Supplemental report to: Evaluating the Economic Benefits from the Canadian Beef Check-Off

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Executive Summary

The evaluation of the economic impact of the National Check-off program for beef cattle in Canada had four main conclusions. First, historic investment of NCO funds in marketing and research activities generated positive economic benefits for producers; every check-off dollar invested in marketing and research activities earned back $9 in producer benefits. Second, there has been under investment in both marketing and research activities; the extent of under investment was larger for research than for marketing activities. Third, shifting check-off dollars from marketing to research could increase producer benefits without an increase in the check-off levy. Last, every dollar refunded to Alberta cattle producers, under their recently enacted provincial legislation, cost Canadian cattle producers $11 in economic benefits. This supplement report provides analysis and discussion of a number of "what-if" scenarios related to the National Check-off program. Key results include the following:

- Investment in domestic and international marketing activities generated positive economic benefits for producers. From fiscal year 2005/2006 to the end of 2008 every check-off dollar invested in domestic (i.e. Canada and the U.S.) marketing activities increased producer benefits by $3.40, while every dollar invested in international marketing activities increased producer benefits by $16.

- There has been under investment in both domestic and international marketing activities; the extent of under investment has been worse for international marketing activities than for domestic marketing activities.

- Simulation results show that participation of Quebec and PEI in the NCO program, coupled with the application of a $3.40 per tonne levy on beef imported into Canada, generates positive economic benefits for Canadian cattle producers. Every additional check-off dollar (i.e. check-off revenues from Quebec and PEI and the import levy) invested in marketing and research activities increased Canadian cattle producer benefits by $8.

- Application of the existing $1 per head NCO levy to live cattle exported from Canada to the U.S. can increase Canadian cattle producer benefits. Simulation results show that every additional check-off dollar (i.e. check-off revenues from the export levy) invested in marketing and research activities increased Canadian cattle producer benefits between $5.65 to $7.

- Assuming investment levels do not change, Canadian cattle producer benefits will increase if the proposed merger of BIC and CBEF leads to enhanced effectiveness in increasing demand for Canadian beef. Simulation results suggest that a one percent increase in marketing effectiveness (as measured using the elasticities of demand for Canadian beef with respect to investment in marketing activities) could lead to an increase in Canadian cattle producer benefits anywhere between $1.2 and $1.9 million.

- Increases in the check-off levy to $2, $3 and $5 per head were simulated. Coupled with leveraged funds, the additional investment in marketing and research activities increased Canadian cattle producer benefits. For every additional dollar invested, the increase in cattle producer benefits ranged from $7.20 (with a $5 per head levy) to $9.30 (with a $2 per head levy).

1. Introduction

The Final Report concerning the evaluation of the economic impact of the National Check-off program for beef cattle in Canada had four main conclusions. First, historic investment of NCO funds in marketing and research activities generated positive economic benefits for producers. Every check-off dollar invested in marketing and research activities earned back $9 in producer benefits. Second, further analysis revealed under investment in both marketing and research activities, and that the extent of under investment in research was larger than for marketing activities. Third, producer benefits could be increased by changing the ratio of check-off funds devoted to marketing and research. Historically, 93 percent of producer check-off dollars were invested in marketing and 7 percent in marketing. The Final Report contained analysis showing that shifting check-off dollars from marketing to research could increase producer benefits. Lastly, every dollar refunded to Alberta cattle producers, under their recently enacted provincial legislation, cost Canadian cattle producers $11 in economic benefits.

This supplemental report serves to communicate results from a number of additional "what-if" scenarios, as well as break down some of the earlier report results. Specifically, the report includes a break down of the historic benefit-cost ratio (BCR) for domestic and international marketing activities. As well, the break down of the marginal BCR for domestic and international marketing activities are also report to help assess whether historic investment in these specific marketing activities has been optimal.

This supplemental report also includes four new "what-if" scenarios. The impact of Quebec and PEI contributing check-off funds to the NCO program, coupled with the application of a levy on beef imported into Canada, is considered. This scenario mimics what would be expected if the NCO were a truly national program (in that all eligible provinces participate) coupled with application of an import levy on beef. The next scenario considers what would happen if the current $1 per head check-off levy were applied to live cattle exports.

Next, the impact of a possible merger of BIC and CBEF is explored by recognizing that such a merger could enhance the effectiveness of domestic and international marketing activities. To this end, the model is used to simulate an increase in the response of consumer demand for Canadian beef (both in Canada and its export markets) to marketing activities and the impact on producer benefits explored. The last scenario considers the impact of increasing the national check-off levy and investing these additional funds in marketing and research activities. Such analysis seeks to explore how best to optimize the check-off levy. For brevity, this supplemental report does not include discussion of the model or data. Readers interested in further details are referred to the Final Report and its technical appendix for in-depth discussion.

2. Results & Analysis

2.1. BREAK DOWN OF AVERAGE BCR FOR INVESTMENT IN MARKETING ACTIVITIES

As stated in the Final Report, the benefit-cost ratio (BCR) associated with historic investment in marketing activities was 7.55:1. This means that every check-off dollar invested in marketing activities earned back $7.55 in producer benefits. What was not reported then was the break down of this BCR

across domestic and international marketing activities. This section includes discussion of this break down. Attention is focused first on the average BCR associated only with domestic marketing activities, then the BCR for international marketing activities only.

As with the analysis in the Final Report, the simulations which underlie these results implements a reduction in investment in either domestic or international marketing investment. This reduction in investment lowers demand for beef (in Canada and a broad) and results in a new set of prices and quantities at the retail and farm level. These new prices and quantities then lead to reduced producer benefits compared to the baseline scenario (see the Final Report for a discussion of the baseline scenario). If the reduction in benefits is larger than the reduction in investment, then we know that producers would have been worse off without the actual level of investment, and we conclude that producers benefited from investment of check-off funds.   (If the reduction in benefits is smaller than the reduction in investment, then we conclude that producers have not benefits from their investment).

As discussed in the Final Report, the reduction in domestic marketing investment is set equal to the historic value of the check-off funds invested in these activities; this equates to a 48.7 percent reduction in domestic marketing investment. Similarly, the reduction in international marketing activities is set equal to the historic value of the check-off funds invested in these activities, which equates to a 37.5 percent reduction in investment in international marketing activities.

2.1.1 Average BCR From Investment of Check-off Funds in Domestic Marketing Activities

Table 2.1 shows the value of the assumed reduction in domestic (i.e. Canada and the U.S.) marketing investment and corresponding reduction in total producer benefits (i.e., cow-calf, non-fed cattle and fed-cattle producers) in a pre-BSE period, and for fiscal years 2005/2006 through to the end of calendar year 2008. The analysis has taken account of inflation by deflating prices and monetary values, and as such the reduction in investment and producer benefits are in real terms. Compared to the baseline scenario the assumed reduction in domestic marketing investment resulted in a reduction in producer benefits. Moreover, in all periods considered, the reduction in benefits exceeded the reduction in investment. **This tells us that, without check-off fund investment in domestic marketing activities, market-level producer benefits would have been lower.**

The average BCR is the ratio of the reduction in producer benefits to the reduction in investment. For this particular what-if scenario, the average BCR for investment in domestic marketing activities is greater than one. **This tells us that the market-level producer benefits associated with check-off fund investment in marketing activities exceeded the value of the invested funds – producers gained net economic benefits from investing their check-off dollars in domestic marketing activities**. And, as shown in Table 2.1, the average BCR in the post-BSE time periods increased from 2.21 to 5.01. Moreover, these increases were such that by the end of 2008, the average BCR for investment in domestic marketing activities was 175 percent larger than the average BCR prior to the BSE crisis.

Table 2.1. Impact of reduction in check-off fund investment in domestic marketing activities

	Reduction in investment ('000 of dollars)	Reduction in benefits ('000 of dollars)	Average BCR
Pre-BSE	$1,297.06	$3,714.2	2.86
FY05/06	$3.438.21	$7,594.12	2.21
FY06/07	$3,762.41	$12,645.45	3.36
FY07/08	$3,432.2	$13,906.94	4.05
July 1 2008 to Dec 31 2008	$1,436.5	$7,190.61	5.01
NPV over the fiscal years 05/06 TO 08/09 YTD	$11,320.63	$38,502.48	3.40

To aggregate across the post-BSE time periods, the net present value (NPV) of the reduction in investment and reduction in producer benefits is calculated assuming a three per cent discount rate and discounted back to the start of FY 2005/2006. In this case, the reduction in domestic marketing investment equals $11.3 million, while the reduction in producer benefits is $38.5 million, implying an average BCR from FY 05/06 through to Dec. 31, 2008 of 3.4:1. **Stated another way, between FY 2005/2006 and the end of 2008, every check-off dollar invested in domestic marketing activities gave back $3.40 in producer benefits.**

2.1.2. Average BCR From Investment of Check-off Funds in International Marketing Activities

Table 2.2 mimics the information contained in Table 2.1, but for the counterfactual simulation where only investment in international marketing activities is reduced. As above, the reduction in investment in marketing activities in the international marketplace resulted in a reduction in producer benefits compared to the baseline scenario. Moreover, in all periods considered, the reduction in benefits exceeded the reduction in investment. **This tells us is that without check-off fund investment in international marketing activities, producer benefits (at the market level) would have been lower.** The implied average BCR for investment in international marketing activities in the post-BSE time periods ranges from 14.3:1 to 17:1. Moreover, the discounted reduction in investment equals $5.6 million dollars, while the reduction in producer benefits is $89 million, implying an average BCR from FY 05/06 through to December 31 2008 of 16:1. Since this value exceeds one, we know that the benefits associated with investment in these marketing activities exceed the value of the investment **– simply put, producers gain net economic benefits from investment of their check-off fund dollars in marketing activities in the international marketplace**.

Table 2.2. Impact of reduction in check-off fund investment in international marketing activities

	Reduction in investment ('000 of dollars)	Reduction in benefits ('000 of dollars)	Average BCR
Pre-BSE	$1,280.61	$21,216.12	16.57
FY05/06	$1,487.57	$21,283.96	14.31
FY06/07	$1,739.85	$28,894.64	16.61
FY07/08	$1,753.23	$29,731.90	16.96
FY08/09 to Dec 31 2008	$982.30	$15,547.53	15.83
NPV over the fiscal years 05/06 TO 08/09 YTD	$5,574.33	$89,126.82	15.99

2.2 HAS INVESTMENT OF CHECK-OFF FUNDS IN DOMESTIC AND EXPORT MARKETING ACTIVITIES BEEN OPTIMAL?

The final report included an assessment of whether historic investment in marketing and research activities was optimal. That analysis considered the impact of a one-time $10 increase in investment in marketing and/or research in 2007. Results indicated there has been under investment in both marketing and research activities, but that the extent of under investment was worse for research activities than marketing activities.

The purpose of this section is to present results and conclusions for a similar analysis, but with a focus on whether investment in domestic marketing activities has been optimal, and whether investment in international marketing activities has been optimal. To relate this analysis to the final report, the same $10 increase in the nominal level of investment is assumed to occur in the first quarter of 2007. To account for inflation, this $10 shock is deflated by the all-item CPI during simulation. And, as before, the discounted stream of economic benefits arising from the one-time increase in investment is used to measure the economic benefits arising from this increase in investment.

Table 2.3 shows the deflated value of the incremental investment and the net present value (NPV) of the deflated stream of the associated producer benefits. Since the net present value of the stream of benefits arising from a one-time shock is considered, the marginal BCRs reported here are for the long-run. When the $10 of incremental investment ($9.1 in deflated terms) is spent on domestic marketing activities only, the NPV of the stream of producer benefits exceeds the cost of the incremental investment. Moreover, the marginal BCR associated with spending this incremental investment only on domestic marketing activities is 7.64. This means that the last dollar invested in domestic marketing activities earns back $7.64. Since these incremental benefits exceed the incremental costs, **one conclusion to draw is there has been under investment in domestic marketing activities**.

When the $10 of incremental investment ($9.1 in deflated terms) is spent on international marketing activities only, the NPV of the stream of producer benefits exceeds the cost of the incremental investment. Moreover, the marginal BCR associated with spending this incremental investment only on international marketing activities is 19.96. This means that the last dollar invested in international marketing activities earns back $19.96. As above, since these incremental benefits exceed the incremental costs, **one conclusion to draw is there has been under investment in international marketing activities**.

Table 2.3. Impact of incremental investment of $10 in Q1 2007 in domestic and international marketing activities

Allocated to:	Deflate incremental investment ('000 of dollars)	NPV of deflated benefit stream ('000 of dollars)	Marginal BCR*
Domestic marketing only	$0.0091	$0.069	7.64
International marketing only	$0.0091	$0.181	19.96

* Calculated using incremental investment and NPV of deflated benefit stream measured to five decimals. As such, the ratio of the third column to second column will give rounding errors compared to the marginal BCR calculated in the analysis.

Recognize that the pattern of investment may vary over the year, as do market conditions. To account

for this, the above two counterfactual simulations were repeated assuming the incremental investment occurred in either the second quarter, third quarter or fourth quarter of 2007. Table 2.4 shows the marginal BCRs associated with these shocks. Compared across quarters we see that marginal BCRs show some variability, but with one exception, they are all greater than one, again suggesting under investment in both domestic and international marketing activities.

Table 2.4. Impact of incremental investment of $10 in marketing and research activities in different quarters of 2007

Allocated to:	Shock in Q1	Shock in Q2	Shock in Q3	Shock in Q4
Domestic marketing only	7.64	4.32	4.32	0.86
International marketing only	19.96	15.99	12.99	15.71

The main conclusions to draw from this analysis are that there has been under investment in domestic and international marketing activities. Moreover, the extent of under investment has been worse for international marketing activities, followed by domestic marketing activities. In conjunction with the final report, the results indicate that **any changes to the pattern of investment should flow more funds to beef-cattle research, then marketing activities in the international marketplace, and lastly domestic marketing activities**.

2.3 NATIONAL LEVY WITH PROPORTIONAL LEVY APPLIED TO BEEF IMPORTS

While the NCO levy is referred to as a national levy, not all regions remit funds to NCO. While efforts are underway to finalize participatory agreements, producers in Quebec and PEI do not currently contribute check-off funds to NCO. (Note that given its size, Newfoundland and Labrador are exempt from the NCO levy.) This means in practice the NCO levy is not entirely national. One consequence of not having all eligible provinces participating in the NCO program is that a check-off levy cannot be applied to beef imports entering Canada.

Given the efforts to secure participation of Quebec and PEI, some have wondered what impact their levy contributions, coupled with a proportional levy on beef imports to Canada, would have on producers' bottom line. As such, this section discusses a scenario which assumes participation of Quebec and PEI and a proportional levy on beef imports. To reflect participation by Quebec and PEI in the NCO program, the amount of check-off funds invested in marketing and research activities is increased. That said, it is difficult to measure the precise number of marketings in a given quarter in each province. However, taken together, Quebec and the Maritimes account for 5.1 percent of the federally inspected slaughter between 2005 and 2008. Assuming the number of marketings is proportional to federally inspected slaughter, the addition of Quebec and PEI to the NCO program is thus assumed to increase check-off fund investment in marketing and research activities by 5 percent.

Based on personal communication with NCO staff and executive, it is noted that in 2009 the 188,000 tonnes of beef imported into Canada could have increased NCO levy revenue by $640,000 (assuming a 650 pound carcass equivalent conversion from the $1 per head levy to a per pound levy). As such, the proportional levy applied to beef imports in this simulation is assumed to equal $3.40 per tonne (which equals $680,000 divided by 188,000 tonnes). The check-off revenues raised by applying this levy on beef imports into Canada are assumed to be invested in marketing and research activities. Furthermore, these import levy revenues are endogenized by setting their value equal to the volume of beef imports

(which is an endogenous variable in the model) times the per unit import levy (i.e. $3.40 per tonne). To reflect the impact of applying this levy at the border, the beef trade equations in the original model are modified to reflect the import dampening effect of the import levy. (The functions reflecting beef trade between Canada and the U.S. and Canada and the rest-of-world are shifted up by an amount equal to the import levy.) Lastly, note that the additional check-off revenues considered (both from Quebec and PEI and the import levy) in this simulation are allocated to marketing and research activities proportionally to their historic levels.

Table 2.5 summarizes the impact of the participation of Quebec and PEI coupled with application the import levy for the years 2005/2006 through to the end of 2008. The second column of the Table shows the increase in NCO investment in marketing and research activities associated with the five percent increase in NCO revenue arising from participation of Quebec and PEI in the NCO program. The third column shows the value of NCO revenue stemming from the $3.40 per tonne import levy on beef. The fourth column shows the total increase in marketing and research investment arising from the import levy and participation of Quebec and PEI.

An important point stands out; the lion's share of the total increase in investment in marketing and research activities comes from the participation of Quebec and PEI. However, also note that as market access opened in the wake of the BSE crisis, the contribution of the import levy to overall NCO revenue rose in absolute value, but also relative to the incremental check-off funds from Quebec and PEI. This relative contribution of the import levy revenue speaks to the importance of achieving national status for the NCO program and subsequent implementation of the import levy.

Table 2.5. Impact of Quebec & PEI remitting to the NCO program coupled with application of the national levy

	Increase in NCO revenue from Quebec and PEI ('000 of dollars)	Value of import levy revenues ('000 of dollars)	Total increase in NCO investment in marketing and research ('000 of dollars)	Increase in producer benefits ('000 of dollars)	Incremental BCR
FY05/06	$666.20	$175.75	$841.96	$5,219.05	6.20
FY06/07	$708.79	$198.30	$907.09	$7,410.02	8.17
FY07/08	$524.92	$306.74	$831.67	$7,390.74	8.89
FY08/09 to Dec 31 2008	$245.39	$203.18	$448.56	$4,019.15	8.96

The additional investment in marketing and research activities had a positive effect on producer benefits in the simulation model. As shown in the fifth column of Table 2.5, producer benefits increased after Quebec and PEI join the NCO program and the import levy was applied. Moreover, the increase in producer benefits exceed the value of the additional investment, indicating that moving to a truly national levy and applying the import levy creates positive net economic benefits for Canadian cattle producers. To help contextualize this gain, the incremental BCR is calculated for each year in this scenario. The incremental BCR equals the ratio of the change in producer benefits to the value of the incremental investment. This ratio varies from 6.2 in fiscal year 2005/2006 to 8.96 in the first half of fiscal year 2008/2009. On average over this period, the incremental BCR averaged about 8:1. This means **every dollar of incremental investment arising from participation of Quebec and PEI in the NCO program and application of a proportional beef import levy earns back about $8 in producer benefits**.

Lastly, it is important to note that the incremental BCR is less than the historic BCR reported in the Final Report. Such an outcome is expected. Recall that model allows for diminishing marginal returns to investment in marketing and research activities, so investment of additional check-off revenues, over and above the historic level of investment, is expected to yield a lower payoff. Fortunately in this case, the benefits gained by producers still exceeds the value of the incremental investment.

2.4 APPLYING THE EXPORT LEVY TO LIVE CATTLE EXPORTS FROM CANADA

Currently, the national check-off levy is not applied to live cattle exported from Canada. Given the Canadian cattle industry has been positioned as an export oriented industry, and the benefits accruing to cattle exporters through marketing activities in Canada's export markets, some have wondered whether the national check-off levy should apply to live cattle exports. Since the lion's share of live cattle exports are destined for the U.S., this scenario explores the impact of the application of the levy on live cattle exports from Canada to the U.S. Admittedly such an analysis omits potential check-off revenues from the export of live cattle to countries other than the U.S.; however, these non-U.S. bound exports are small in number compared to Canada-U.S. live cattle trade.

It is important to note that the application of the levy to live cattle exports is a kin to the application of an export tax. Economic theory tells us that application of an export tax reduces the incentive to export and that the volume of exports should fall. This means application of the check-off levy to live cattle exports could reduce the volume of live cattle exports. Important in this regard is that a reduction in the volume of live cattle exports would reduce the check-off revenue arising from applying the levy to live cattle exports (compared to a scenario where the volume of live cattle exports are assumed to not be affected the application of the levy). Simply put, the additional check-off revenue arising from application of the levy to live cattle exports may not be as large as one might expect given the historic volume of live cattle exports.

To explore the impact of the application of the levy to live cattle exports, the simulation model is modified to include additional check-off revenues from the application of the NCO levy to live cattle exports. These additional revenues are allocated to marketing and research activities proportionally to their historic levels. Moreover, the value of the additional check-off revenues are fully endogenized in the simulation model. This is done by setting the additional check-off revenues equal to the volume of live cattle exports times the one-dollar per head check-off.[2] Since the application of this check-off to live cattle exports is a disincentive to trade, the Canada-U.S. price transmission equation (see Appendix 1 in the Final Report) is adjusted to put a price wedge (equal to the per pound equivalent of the one-dollar a head NCO levy) between the price of fed-cattle for slaughter in Canada and the price of fed-cattle for slaughter in the U.S.

Table 2.6 provides a summary of the impact of the application of the NCO levy to live cattle exports on producer benefits. Specifically, it shows, for fiscal year 2005/2006 through to the end of the calendar year 2008, the additional check-off revenue associated with application of the NCO levy to live cattle exports, and the increase in producer benefits when these incremental check-off revenues are invested in marketing and research activities. Recall that the incremental funds are allocated to marketing and

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[2] Since the model solves for net exports of live cattle, this simulation assumes that imports of live cattle are exogenous, and so any change in net exports is accounted for solely by changes in live cattle exports.

research activities proportionally to the historic level of check-off fund investment in these activities.

Table 2.6. Impact of the application of the NCO levy to live cattle exports from Canada to the U.S.

	Incremental revenue ('000 of dollars)	Increase in producer check-offbenefits ('000 of dollars)	Incremental BCR
FY05/06	$322.44	$1821.58	5.65
FY06/07	$548.36	$3666.63	6.69
FY07/08	$680.71	$4728.03	6.95
July 1 2008 to Dec 31 2008	$333.75	$2383.68	7.14

Over the period considered, incremental check-off revenue associated with the levy on live cattle exports increased on a fiscal year basis. Such a trend reflects the positive impact of market access efforts, as well as the emergence of the North American cattle sector from the post-BSE period. What is more important, however, is that investment of incremental check-off revenues from application of the levy to live cattle exports resulted in an increase in producer benefits. Indeed, as shown by the incremental BCR (which shows the ratio of the change in producer benefits to the value of the incremental investment) from fiscal year 2005/2006 through to the end of calendar year 2008, **each incremental check-off dollar invested in marketing and research activities earned back at least $5.65 in producer benefits**. Important in this regard is that account has been taken of the disincentive effect on exporting associated with the application of the levy on live cattle exports.

As with the import levy, it is important to note that the incremental BCR is less than the historic BCR reported in the Final Report. Given the assumption of diminishing marginal returns to investment in marketing and research, such an outcome is expected.

2.5 IMPACT OF MERGING BIC AND CBEF

The possible merger of BIC and CBEF can impact the NCO program in two ways. First, the merger might lead to cost savings compared to the status quo (with two separate marketing divisions). If such cost savings were to emerge, they could, in principle, be invested in marketing and/or research activities. Reinvestment of cost savings in marketing and research activities could serve to lessen the impact of under investment in marketing and research activities, to the benefit of producers. However, the possible merger is not expected to lead to substantial cost savings; those familiar with the possible merger estimate these cost savings to be about $177,000 annually. Such a cost saving is small in comparison to BIC and CBEF budgets.

Second, a merger, if it occurs, is anticipated to increase the co-ordination of domestic and international marketing efforts. Enhanced co-ordination is expected to increase the effectiveness of domestic and international marketing activities. While it will be difficult, if not impossible, to gauge the extent to which a merger will increase the effectiveness of domestic and international marketing activities in the future, it is possible simulate the impact of possible increases in marketing effectiveness by increasing the elasticity of demand for beef with respect to marketing activities.

Specifically, the scenarios considered in this section assume an increase in: the elasticity of demand for beef in Canada with respect to marketing activities in Canada; the elasticity of demand for Canadian beef in the U.S. with respect to BIC marketing activities in the U.S.; and the elasticity of demand for

Canadian beef in the rest of the world with respect to CBEF marketing activities. To capture a range of possible increases in effectiveness, these three elasticities are first assumed to increase by 5 percent, then by 10 percent and lastly by 25 percent. Hypothetical increases such as these will shift demand for beef without an increase in investment in marketing and research activities. While there is no basis for choosing these particular increases in effectiveness, they will illustrate the extent to which enhanced effectiveness can increase producer benefits without increase the amount of money invested in marketing and research activities.

Table 2.7 shows the impact of the assumed increases in marketing effectiveness on producer benefits. As one might expect, producer benefits increase when the effectiveness of the marketing investment increases. Moreover, as the size of the assumed increase in effectiveness grows, so to does the impact on producer benefits. While not reported in the table, **note that every one percent increase in the three demand elasticities results in anywhere between a $1.2 million to $1.9 million increase in annual producer benefits** (depending on which year is considered). While not considered in these simulation, it is important to note that if any cost savings arising from the merge are invested in marketing (or research activities), then the impact of these activities on producer benefits will be enhanced, albeit by a small amount given the modest cost savings estimated to arise if a merger were to occur.

Table 2.7. Impact of enhanced effectiveness of marketing and research investment arising from a BIC/CBEF merger

	Increase in producer benefit ('000 of dollars)		
	5 percent increase in marketing effectiveness	10 percent increase in marketing effectiveness	25 percent increase in marketing effectiveness
FY05/06	$6,414.49	$12,829.19	$32,074.68
FY06/07	$9,120.28	$18,241.05	$45,606.10
FY07/08	$9,542.28	$19,085.06	$47,716.37
July 1 2008 to Dec 31 2008	$4,975.63	$9,951.63	$24,881.79

2.6 OPTIMIZING THE CHECK-LEVY

One question to arise is whether the current $1 per head NCO levy is adequate. To investigate this issue, a number of "what-if" scenarios were developed to explore if an increase in the levy would raise producer benefits and if so, whether the increase in benefits exceeds the additional costs borne by producers. Three "what-if" scenarios are developed; first, the currently $1 per head levy is increased to $2 per head. Then an increase in the levy to $3 per head is simulated. Lastly, the levy is increased to $5 per head. The increases in check-off revenues arising from the increase in the levy are then allocated to the respective marketing and research activities proportionally to the historic pattern of investment.

The divisions responsible for undertaking marketing and research activities have been successful in leveraging producer check-off dollars. As such, the "what-if" simulations which consider an increase in the levy take explicit account of the respective division's ability to leverage check-off funds. To do so, the leverage ratios reported in the Final Report are used to calculate the incremental investment available for investment in each activity. In particular, the leverage ratio (the ratio of total investment to check-off dollars) for research was 5.2:1 over the period 2002/2003 through to 2007/2008; this means that each additional check-off dollar allocated to research (arising from an increase in the levy)

results in $5.20 of incremental investment in research.

While the Final Report included a leverage ratio for marketing activities (this ratio was 1.7:1), it did not break this ratio down across domestic (i.e. Canada and the U.S.) and international marketing activities. The leverage ratio for domestic marketing activities over the 2002/2003 to 2007/2008 period was 1.5:1, while that for international marketing activities was 2:1. This means that each additional check-off dollar allocated to domestic marketing activities (as a result of an increase in the levy) results in $1.50 of incremental investment in domestic marketing, while each additional check-off dollar allocated to international marketing activities results in $2 of incremental investment in international marketing.

Table 2.8 summarizes the results from three "what-if" scenarios. The table shows the additional check-off funds contributed by producers, the value of producer check-off funds plus leveraged funds (i.e. the incremental investment), and the change in producer benefits. If the change in producer benefits exceeds the value of additional check-off funds invested by producers, then producers earn positive net economic benefits. The table also shows the ratio of the change in producer benefits to the value of incremental benefits (as before, this is referred to as the incremental BCR).

Regardless of whether the levy is increased to $2, $3 or $5 per head, the change in producer benefits (relative to the baseline) exceeds the value of producers' additional check-off contributions. This tells us that **increases in the levy, coupled with leveraging of these additional check-off dollars, will generate positive benefits for Canadian cattle producers.** In 2007/2008, the last fiscal year for which complete data was available, and after accounting for leveraging of check-off dollars, the incremental BCRs ranged between 7.2:1 (when the levy increases to $5 per head) to 9.3:1 (when the levy increases to $2 per head). It is important to note that the incremental BCR divides the change in producer benefits by the incremental investment (i.e. producer check-off dollar plus leveraged funds).

Moreover, in all scenarios the incremental BCR increases overtime, a result which most likely reflects recovery of the market from BSE and associated border closures.   Compared across scenarios one also sees that the incremental BCR in any particular year falls as the levy increases, again reflecting diminishing marginal returns.

Table 2.8. Impact of simulated increases in the check-off levy and investment in marketing and research activities

	Producer's incremental check-off contribution ('000 dollars)	Incremental investment in marketing and research ('000 dollars)	Change in producer benefits ('000 dollars)	Incremental BCR
Scenario 1: levy increases to $2/head				
FY05/06	$5,503	$9,652	$56,156	5.82
FY06/07	$6,285	$11,154	$93,085	8.35
FY07/08	$6,149	$11,321	$104,952	9.27
July 1 2008 to Dec 31 2008	$2,932	$5,535	$51,750	9.35
Scenario 2: levy increases to $3/head				
FY05/06	$11,006	$19,303	$99,382	5.15
FY06/07	$12,570	$22,308	$165,473	7.42
FY07/08	$12,299	$22,641	$188,912	8.34
July 1 2008 to Dec 31 2008	$5,864	$11,071	$93,818	8.47
Scenario 3: levy increases to $5/head				
FY05/06	$22,012	$38,607	$167,144	4.33
FY06/07	$25,140	$44,616	$281,106	6.30
FY07/08	$24,597	$45,283	$325,761	7.19
July 1 2008 to Dec 31 2008	$11,728	$22,142	$163,164	7.37

3. Leveraging, Effectiveness & BCRs

The role of leveraging and organizational effectiveness cannot be overstated. As noted above, and in the Final Report, BIC, CBEF and BCRC have all used leveraging to their advantage, thus expanding the scale and scope of their respective marketing and research activities.   Research has the highest leverage ratio (5.2:1), followed by international marketing activities (2:1) and then domestic marketing activities (1.5:1).   At the same time, research has the highest average BCR (45:1), followed by international marketing activities (16:1) and domestic marketing activities (3.4:1). Nevertheless, it is very important not to attribute differences in the marketing and research BCRs entirely to differences in the leverage ratios. Indeed, attribution of differences in the BCRs is very complicated, and relates not just to leverage ratios, but also the scale of investment in marketing and research (both check-off funds and leveraged funds), diminishing marginal return to investment and how the respective demand and supply curves respond to investment in marketing and research.

Nevertheless, except for the simulations in section 2.6, the analysis in this report and the Final Report did not take explicit account of the role of leveraging. In fact, leveraged funds here held constant. Had account been taken of the leveraged funds during calculation of the historic BCRs (i.e. average BCRs), the latter would have been higher than reported in the Final Report and above. However, assuming the responsiveness of supply and demand to investment in marketing and research does not change, diminishing marginal returns means any <u>increases in investment in marketing and research beyond their</u>

<u>historic levels</u> (either through more check-off funds or increased leverage) will result in lower BCRs. But that does not mean producer benefits fall; all it means is that the incremental producer benefits arising from incremental investment is smaller than the return to producers from each dollar invested historically.

Recognize, however, that if leveraging increases and at the same time so too does the responsiveness of demand and supply to marketing and research investment (though enhanced organization effectiveness), then not only would producer benefits increase, but so too could the historical (i.e. average) BCRs. Whether the historic BCRs increase compared to those reported in this report and the Final Report will depend on the extent to which demand and supply becomes more responsive to marketing and research investment, and the increase in leverage. While a detailed analysis of the impact of leveraging on the BCRs and producer benefits is outside of the scope of the current study, it will be important to undertake further analysis to measure the extent to changes in the historic BCRs are due to changes in leveraging ability and how much are due to each organization's programming changes.

4. Summary and Conclusions

This supplemental report provides analysis and discussion of a number of "what-if" scenarios related to the National Check-off program. The first set of simulations provide a break down of the historic return to investment in domestic and international marketing activities. Results indicate that on average over the period from fiscal year 2005/2006 to the end of 2008 every check-off dollar invested in domestic (i.e. Canada and the U.S.) marketing activities increased producer benefits by $3.40. Over the same time period, every check-off dollar invested in international marketing activities increased producer benefits by $16. One important conclusion to draw is that investment in both domestic and international marketing activities generates positive economic benefits for producers.

The second set of simulations provided a break down of the marginal benefit-cost ratio associated with a small increase in investment in either domestic or international marketing activities. These simulations provide information to help answer the questions: "Has investment in domestic marketing activities been optimal?" and "Has investment in international marketing activities been optimal?" Results indicate there has been under investment in both domestic and international marketing activities, and that the extent of under investment has been worse for international marketing activities.

The analysis also considers the impact of Quebec and PEI contributing check-off funds to the NCO program coupled with the application of a $3.40 per tonne levy on beef imported into Canada. This scenario mimics what would be expected if the NCO were a truly national program (in that all eligible provinces participate) coupled with application of an import levy on beef. The economic impact of the import levy revenues, coupled with the NCO levy revenues from Quebec and PEI, is positive; every additional dollar invested in marketing and research activities increased Canadian cattle producer benefits by $8.

Simulation results also show that Canadian cattle producer benefits increase when the $1 per head NCO levy is applied to live cattle exported from Canada to the U.S. Over the period fiscal year 2005/2006 to the end of 2008, the return to investment of these additional funds in marketing and research activities ranged from $5.65 to $7 per additional check-off dollar invested.

While a possible merger of BIC and CBEF is expected to result in modest cost savings, the impact of enhanced coordination of effort (arising from a merger) is expected to increase the effectiveness of domestic and international marketing activities. To capture this increase in effectiveness, the simulation model was used to measure the impact of enhanced effectiveness by simulating increases in the elasticity of demand for beef with respect to domestic and international marketing activities. Based on analysis which considered either a 5, 10 or 25 percent increase in the respective marketing activity's elasticity, it was concluded that every one percent increase in the elasticity of demand with respect domestic and international marketing activities increased Canadian cattle producer benefits anywhere between $1.2 and $1.9 million dollars.

Lastly, increases in the check-off levy to $2, $3 and $5 per head were simulated. Important in this respect, is that the additional check-off revenue was used as leverage in accessing additional funds for investment in marketing and research activities. In fiscal year 2007/2008, simulation results show that Canadian cattle producer benefits increase for all levy increases that were considered. Moreover, the increase in producer benefits exceeded the additional check-off levies, indicating positive net economic benefits for Canadian cattle producers. The incremental benefit-cost ratio for the additional investment in marketing and research activities ranged from 9.3:1 when the levy increased to $2 per head to 7.2:1 when the levy increased to $5 per head.