Effects of Advertising, Food Safety and Health Concerns on Meat Demand in Canada

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The demand for meat in North America is a heavily researched area (e.g., Chalfant, Gray and White 1991; Reynolds and Goddard 1991, Chen and Veeman 1991; Brester and Schroeder 1994; Eales 1996; Kinnucan et al. 1997; Alston, Chalfant and Piggott 1998; Patterson and Flake 1999; Schroeder, Marsh, and Mintert 2000). However, no previous study has taken into account the wide range of media influences on changes in consumption—for example, media coverage related to food safety and health concerns, the many different kinds of advertising which may affect meat demand, and social-marketing strategies of government and NGOs.

Advertising has been popular among producer groups seeking to increase sales of agricultural products such as beef, pork, and chicken, sometimes aimed at reducing the impact of negative media information related to health and food safety. It is also an effective tool used by processors and retailers to increase market share of a specific branded product or to launch new products. Although advertising, particularly generic advertising, has been used as a marketing strategy to combat health concerns, other kinds of advertising have been aimed at confronting decreased sales in difficult situations. Attempts to reduce the impact of negative information have been made by the industry in the form of generic advertising. In Canada, for instance, beef generic advertising is funded by beef producers through a check-off that the cattle producer pays at the time an animal is sold. These attempts may have been helped or hindered by contemporaneous brand and restaurant advertising.

A few European studies have included both media coverage and advertising expenditures in meat-demand systems in order to measure to what degree advertising has helped reduce the influence of negative information on consumer food choices.

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Recent events in the North American market suggest the need for a similar evaluation. It is possible that advertising could ameliorate the effects of negative information.

Model and Data

This study employs a two-stage meat-demand system with a Generalized Box-Cox functional form, with data on the Canadian meat market (beef, pork, and chicken) from 1976 to 2001. The creation of Food Safety and Health Media Coverage Indices over time is undertaken for each meat type through careful searches of newspapers, which are used as a proxy for all media coverage.

Meat demand in Canada has been following a trend similar to that in other developed world markets: beef demand has been declining since the late 1970s while chicken consumption has been increasing. Per-capita beef consumption declined by 23.3% from 1980 to 2001, per-capita consumption of chicken increased by 91.5% during the same period, and per-capita pork consumption has declined by 11.3% during those 21 years.

Quarterly meat disappearance in Canada was calculated with data published by Agriculture Canada and Statistics Canada. Population, CPI for all goods, disposable income, and CPIs for fresh or frozen beef, pork, and chicken were obtained from CANSIM. We include in the model expenditures on generic, brand, and fast food restaurant advertising.

The media indices were obtained using the publications library of Dow Jones Interactive and take into account the number of newspaper articles published in Canada per quarter from 1976 to 2001. The Food Safety Indices (FSIs) are counts of the number of articles related to BSE and E. coli for beef, E. coli and Salmonella for pork, and E. coli and salmonella for chicken. The Health Indices (HIs) are counts of the number of articles linking consumption of each meat type (beef, pork, and chicken) with cancer, heart disease, and stroke.

Results

The first stage of the demand system is a double log relationship with total expenditure on meats as the dependent variable, which is explained by several variables, including the sum of generic, brand, and restaurant advertising expenditures for the three meats; the percentage of meat servings with respect to total servings recommended in the various Canadian Food Guides; and the value of both the food-safety and health indices for the three meats. The second stage of the model will be composed of a system of equations using the Generalized Box-Cox (GBC) functional form.

TSP 4.5 is used for the estimation of the two-stage meat-demand system. The equations are estimated simultaneously with substitutions of endogenous variables from one stage into the other stage. A number of lags were tested for the various information variables. Ninety-one percent of the variation in total expenditure on meats is explained by the first-stage equation[1]. The weighted average-price coefficient is positive and significant at the 1% level, indicating inelasticity of aggregate demand for meat. The meat-safety index is positive and significant (1%) at the first stage; the sign may be explained by the fact that people could change from buying one kind of meat to buying a different kind (i.e. less pork but more beef or chicken), or even the same meat but of higher quality (i.e. stop eating ground beef because of its possible association with E. coli and start consuming high-quality steaks). Also at the first stage, the health index is negative but not statistically significant even at the 10% level.

The addition of quarterly dummy variables detected seasonality; total expenditure on meats is significantly different (higher) in the first, second, and third quarters of the year relative to the fourth quarter. Significant (1%) habit formation was detected through the lagged dependent variable. The sum of generic, brand, and restaurant advertising for the three meats has a positive and significant (5%) effect on total expenditure. Interestingly, recommendations made in the different Canadian Food Guides have a negative and significant (1%) effect, suggesting that total expenditure on meats has, in fact, been affected by such recommendations.

Calculated across the two stages of the demand system, all own-price elasticities are negative and significant (1%) and the cross-price elasticities are all positive except the effect of pork price on beef and chicken consumption. All the cross-price elasticities are significant. [2]

The own-food safety elasticity for pork is negative and significant (10%), suggesting that an increased number of newspaper articles linking pork with E. coli and salmonella decreases pork consumption. The pork-safety index has also cross effects, significantly increasing beef consumption. Considering other cross-food safety elasticities, an increased number of articles about beef-safety issues significantly decreases both pork and chicken consumption. The explanation for the beef food-safety index not having own negative and significant effects may have its roots in the fact that, from 1976 to 2001, BSE was not a beef-safety issue in Canada (BSE coverage from other countries makes up the majority of the beef food-safety-index values). Canadian consumers might have perceived external beef-safety issues as such and might have believed that the domestic supply of beef was safe, thus not altering their consumption preferences. With respect to the cross-health relations, no own- or cross-health elasticity has a significant impact on beef, pork, or chicken consumption. Further work to disaggregate the health index more clearly into positive and negative indices is warranted (Dyack 2002).

The own-generic advertising elasticity is positive and significant for pork. Thus increased advertising expenditures from hog producers significantly increases consumption of their product. On the other hand, pork consumption is negatively affected by increased generic advertising expenditures made by chicken producers. Both beef and chicken brand advertising have significant and positive own effects. Beef and pork brand advertising have significant but positive effects on chicken consumption. Beef fast food restaurant advertising significantly increases beef consumption and significantly impacts chicken consumption (positively).

Conclusions

The model used found that pork-safety issues have negative and significant own consumption effects,

[1] Data and parameter estimates are available on request from the authors.

[2] Elasticity estimates are available on request from the authors.

and positive cross-effects on beef. Pork generic advertising has own positive effects, while pork consumption is negatively affected by chicken generic advertising. Both beef brand and beef fast food restaurant advertising increase beef consumption.

Although the econometric analysis has been extensive, more and deeper work needs to be done. Some of the possible extensions are to differentiating more clearly between positive and negative articles about both food-safety issues and health concerns, and including medical journal articles on health issues instead of only newspaper articles.

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