



The Beef Industry's Contribution to the Canadian Economy

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The cattle and beef sector is an important driver of economic activity in Canada. However, that is not always apparent from looking at Farm Cash Receipts (FCR) alone. By only looking at direct sales, as represented by Farm Cash Receipts, the industry's contribution is undervalued as it does not consider the spin-off effects created throughout the supply chain. As such for many years the Canadian cattle industry has been taking FCR for cattle and calves and using a multiplier of 4 to communicate the beef cattle industry's broader contribution to the economy. The multiplier currently used was developed in 1992 and consequently does not take into account the expansion of the cattle feeding industry in Western Canada in the late 1990s and the expanding role of beef exports. Consequently the purpose of the study completed by Dr. Kulshreshtha et al. is to update the overarching multiplier, as well as look at other important multipliers which show how the Canadian cattle industry contributes to the overall economy in Canada.

Background

The researchers developed an input-output model for the Canadian cattle industry, taking into account regional aspects (East, West and Alberta), and four multipliers were calculated for each region and nationally:

- (1) An overarching **production/sales multiplier** that can be applied to a Farm Cash Receipts for beef cattle.
- (2) The overarching sales multiplier accounts for all economic activity at all levels in the supply chain. However, that results in double-counting occurring as one sector's sale is another sectors purchase. Therefore the **GDP multiplier** removes the double-counting to accurately measure industry's contribution to Canada's GDP.
- (3) An **employment multiplier** that moves beyond just accounting for the number of beef cattle farmers as reported by the Agriculture Census and accounts for the number of jobs throughout the supply chain that the beef industry is responsible for.
- (4) An additional multiplier was generated to look at the impact of **labor income**, as income results in spending which spreads into other sectors in the economy and is an important source of activity.

Every industry has both a direct impact on the economy made through sales, as well as secondary impacts which are a sum of indirect impacts and induced impacts. Indirect impacts are generated by the inputs it buys and the business it generates further down the supply chain. Induced impacts are created through spending of income within the region. There are also the jobs it creates in other sectors through the dollars spent by employees and through trade. Overall, there are six types of economic effects:

- (1) *Input Change Effects*, which result from the combination of various inputs used in the production process of a given sector;

- (2) *Labor Income Expenditures Effects*, which result from the re-spending of wages, salaries, and profits from unincorporated business on consumer goods and services;
- (3) *Capital Expenditures Effects*, which are a result of new investments in durable and semi-durable goods required to undertake new production of goods and services;
- (4) *Output Effects*, which result from a change in the demand for various goods and services either within a region or from outside the region;
- (5) *Downstream Effects*, which result from the marketing, transportation and primary processing and secondary processing activities triggered by production of various firms in the region; and
- (6) *Forward Linkages Effects*, which result when a part of the output of a sector is purchased by another sector and additional value-added activities, are generated.

To illustrate the above point, let us take an example of producers using feed grains for livestock production. Assume that these feed grains are supplied from an adjoining crop farm and we can look at the chain of reaction that would take place as a result of this single decision of the livestock producer.

Seeing higher expected demand for feed grains from livestock production, the crop producer would likely add more area to these crops. In addition, the producer may decide to apply some fertilizer to a crop. The fertilizer is locally purchased, thereby putting additional money in the hands of the dealer. The dealer, in turn, must order this from the distributor, which would eventually be met by the manufacturer. During this process, money is generated through transportation of the product (going to various modes of transportation – railways or trucks), to government coffers through payment of taxes at various levels, and of course, in the hands of workers who work for the dealer and the distributor.

New demand at the manufacturer's level has to be met through new production. This may require some expansion in plant capacity through investment in machinery and equipment, or simply expansion of the production level with given capacity of the plant. In either situations, inputs required for production of fertilizer will increase, which would increase demand for mining products (such as natural gas). The mining sector, having received new orders, would gear up to higher production levels and would demand more inputs required for its own production. Workers in the manufacturing and mining concerns would be compensated, thereby generating new incomes in the region. This new income would find its way to new purchases of various consumer goods and services. Each of these actions would add further to the economic growth of the region. Some of the goods and services may be imported from other parts of Canada or the world.

The nature of interdependencies that currently exist between a regional economy and cattle and calves sector can also be illustrated by the 2003 experience with BSE (Bovine Spongiform Encephalopathy) in Canada. This incidence caused the U.S. to close the border to Canadian cattle. This substantially reduced the demand for Canadian cattle, since the U.S. has been a major destination for Canadian feeder and slaughter animals. The lack of buyers affected many stockyards, trucking companies, and brokers. Reduced demand brought about more market pressures on price. A lack of sales of these animals meant that they were kept on farms longer. This led to higher feed demand. Lack of markets, lower prices, and higher feeding costs resulted in lower net income for cattle producers. This decreased family expenditures of these producers, resulting in lower demand for consumer goods. This reduction in cattle sales results in lesser transportation, wholesaling, and retailing activities. Government coffers were also affected since the tax revenue generated is reduced. Overall, various economic sectors in Canada were affected either directly or indirectly.

These two examples briefly illustrate the intricate and far-reaching relationships that exist in the complex economic systems of the beef cattle industry.

The combination of the direct impact (2011 FCR for Canada were \$6.49 billion) along with these ripple effects throughout the economy result in the cattle industry being responsible for \$33 billion worth of sales of goods and services either directly or indirectly (a multiplier of 5.2 up from the previous 4 used historically). These sales contribute \$13 billion to the country's Gross Domestic Product (GDP), which includes \$8 billion through personal incomes¹. Either directly or indirectly through induced income effects, the sector generates 228,811 jobs in the country².

Multipliers

In terms of farm level net activity, the impact of the Canadian beef cattle industry on the national economy is high. If production in the beef cattle sector increases by \$1, output of all goods and services in the economy increase by \$4.2 for an overarching **production/sales multiplier** of 5.22. For every \$1 contributed to the GDP, another \$0.916 dollars are generated by other sectors for a total **GDP multiplier** of 1.916. Similarly every job in the sector yields another 3.56 jobs elsewhere in the economy, resulting in an **employment multiplier** of 4.56 person-years on a full-time equivalent basis. For every \$1 of income received by workers and farm owners, another \$2.08 are created elsewhere – resulting in an **income multiplier** of 3.08. For every million dollars in cattle sales, 26 to 27 workers are employed in the Canadian economy.

Multipliers broken out by sector

All sub-sectors of the industry contribute to the economy and consequently multipliers can be estimated for each sub-sector. At the same time it is important to note that the sum total of all of the individual sub-sector multipliers does not result in the total industry multiplier. Individual sub-sector multipliers will not add up to the total, as it will result in some values being double counted. Consequently when an aggregate multiplier is developed it is typically smaller to remove any double counting. The following contributions estimated are for the 2011 calendar year:

- The *cow/calf* sector, with \$1.68 billion in sales, contributed \$714 million to GDP including \$440 million in wages and supported 14,259 full-time equivalent jobs.
- The *backgrounding* sector, with \$8.2 billion in sales, contributed \$3.0 billion to GDP including \$1.85 billion in wages and supported 68,218 equivalent full-time jobs.
- The *feedlot* sub-sector, with \$9.86 billion in sales, contributed \$4.1 billion to GDP including \$2.69 in labor income and 82,687 full-time jobs.
- The *processing* sub-sector generates another level of economic activity, with an estimated \$31.7 billion in sales of goods and services (direct, indirect and induced), it contributed \$12.4 billion to GDP including \$7.1 billion in wages and the employment of 196,690 workers that are directly or indirectly related to cattle slaughtering and meat processing.

¹ The difference between the \$33 billion in sales and the \$13 billion that goes towards GDP is double-counting. The GDP removes all double-counting when one sector purchases goods from other sectors, whereas sales of goods is a gross measure of economic activity and does include double-counting of goods.

² It should be noted that multipliers are affected by the magnitude of direct impacts (farm cash receipts). For example, when an industry is experiencing negative returns (as occurred over the last decade) they still create jobs and ripple effects throughout the economy. Consequently this contribution is divided by a smaller gross sales and shows up as higher multipliers than if the industry was experiencing positive returns.

Regionally

Cattle production in Western Canada and its subsequent processing activities represent a total of \$24 billion in sales and a net contribution to the regional GDP of \$8.8 billion in 2011. Directly or indirectly employment of over 127,000 workers is related to farm level production and processing.

Cattle production in Eastern Canada along with the substantial processing activities in the region, represented a total of \$8 billion in sales; contributing \$2.6 billion to the regional GDP. Overall, 63,907 workers are associated with the sector (including paid owners of unincorporated businesses). While Western Canada has significantly more beef production, the large population in Eastern Canada supports a substantial processing industry which contributes to the economic activity in the region. In addition, a large dairy industry contributes to the beef production in the area.

Note the regions do not add up to the Canadian total due to inter-regional trade and rounding.

Alberta

In Alberta alone, the cattle sector generated in 2011 a total of \$16.9 billion in sales, contributing \$6 billion to the provincial GDP; including \$3.6 billion in labor income. Through direct, indirect and induced effects, the sector is responsible for generating 62,612 full-time equivalent jobs.

In terms of farm level net activity, the effect on the provincial economy is high. For every dollar contributed by the sector to the GDP, the provincial GDP increases by another \$5.16 for a total multiplier of 6.16. Similarly every job in the sector yields another 2.7 jobs elsewhere in the economy, resulting in an employment multiplier of 3.7 person-years.

All sub-sectors of the industry contribute to the economy. Caution should be used when interpreting the below breakdown by sub-sector. They will not add up to the total as some double counting is removed when aggregating.

- The *cow/calf* sector with \$461 million in sales, contributed \$196 million to GDP including \$124 million in wages and supporting 3,158 full-time equivalent jobs.
- The *backgrounding* sector, with \$4.02 billion in sales, contributed \$1.3 billion to GDP including \$804 million in wages and supporting 16,502 equivalent full-time jobs.
- The *feedlot* sub-sector, with \$3.9 billion in sales, contributed \$1.7 billion to GDP including \$1.17 in labor income and 25,484 full-time jobs.
- The *processing* sub-sector generates another level of economic activity, with an estimated \$11 billion in sales of goods and services, it contributed \$3.7 billion to the provincial GDP and the employment of 31,116 workers in the province. For every job in this sub-sector (approximately 4,489), two to five jobs are created in the economy.