Laser-Branding Technologies to Increase the Quality of Watermelons in Chinese Markets

Researchers:

Jie Bai

Sector(s): Agriculture, Labor Markets

Location: Shijiazhuang, Hebei, China

Sample: 60 sellers in 60 markets; 675 households

Target group: Entrepreneurs Small and medium enterprises

Outcome of interest: Attitudes and norms Profits/revenues

Intervention type: Technology

□□□□□□□□ **:** https://dx.doi.org/10.5281/zenodo.13909671

Partner organization(s): Weiss Family Program Fund for Research in Development Economics, George and Obie Shultz Fund, Hebei Shuangxing Seed Co., Ltd.

Many markets in low-income countries lack reliable and easily identifiable high-quality products, particularly in food markets. One reason for low-quality provision is the challenge sellers face to build a reputation for selling high-quality products due to mistrust and differing information between buyers and sellers. Researchers conducted a randomized evaluation to test the impact of different types of labels to signal product quality on sellers' ability to develop a reputation for consistently selling high-quality watermelons in China. The more expensive laser-cut label influenced sellers to provide higher quality watermelons than the sticker label. The use of the laser-cut label also led to higher sales profits, whereas the cheaper sticker label had no effect on profits.

□□□□□□□ □□□□□□□

Many markets in low-income countries, particularly food markets, lack reliable and easily identifiable high-quality products. There are many possible explanations for poor quality, including the lack of technology, quality inputs, access to credit, or poor management. Differing levels of access to information and mistrust between buyers and sellers could be another factor. Sellers may struggle to build a reputation for high-quality goods when a seller's claim of offering high-quality products cannot be immediately verified. Mistrust in such markets makes reputation building a difficult and low-return investment for sellers. In such a context, introducing a credible sign of quality could play a crucial role in informing consumers about the quality of the products and helping establish trust between the buyer and the seller. This could help a seller build a good reputation, lead to higher sales of quality products, increase profits for sellers, and overall improve the quality of goods in the market. Various technologies like fancier packaging or certified labels have been tried to signal quality. However, rampant counterfeiting has undermined these strategies. Could more expensive laser-branding help sellers establish a reputation for selling quality products?

□□□□ □□□□□□□

Chinese consumers have growing concerns about food safety and quality available in local markets. In a survey in 2014, 80 percent of respondents said they were upset about the food safety situation in China.[1] Recent scandals about quality have led to growing mistrust among consumers and resulted in a greater willingness to pay for high quality products. For example, consumers are willing to pay a 28 percent quality premium for watermelons, one of the most popular products transacted in local markets.

This evaluation took place in the city of Shijiazhuang, China, with an urban population of over 2.8 million and more than 200 open-air local markets. These semi-formal markets have many small-scale retailers. The sellers are both men and women with an average of ten years of schooling. Ninety-five percent of retailers sell fruits as their primary income source.

This intervention examines the watermelon market. Watermelon quality is particularly difficult to detect prior to consumption because they are usually sold whole, and quality varies even within a single seller's pile. Although the markets are highly localized and allow for repeated face-to-face interactions between local sellers and consumers, sellers have not built reputations as consistently high-quality sellers. When consumers were asked in a survey whether they thought any seller in the local market provided higher quality than others, 98 percent answered "No."



Watermelons at a local market in China

Photo credit: Lesia Povkh, Shutterstock.com

□□□□□□□ □□□□□□□ □□ □□□□□□

Researchers conducted a randomized evaluation to test the impact of two types of labels and an incentive on sellers' ability to build a reputation for providing high-quality watermelons in China. Researchers randomly assigned sixty different markets to receive the laser-cut label, the sticker label or no label. Then, they randomly assigned half of the sixty sellers within these markets to receive an incentive. This resulted in six groups:

1. *Laser-cut label group, no incentive (10 sellers):* The sellers in this group received a laser-cut label with the words “premium watermelon” made using an expensive laser engraving machine on the watermelons they sorted into a premium pile.
2. *Sticker label group, no incentive (10 sellers):* The sellers in this group received a cheap and simple sticker with the words “premium watermelon” pasted on the watermelons they sorted into a premium pile.
3. *No label group, no incentive (10 sellers):* The sellers in this group did not receive any labels to differentiate watermelon quality.
4. *Laser-cut label group, with incentive (10 sellers):* In addition to receiving a laser-cut label on the watermelons sorted as premium, the sellers in this group received a monetary reward if their watermelons passed quality checks.
5. *Sticker label group, with incentive (10 sellers):* In addition to receiving a simple sticker pasted on the watermelons sorted as premium, the sellers in this group received a monetary reward if their watermelons passed quality checks.
6. *No label group, with incentive (10 sellers):* The sellers in this group did not receive either label to differentiate their watermelons. They received a monetary reward if their watermelons passed quality checks.

Throughout the eight weeks of the intervention, surveyors visited the sellers in the sticker and laser-cut label groups every morning to perform the free branding service on the watermelons the sellers had sorted into a premium pile. The groups that were offered the incentive received RMB 100 (US$16.23 in 2014) at the end of each week for six weeks, the equivalent of daily sales profits, if the two watermelons selected during random visits throughout the week passed quality checks. Quality was assessed using a sweet meter, a device that measured the sugar content of the watermelon. The incentive was a way to subsidize the technology the sellers used to build their reputation.

Researchers rolled out the intervention between July and September 2014. They collected quality data from sellers during the biweekly random quality checks and also collected information about daily retail and wholesale prices and sales. One week after the intervention and one year later the researchers conducted follow-up surveys to determine sellers’ willingness to pay for labeling in the longer term.

□□□□□□□ □□□□□□□ □□□□□□□□□ □□□□ □□□□□□□□

The more credible laser-cut labels influenced sellers to provide higher quality watermelons than the sticker labels. The use of the laser-cut label also led to higher sales profits, whereas the cheaper sticker label had no effect on profits. However, the resulting increase in profits for the laser-cut label did not cover the fixed cost of the technology for sellers.

Quality provision: Sellers that were not introduced to either label stopped sorting their watermelons after the first two weeks, when sorting was no longer enforced, while most sellers (roughly 80%) who were assigned to either label continued to differentiate for the eight weeks of the intervention regardless of receiving an incentive. One year later, none of the 57 sellers who could be tracked down were still sorting their watermelons to differentiate quality.

During the intervention, the average quality of watermelons in the premium pile in laser markets was .735 degrees higher than the quality of watermelons in the normal pile (9.787 degrees) in the laser market. The average quality of watermelons in the premium pile in sticker markets was .378 degrees higher than the watermelon quality (9.366 degrees) in the normal pile in sticker markets. For reference, a sweetness difference of 0.5 degrees matters significantly for taste.

The incentive led sellers using both the sticker and laser label to provide higher quality watermelons. Among the incentivized sellers using the laser and sticker labels, the quality of watermelons in the premium pile was .55 points and 1.034 points higher respectively than among their respective non-incentivized groups during the six weeks the incentive was given. Once the incentive

was removed there was no change in the quality of watermelons in the premium pile among the sellers using the laser-cut label. For the sellers using the sticker label, once the incentive was removed, the quality of watermelons in the premium pile decreased .674 points. The researchers suggest building a reputation as a quality provider for sellers using the sticker label takes more time than for sellers using the more credible laser-label to indicate quality.

Sellers' profits: Sellers using the laser label earned 30 to 40 percent higher sales profits than the label-free group on average, due to both a higher price and a higher quantity of watermelons sold in the premium pile. The sticker group's sales were not higher than the label-free group's sales. The researchers suggest the lack of increased profits among sellers using the sticker label demonstrates why sellers were not sorting their watermelons prior to the intervention even though stickers have long been cheaply available.

Buyer behavior: Buyers who had good experiences selecting high quality watermelons from the markets where laser-cut labels were introduced were 45 percent more likely to repurchase a premium watermelon from a seller with laser-branding than a buyer who had not had good past experiences selecting a high-quality watermelon. A buyer was not more likely to purchase a premium watermelon from the sticker label seller, having had good past experiences buying watermelons. Researchers suggest this difference demonstrates that the laser label enhanced the buyer's speed to learn to recognize a seller's reputation.

Taken together, these findings suggest a quality signal may need large up-front costs in order to be viewed by the buyer as credible. However, such high initial costs can hinder adoption among small-scale sellers in low-income countries. In this study, even for the sellers using the laser label that saw profits increase, it would take close to twelve years to recoup the fixed cost of the laser machine. Researchers suggest that the increase in profits from using the laser-label may not be sufficient to justify investing in a credible sorting technology. Therefore, researchers also recommend further research on temporary incentives to subsidize the reputation-building process. Policies that help markets overcome information asymmetries between buyers and sellers and facilitate reputation-building among sellers could raise welfare.

---

1. Duggan, Jennifer. 2015. "China's middle class turns to organics after food safety scares." *The Guardian*. Last modified May 14. https://www.theguardian.com/sustainable-business/2015/may/14/china-middle-class-organics-food-safety-scares.