Sweetener selection

Research by Getu Hailu, John Cranfield and Rawlin Thangaraj

Heightened consumer awareness of the link between the foods they eat and their health is a stimulus for change in both food consumption and food processing behaviour. For example, as consumers become more aware of the negative health effects of certain sweeteners, their demands change accordingly.

A study by Getu Hailu, Associate Professor, FARE, John Cranfield, Professor, FARE and Rawlin Thangaraj, a former FARE graduate student, reasons that when deciding which sweetener (or combination of sweeteners) to use in their products, food manufacturing firms are likely influenced by both publicly available health information and the relative cost of production of using different sweeteners.

The researchers first used economic models to estimate the relative cost to manufacturers of using high fructose corn syrup and cane sugar in United States food products. This enabled them to comment on whether manufacturers are likely to substitute one type of sweetener for the other, based on market forces. Statistical techniques were then used to determine if there is a relationship between the use of a particular sweetener and publicly available health information.

Results showed that cane sugar and high fructose corn syrup are used more often in combination than as substitutes for one another. This may be because manufacturers blend the two sweeteners in order to produce a certain taste in their product. The use of cane sugar could be significantly affected by changing prices of corn. For example, if the price of producing corn were to rise, high fructose corn syrup would then become a less competitive substitute for cane sugar.

While the choice of sweetener is influenced by cost and health information, substitution between cane sugar and high fructose corn syrup is more closely related to changes in relative prices. The choice of sweetener is more readily influenced by media coverage than by scientific publications.

This research is valuable for the food manufacturing industry and regulatory authorities who can use these results to direct attention to the importance of media information on sweetener choice. Policy makers in the sweetener segment of food manufacturing can also use this research to design policy instruments based on the nature of the price responses of cane sugar versus high fructose corn syrup.

While it is not the most important factor, publicly available health information does affect the choice of sweeteners used by food manufacturers. To make their decisions, manufacturers weigh the trade-offs between relative price of sweeteners and increasing the market share of their food product.

A version of this article appeared in Clear Language Research Summaries, a project of the Institute for Community Engaged Scholarship (ICES) at the University of Guelph. Read more about this study in Hailu, G., Cranfield, J., & Thangaraj, R. (2010). Do U.S. Food Processors Respond to Sweetener-Related Health Information? Agribusiness, 26 (3), 348-368.

Funding for this research was provided by Agriculture and Agri-Food Canada, Consumer and Market Demand Agriculture Policy Research Network.
Canada’s changing food landscape

By John Cranfield, Professor, FARE

The evolving demographic profile of the Canadian population will change what is on a consumer’s plate. The agri-food sector’s ability to meet demand for new food products will be predicated on anticipating what consumers in the future want to eat or drink. This is not easy. However, changes in the demographic composition of the Canadian population can help shed light on demand for different types of food.

The population has shown relatively constant growth since Confederation. And while many in Canada are descendants of early immigrants from western and northern Europe, changes in Canadian immigration policy, beginning in the 1960s, resulted in migration from other parts of the globe. Since then migration to Canada from a variety of regions has been evident (see chart), especially in recent years.

This migration has led to localized communities of individuals with similar ethnic origins (e.g., ‘little Italy,’ ‘little India’). Within these communities, grocery stores and food service establishments are often tailored to the ethnic origin of the inhabitants. Over time, individuals from outside that local community (e.g., a Canadian born individual of western European descent) patronize these grocery and food service establishments.

This interaction between new migrants and ‘native’ born Canadians can lead new migrants to adopt (or adapt) elements of a ‘western’/Canadian diet. In turn, native born Canadians often adopt/adapt the diet of migrant communities. This two-way process of adopting and adapting one’s diet to that of a different ethnic region or culture is called dietary acculturation, and it is changing the nature of the market for food in Canada.

In particular, we are seeing the rapid emergence of two segments related to ethnic food and ethnicity. The first is the market for food products (and food service establishments) geared to new Canadians and migrants from other regions of the world. The second is a segment for ethnic food products (and foodservice venues) targeted to the non-ethnic market.

As Canada becomes more ethnically diverse, the landscape of the Canadian food environment will evolve. Understanding the impact of such change on demand for foods in Canada will become increasingly important. Such understanding can help inform the supply side of the market in terms of retail and food service location decisions, as well as decisions related to the marketing mix, and importantly for primary agriculture, decisions about what to grow.

Source: Statistics Canada

Number of respondents to the Census of Canada (1996, 2001 and 2006) across geo-political origins

<table>
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<th>Region of origin</th>
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<th>2001</th>
<th>2006</th>
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<tr>
<td>East and Southeast Asian</td>
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</table>

Source: Statistics Canada

FARE Talk

Enlightening discussions about contemporary topics relevant to food, agricultural, and resource economics

Origins of property rights

There are five different theories about the origins of property rights, according to FARE Professor Dr. Glenn Fox. And each theory may lead one to a different interpretation of an issue.

He examined and compared these theories in a recent article for the Canadian Journal of Agricultural Economics; the article was the basis for his discussion in a podcast, hosted by Dr. Brady Deaton, Jr., Associate Professor, FARE.

Fox used recent examples from within Canadian agriculture to illustrate how different theories about property rights can affect one’s interpretation of an issue. One of those examples is the long controversial and now defunct Canadian Wheat Board (CWB). The CWB was viewed by proponents of the utilitarian theory as an arrangement that has a net benefit for everyone affected by the policy, even though there may be some disadvantages, including limited
Curbing food fraud

By Andreas Boecker, Associate Professor, FARE

‘I could eat a horse’ is a phrase used to describe a really empty stomach. But the meat scandal in Europe earlier this year leaves a sour taste to this phrase, because many have unknowingly eaten horse. Even if consumer health was not at risk, this incident prompts many questions: “How can food fraud happen, how big is the problem, and how can it be curbed?”

The incentives for replacing high-value ingredients with low-value items are straightforward – the probability of being detected is low because protocols do not include DNA-testing for horse meat; procurement of meat from numerous suppliers makes identification of the source of adulteration difficult; and penalties for convicted fraudsters are mild.

While there is no official count of food fraud cases, it appears to be a growing and increasingly global problem. In the United States, conservative estimates state that 7% of foods offered contain fraudulent ingredients.

To stay ahead of fraudsters, industry has invested heavily in counter measures for enhanced quality assurance. Incentives are particularly large for branded manufacturers to invest in rapid analysis techniques and market surveillance systems. They stand to lose the most in terms of consumer trust and brand equity, should they be impacted by food fraud.

Established testing methods, such as DNA-testing, are based on the analysis of substances that occur naturally in the ingredient. Molecular tags, a novel technology, provide additional potential for more effective quality assurance by adding substances in minute quantities to the original ingredients. Made from naturally occurring oligosaccharides, these ‘molecular tags’ can be altered in almost countless ways to yield unique identifiers whose precise constellation and concentration would only be known to the manufacturer. If testing for ‘molecular tags’ was routine, the source of adulteration could be more quickly detected.

Professor Nicholas Low, University of Saskatchewan, received funding from the Advanced Foods and Materials Network to further develop this technology and integrate it with established testing protocols in a cost effective way. But would consumers accept this technology? Professors Jill Hobbs, University of Saskatchewan, and Andreas Boecker, University of Guelph, co-investigated this question through focus group interviews and discrete choice experiments with consumers.

Since product-specific responses were expected, Hobbs investigated meat and juice, and Boecker natural health products. They found that if consumers receive no information or scientific jargon, they are skeptical of the technology. However, if information links the technology to curbing food fraud, consumers accept it – a positive willingness to pay was estimated for products containing ‘molecular tags.’ Further, Boecker and graduate student Apichaya (Pat) Lilavanichakul found that it did not matter whether a national brand or regional brand would use this technology. These results should encourage decision makers in the food industry to consider employing this technology for traceability and quality assurance.

**Funding for this project was provided by the Advanced Foods and Materials Network.**

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Industry perspective

“The whole issue of food fraud is very much hidden,” says Hélène St. Jacques, principle of Informa Market Research and chair of the Toronto Food Policy Council. St. Jacques is a veteran social marketing and public education research expert. St. Jacques, who conducted the ‘molecular tag’ focus groups, says the existence of food fraud was a total surprise for participants. She credits this, in part, to their trust in Canada’s food supply.

“They expressed a very strong belief that the security of the Canadian food system is very high and they attribute this to the Government of Canada. They trust the government has a good system and/or they trust the big brand names and/or retailers,” she says. But the horse meat scandal, which took place after these focus groups, has put food fraud on consumers’ radar and ignited a broader debate about the final responsibility for distributing safe food and effective regulation.

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A deeper look at technological advancements in crop production

Research by Alan Ker, Chair and Professor, FARE and Tor Tolhurst

Over the past half century, technological change has dramatically increased the yields of staple crops. Provincial yields in Ontario provide a compelling demonstration of these increases, which are pervasive across a variety of crops. For example, since the 1940s, the average yields of staple crops in the province have increased by orders of magnitude: nearly three for corn, over two for soybeans and nearly two for wheat.

Typically, research proceeds with the assumption that technology is increasing average yields only and does not delve further into the impacts of technological advancement on the rest of the yield distribution. However, consider Figures 1 and 2, which illustrate another possibility: a unique and different rate of technological advancement for the lower yields versus the higher yields.

The higher rate of technological advancement in the upper versus lower component of the yield distribution is interesting and suggests that technological advancements are more geared toward increasing higher end yields or at least farmers tend to adopt technologies that increase higher end yields as opposed to adopt technologies that reduce the probability of lower end yields. This finding is not only statistically significant, but also consistent across a variety of crops in Canada and the United States. For example, since the 1970s mean yields in the upper component have increased 1.70, 1.37, and 1.14 times faster than in the lower component for Ontario soybeans, corn and wheat, respectively.

These findings are relevant to all issues that are dependent on technological change in agriculture such as food sustainability, economic development, feeding a rapidly growing world population, biofuels markets and policy, and measuring, mitigating or enhancing the effects of possible climate change.

Left: historical yields since 1970 with two-component linear trend.

Right: corresponding distribution using normal mixture and nonparametric kernel.

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