

## An Economic Analysis of Generic Advertising and Promotion Activities by Dairy Farmers

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Over the last several decades, Dairy Farmers of Canada have invested heavily in generic advertising and promotion of cheese and butter products. Such investment is undertaken with the intent of increasing utilization of raw milk and, given the supply management nature of milk production in Canada, raising producer revenues. Given the large amount of investment in advertising and promotion, it is important to conduct periodic economic evaluations to determine the profitability of these activities. While previous studies (recently by Kaiser, Cranfield, and Doyon) suggest that investment in generic fluid milk advertising does, indeed, generate a positive net return, there has not been a study done on cheese and butter promotion in a long time.

Accordingly, the objectives of this study are twofold. First, to provide an economic assessment of the responsiveness of cheese and butter consumption to generic advertising and promotion in Canada over the last several years. Second, to compute various measures of rates of return to advertising and promotion for these commodities that are useful for evaluation and allocation decisions by DFC. This analysis is conducted using econometric models of national cheese and

butter demand in Canada. The econometric results are used to simulate the impacts of generic advertising and promotion/sponsorship programs on these two commodity markets. Specifically, we simulate the impact of increasing advertising and promotion budgets by 1% on consumption and producer revenues to ascertain the extent to which the resulting benefits exceed the costs. Based on this simulation, a marginal rate of return to advertising and promotion is calculated for each commodity. We also simulate the market impacts for a scenario where there is no generic cheese and butter advertising and promotion. Based on this simulation, an average rate of return to advertising and promotion is calculated for cheese and butter. The average rate of return is a useful figure since it measures the overall profitability of the investment.

Per capita consumption of both cheese and butter has been increasing in Canada. Per capita cheese consumption is up 7.5% on an annual basis from 1995, while per capita butter sales are up 10.5%. In order to determine what factors have had a significant impact on these consumption trends, we develop an econometric demand model for cheese and

butter.

Per capita cheese (and butter) sales are assumed to be affected not only by generic advertising and non-advertising demand enhancement expenditures (e.g., promotion, nutrition education, and sponsorships), but also by the retail price of cheese (butter), prices of substitutes for cheese (butter), consumer income, age demographics, and seasonal indicator variables. While this was the initial specification used for each commodity, the final specification differs for butter and cheese in terms of which variables were included in the model.

The most important cheese demand factor is age demographic changes. Specifically, the percentage of the population between 15 and 30 years of age had an estimated elasticity of 5.249. This means that a one percent increase in this age cohort measure would result in a 5.249 percent increase in per capita cheese demand when holding all other demand factors constant. Given the large magnitude of this variable relative to the other demand factors, it is clear that changes in this age cohort are the most important factor impacting changes in cheese demand. This result is consistent with previous studies, which show that young adults are the most important age segment

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driving cheese consumption (e.g., Schmit and Kaiser).

Not surprisingly, the retail price of cheese has a negative and statistically significant impact on per capita demand. The results indicate that a one percent increase in the real retail price of cheese would result in a 0.654 percent decrease in per capita cheese quantity demanded. The magnitude of this elasticity was the second largest factor effecting cheese demand. This result, which is consistent with other studies (e.g., Kaiser and Dong), illustrates that while the demand for cheese is inelastic, it is relatively more elastic than fluid milk which tends to have own price elasticities less than 0.25 in absolute value (Kaiser, Cranfield, and Doyon estimated fluid milk elasticities of -0.25, -0.21, and -0.08 for Quebec, Ontario, and the Maritimes, respectively).

Per capita disposable income has a positive and statistically significant impact on per capita cheese consumption. A one percent increase in real per capita income would result in a 0.168 percent increase in per capita cheese demand, holding all other demand factors constant.

The retail meat price index has a negative, but statistically insignificant impact on per capita cheese demand. A one percent increase in the real meat price decreases per capita cheese demand by 0.262 percent. This negative relationship indicates that meat and cheese are complementary rather than substitute products in Canada.

Finally, the generic cheese marketing activities conducted by dairy farmers have had a positive and statistically significant impact on per capita cheese demand. The average generic cheese advertising elasticity was computed to be 0.009 and was statistically significantly different from zero at the 10 percent significance level. Thus, a one percent increase in generic cheese advertising would increase per capita cheese consumption by 0.009 percent holding all other demand factors constant. This is similar, but a little lower than Schmit and Kaiser's estimated cheese advertising elasticity for the United States, which was 0.013. The average generic cheese promotion elasticity was computed to be 0.007 and was statistically significant at the 10 percent level. Thus, a one percent increase in generic cheese promotion would increase per capita cheese consumption by 0.007 percent holding all other demand factors constant. While these elasticities are not large relative to the other demand determinants, they are statistically different from zero and positive. Moreover, two points should be considered. First, one should not expect a large advertising or promotion elasticity since dairy farmers' annual budgets are quite small relative to the budgets of private companies such as large cheese corporations. Second, since dairy farmers' expenditures are relatively small, a small advertising or promotion elasticity can still confer large positive net benefits to the industry.

The own price elasticity of butter is negative and second largest in terms of magnitude of impact on butter demand; a one percent increase in the price of butter would result in a 0.585 percent decline in per capita butter demand. The size of the own price butter elasticity, which is consistent with other studies (e.g., Goddard and Amuah; Chang and Kinnucan; Moschini and Moro), indicates that while the butter demand is inelastic, it is relatively less elastic than that for cheese, but more elastic than fluid milk.

The retail margarine price index has a positive, but statistically insignificant impact on per capita butter demand. A one percent increase in the real meat price increases per capita butter demand by 0.599 percent. This positive relationship indicates that margarine and butter are substitute products in Canada, and is consistent with previous work (e.g. Goddard and Amuah 1989; Chang and Kinnucan). Moreover, the size of the own price elasticity for butter and the elasticity of butter with respect to the retail price of margarine underscores the competitive nature of the butter-margarine market. In particular, small changes in the margarine market can have important impacts in the butter market. As well, per capita butter demand appears to be more sensitive to the retail price of margarine than to the retail price of butter.

Per capita disposable income has a positive, but statistically insignificant coefficient. A one

percent increase in real per capita income would result in a 0.42 percent increase in per capita butter demand, holding all other demand factors constant. The value of this estimated income elasticity is consistent with previous research (e.g. Goddard and Amuah; Chang and Kinnucan).

More importantly, per capita expenditure on generic butter advertising and promotion activities has had a positive and statistically significant impact on per capita demand for butter. The average generic butter advertising elasticity was computed to be 0.052 and was statistically significantly different from zero at the ten percent significance level. Thus, increasing per capita generic butter advertising by one percent will increase per capita butter demand by 0.052 percent, all other things held constant. Per capita expenditure on generic butter promotion is also statistically significant, and has an elasticity of 0.047; a one percent increase in per capita generic butter promotion increases per capita butter demand by 0.047 percent.

A simulation model is developed for each commodity to simulate market conditions with and without generic advertising and promotion, and with altered levels of advertising and promotion. These scenarios are used to calculate a marginal and average rate of return on investment to advertising and promotion. Marginal rates of return can be used to determine whether more or less money should be allocated to each

commodity. A large marginal rate of return implies that extra money in advertising or promotion would generate a large return for the incremental investment, and therefore is interpreted as under-spending. On the other hand, a low marginal rate of return implies the opposite, i.e., too much money is being spent on the activity.

The average rate of return is greater than one for both products. However, it is much larger for cheese (8.30) than for butter (1.80). The average rate of return means that each dollar invested in generic promotion and advertising over the period 2001-2005 has yielded, on average, \$8.30 and \$1.80 in net returns to Canadian dairy farmers for cheese and butter, respectively. These results suggest that over the period 2001-2005, dairy farmers have, on average, benefited from generic milk advertising and promotion in butter and cheese.

The marginal rates of return for the period 2004-2005 were equal to 2.30 and -0.04, respectively, for cheese and butter. At the margin, investing more money in generic promotion and advertising is interesting for cheese, since a 1% increase in the promotion-advertising budget generate a return that is 2.3 times greater. On the other hand, further investment in generic promotion and advertising in butter generated, on average for the period 2004-2005, a slightly negative return. This negative impact could be explained by the rather low class 4m prices during this period. If the same calculation is applied to the year 2006, where class 4m prices

were higher, a positive MPROR of 0.6 is found. However, this coefficient is still less than one.

If we disaggregate the impact of generic promotion and of generic advertising, results indicate that the MPROR for advertising in cheese is 1.46 while the MPROR for promotion in cheese is 10.70. This means that, at the margin, a dollar invested in generic advertising for cheese would yield \$1.46 while the same dollar invested in generic promotion would yield \$10.70.

Clearly, more money should be devoted to promotion. However, these results should be interpreted in the context of a marginal analysis. The law of decreasing marginal returns implies that as more money is moved to promotion, the MPROR for promotion would decrease. Thus, the fact that roughly 88% of the generic expenditure is currently devoted to advertising could explain its lower MPROR relative to promotion. For butter, the same analysis yield slightly negative and similar MPROR for advertising (-0.02) as well as for promotion (-0.15).

In light of these results for cheese and butter, it appears that potential increases in generic promotion and advertising should be invested exclusively in cheese. The possibility of reallocating promotion-advertising budget from butter to cheese, at the margin, should also be considered. These results would stand until Canada's imbalance in snf is

mitigated by lower stocks or by new market opportunities that would reduce the snf utilisation in class 4m. Moreover, results also indicate that the current mix of

advertising (88%) and promotion (12%) for cheese should be revised such that more money would be allocated to cheese promotion. These results should

be seen as indicators or tools that can help to make budget allocation decision.

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Information regarding the  
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