST will face higher costs to transition back to dairy production techniques that do not use rBST.

Our study addresses the question of whether retailers’ move from unlabeled conventional milk to milk that is labeled as free of synthetic hormones is driven by consumer bias against rBST or for other reasons. We examine this issue within the context of psychological stigma, a phenomenon in which people develop negative associations with something even though there is no evidence of that item causing a problem or presenting a human health risk. In our experimental setting, we measured adult test subjects’ willingness to pay for milk based on the production method (conventional versus rBST-free). Willingness to pay provides a direct observable measure, as opposed to hypothetical questions in a survey. By altering the order in which people bid for different types of milk, we found that consumers are indeed willing to pay a premium for rBST-free and organic milk despite a lack of scientific evidence regarding harmful effects of rBST on human health. Given consumers’ willingness to pay such a premium, it is likely that the retail move toward rBST-free milk is being driven by consumer preferences.

### The Experiment

To determine whether consumers are biased against

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the presence of rBST in milk, we asked subjects to decide how much they would be willing to pay for milk produced using three different production techniques—conventional, rBST-free, and organic—and three fat types—0% skim, 1% lowfat, and 3.25% whole. Each experiment session lasted approximately one hour and participants' average earnings were \$15. To determine each participant's willingness to pay, we used a "demand-revealing" auction mechanism to assure that subjects' bids represented the true value of their willingness to pay (more details on this mechanism are available from the authors on request).

We presented each participant with a set or "flight" of milk samples for each type of production—conventional, organic, and rBST-free. For each flight of milk samples, participants were given five-ounce tasting cups filled with 0% skim milk, 1% lowfat milk, and 3.25% whole milk. So, for example, one flight consisted of three samples of milk produced conventionally with one cup containing whole milk, a second containing lowfat milk, and a third containing skim milk. Participants were encouraged to taste each sample and to answer a couple of questions regarding the milks' quality and freshness. We then asked them to indicate the most they would pay for a quart of each of the milks. We varied the order in which the flights were presented to determine

whether viewing information about conventional milk after information about rBST-free milk (and organic milk) had a negative impact—a stigmatizing effect—on subjects' willingness to pay for conventional milk.

To mimic information commonly found in a grocery store setting, we provided the subjects with nutritional and production information for each flight of milk. It is important to note that the nutrition information for each milk differed only by fat type, not by production technique. The information handout for rBST-free milk included a statement that the milk "does not contain artificial growth hormones;" the handout for organic milk included a statement that the milk was "produced without the use of antibiotics, synthetic growth hormones, or pesticides." The wording for both statements came directly from the labels on the milk cartons. The information sheet for conventional milk did not include any claims regarding the production process, but contained nutritional information.

To avoid potential problems with brand effects, subjects never saw the original containers for the milk; all milk was poured from clear plastic pitchers. Based on a random draw prior to each experiment, only one of the nine milk types was actually sold after participants tasted and bid on all nine milk types. Participants learned which

item after all bids were complete, subjects were advised to submit bids for each food item as if it would be the one used to determine cash earnings.

### **The Results**

The results of these experiments support the theory that a stigma effect influences consumers' perceptions of conventional milk. Figure 1 illustrates this effect by comparing participants' bids for conventional milk that was tasted first versus last. As the figure shows, subjects in the study consistently offered more for conventional milk, regardless of fat type, when it was the first milk tasted and considered for purchase. The mean offer in this case was \$1.28. Since subjects were not then aware of the other products that would be presented, their willingness to pay for the first flight of milk was determined generally without making direct comparisons with other milk products. However, when conventional milk was presented last (the third of three flights), participants had been presented with the complete set of products and labeling information (similar to the range of choices available when purchasing milk at a store) and had been given an opportunity to taste all of them. Their mean willingness to pay for conventional milk when presented last fell to \$0.61. Milk presented as rBST-free, on the other hand, did not experience this dramatic

decrease when more information was presented. In fact, the mean willingness to pay for rBST-free milk rose slightly from \$1.05 when presented first to \$1.15 when presented last. The same is true regarding organic milk, where mean willingness to pay was essentially unchanged (\$1.37 when presented first vs. \$1.36 when presented last). Thus, one is left with the stark finding that when all production and nutritional information is presented in the market, consumers are willing to pay an average of \$0.54 less for a quart of conventional milk compared to rBST-free milk and \$0.75 less for a quart of conventional milk compared to organic milk.

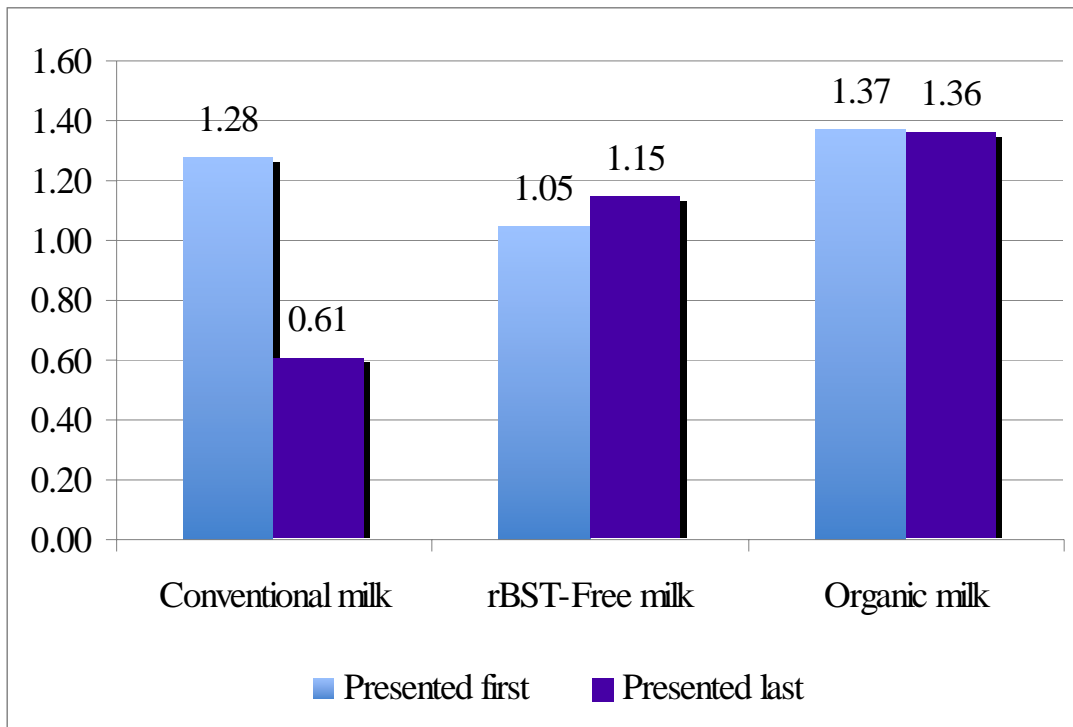
To evaluate the effect of other factors that might influence participants' willingness to pay, we conducted a statistical analysis that controlled for various demographic and socioeconomic characteristics of the subjects, including gender, whether a participant was the primary shopper in the household, whether the participant was aware of the availability of rBST-free and organic milk prior to the experiment, values for participants' answers to the questions asked during the taste tests, how they rated their degree of thirst before tasting the samples, the

frequency with which participants purchased milk of each production type, a variable for risk preference, the number of children under ten in each participant's household, the highest level of education obtained, and income. The statistical analysis confirmed the experimental results. After controlling for all other factors influencing willingness to pay, we found that participants' bids for conventional milk decreased by 33% after tasting and being exposed to information regarding rBST-free milk (milk labeled as "Does not contain any artificial growth hormones"). We found that participants' bids for conventional milk decreased by 45% after tasting and being exposed to information regarding organic milk (i.e., organic milk "produced without the use of antibiotics, synthetic growth hormones, or pesticides"). These results suggest that experiment participants' willingness to buy conventional milk declined after tasting and considering rBST-free and organic milk. The very act of learning about, tasting and making a purchase decision on conventional milk after becoming aware of rBST-free or organic milk lowered the participant consumers' willingness to pay for milk produced with rBST. These findings support the hypothesis that conventional milk becomes a stigmatized good after the introduction of rBST-free and organic labeled milk.

## **Conclusion**

The economic implications of the stigmatization of goods have not been thoroughly examined. Producers of conventional items have been concerned about negative consequences that could result from introduction of competing products with labels that market them as "better" or "safer" products, including bird-friendly coffee, free-range chicken, sustainably harvested wood, eco-friendly bananas, and a variety of fair-trade and hormone-free products. In the dairy industry, rBST is an example of how stigma effects can have economic repercussions for conventional products. The vast majority of studies have shown that conventionally produced milk is no more risky to consume than rBST-free milk. The experimental results presented here illustrate that the recent actions by Wal-Mart, Dean Foods, and Starbucks to ban conventional milk and supply only rBST-free (and organic) milk may have significant negative consequences for conventional milk demand. The implication of the stigma effect found here is that the dairy industry will have to confront this issue head-on or risk a possibly major negative impact on milk consumption.

Figure 1. Average Willingness to Pay for a Quart of Milk by Order



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