Re-examining the implications of COVID-19 on the Canadian dairy and poultry sectors

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Abstract
The dairy and poultry sectors responded quickly to the initial adjustments in the quantity and nature of food products forced by the shuttering of the hospitality sector and the subsequent switch to buying food from grocery stores. In addition, these sectors were less affected by the labor availability and health issues from COVID-19 (coronavirus disease-2019) that plagued others, such as red meat processors. While the overall impacts were less than most other parts of the agri-food system, some elements of supply managed products, particularly poultry processors, have experienced a reduction in returns and are still adjusting to the new demand and supply situation. The extent of the impact is correlated with the degree to which the supply chain further upstream was connected to the downstream hospitality sector.

Résumé
Les secteurs du lait et de la volaille ont réagi rapidement aux ajustements initiaux en termes de quantité et de la nature des produits alimentaires imposés par la fermeture du secteur de l'hôtellerie et le passage subséquent à l'achat de produits alimentaires en épicérie. En outre, ces secteurs ont été moins touchés par la disponibilité de la main-d'œuvre et les problèmes de santé liés à la COVID-19 comparativement à d’autres, comme les transformateurs de viande rouge. Bien que les impacts globaux aient été inférieurs à ceux de la plupart des autres éléments du système agroalimentaire, certains secteurs sous gestion de l’offre, en particulier les transformateurs de volaille, ont connu une réduction des rendements et s’adaptent toujours à la nouvelle situation de l’offre et de la demande. L’ampleur de l’impact est corréllée avec le niveau de dépendance entre la chaîne d’approvisionnement plus en amont et l’industrie hôtelière en aval.

1 | INTRODUCTION

A special issue of the Canadian Journal of Agricultural Economics (CJAE) in 2020 was initiated to explain the observed and potential impacts of coronavirus disease-2019 (COVID-19) on the whole agri-food supply chain in Canada (Ker and Cardwell 2020). Those impacts stemmed largely from the significant curtailment of hospitality services imposed by government restrictions and from the availability and health of labor, particularly for temporary foreign workers employed...
by the fruit and vegetable sector and for employees of large, meat packing facilities. The structure of the agri-food sector has evolved to provide food in the form desired by end users at the least cost, but the focus on efficiency has left the system with little reserve capacity. Thus, the shift in the form and nature of food demanded compounded by the temporary closure of processing facilities caused short-term disruptions as highlighted by events such as the dumping of milk (Weersink et al., 2020). But the specialization and efficiency focus of the food supply chains associated with the initial disruptions may have also been responsible for its rapid rebound (Weersink et al., 2021).

This paper looks back at the impacts of the pandemic on the Canadian dairy and poultry sectors and assesses the longer-term implications for these sectors. The initial impacts on these two sectors were less than others due to the stability and coordination provided by the supply management marketing systems (Weersink et al., 2020). As with most commodities, dairy and poultry quickly rebounded to market conditions typically observed prior to the COVID-19 pandemic. The paper discusses the transitions that have occurred along the channels for dairy and poultry. In addition, it compares the impacts to these sectors in the United States to assess differences in adjusting to COVID-19 with and without supply management.

2 | COVID IMPACTS IN 2020

2.1 | Retail level

The shuttering of the hospitality sector in March 2021 across the country resulted in a sharp decline in total household expenditures on food and beverage services between April and June of 2020 (Figure 1). During this period, Canadian consumers spent 50% less on food away from the home compared to expenditures in the same quarter of 2019 (Statistics Canada., 2020a). Total expenditures on food and beverage services rebounded during the third quarter of 2020 with an easing of restrictions. However, when stricter COVID-19 protocols were put in place during the late fall and the outdoor dining season ended, food and beverage service expenditures declined again in the fourth quarter of 2020.

The decline in foodservice expenditure affected demand for food at the retail level. As discussed in the 2020 special issue of the CJAE, there were short-term shortages of several products in the immediate aftermath of the initial lockdown in March 2020 due to a combination of disruptions in the supply chain, demand shifts among food items (i.e., more butter for baking), and hoarding behavior. These periods of shortages were quickly resolved but there have been shifts in consumption patterns for dairy and poultry products that have required adjustments for the associated supply chains.
The increase in retail sales for dairy and eggs at the onset of the pandemic is illustrated in Figure 2. Total retail sales for eggs and dairy products in Canada for March, April, and May of 2020 were 16%, 20%, and 16% greater than total sales in the corresponding months of 2019 (Statistics Canada, 2020e). Total sales began to slightly decline during the summer months, however sales increased through the rest of 2020 with a resurgence of demand for baking ingredients, following seasonal trends. There has been a strong upward trend in grocery sales of dairy and egg products over the past 5 years, so a portion of this increase is likely attributable to the ongoing upward trend. Another trend over time is an increase in sales of baking ingredients for Christmas baking, such as butter, milk, and eggs which tends to decline after the holidays. This pattern continued through the pandemic; thus, it is likely that part of the decline in sales in early 2020 was caused by additional lockdowns but also in part by the seasonal decrease in demand for these products.

Retail prices were somewhat higher in 2020 than they were in previous years for dairy and poultry products. Average retail prices for a dozen eggs and 4 liters of skim milk were 11% and 2% greater, respectively, in 2020 compared to 2019 (Statistics Canada, 2020d). These increases could be, in part, due to increased costs in the grocery sector (wage increases and COVID PPE protocols), but may also reflect higher demand and temporary reductions in availability as the supply chain pivoted toward retail.

Similar to the situation observed with dairy and eggs, the closure of foodservice outlets shifted the demand for meat to retail stores. As shown in Figure 3, retail sales of fresh meat and poultry in Canada increased significantly from the outset of the pandemic in March of 2020. Total monthly sales in March, April, and May of 2020 were 22%, 23%, and 14% greater than the total sales in the same months of 2019, respectively (Statistics Canada, 2020e). Effectively, foodservice closures severely impacted chicken demand. Although retail sales increased, it was not enough to compensate for the reduction in demand from the closure of the food service part of the supply chain and consequently wholesale chicken prices fell. In contrast to sales, retail chicken prices in Canada declined throughout the spring of 2020 and into the summer, reaching an average price of $6.87/kg in June, a 5 year low (Statistics Canada, 2020d). While prices for some cuts of beef increased due to processing plant closures, the sharp increase in total fresh meat sales combined with the decrease in retail level chicken prices suggests that there was an increase in the volume of chicken consumption at the retail level. This increase only partially offset the loss in demand at the foodservice level. In addition to the closure of food service outlets, stockpiling behavior may be partly responsible for the initial increase in retail sales of fresh meat and poultry. Given the perishable nature of these products they would have to be frozen and demand may temporarily decrease slightly if consumers decide to decrease these inventories.

2.2 Processor level

Dairy and poultry processors have weathered the direct effects of the pandemic on worker availability relatively well. While there were some outbreaks in processing plants, the problems were less significant than those experienced by
the red meat processing sectors (McEwan et al., 2021; Rude, 2021). The lack of significant outbreaks reported by dairy processors in Canada is likely due to greater automation and lower worker densities in these plants. Some processors have reported challenges with increased absenteeism due to concerns about infection, but this is not universal as others have not noticed any change. There were increased costs due to the pandemic with process changes happening in plants and the provision of PPE to staff. Based on a survey conducted by the Canadian Poultry and Egg Processor Council (CPEPC), additional labor costs and reduced capacity resulted in $21.5 million in additional labor costs, as well as $2.2 million in PPE expenses, $7.7 million to ensure physical distancing (barriers etc.), and $5.5 million in additional sanitation measures (CPEPC, 2020).

In addition to increased production costs, processors in both dairy, poultry and egg sectors dealt with changing demand from changes in sales channels. Despite this, overall financial performance of dairy processors was strong as illustrated in Figure 4, which shows total monthly sales for processors and highlights the spike in sales during March when some hoarding behavior took place. Due to pandemic demand trends discussed above, processors were able to sell higher margin dairy products such as butter and liquid milk, thus increasing their profitability. Raw milk prices are based partially on end usage, meaning that if the milk is sold to make high valued products, then processors pay a higher price for that milk which gets passed on to producers. The increase in butter and liquid milk sales increased the prices producers received for their raw milk as those products have higher margins than products such as animal feed or skim milk powder.

The same increased sales of high-value products were not experienced by poultry and egg processors, therefore, the pandemic affected them more severely than their dairy counterparts. The demand shift from foodservice to retail reduced margins for poultry processors as the items sold in the hospitality sector tend to require further processing and have higher margins. In addition, these higher margin products cannot easily be moved from foodservice to retail. For example, partially fried breaded poultry products (e.g., chicken nuggets) that are sold to foodservice companies (e.g., quick serve restaurants) cannot be easily directed to retail, as regulations require that they be fully cooked. CPEPC estimated the cost of lost sales from closure of food service to be $19.8 million (CPEPC, 2020).

The supply managed poultry and egg sectors require processors to hold quotas for the amount of product they have committed to purchase and process, thereby ensuring adequate supply to match processing capacity. Farm prices for these products are set, so processors cannot discourage production through price changes although the prices received from the wholesale market vary with market conditions. The declines in wholesale demand pushed output prices lower for poultry processors but farm prices (or their input prices) remained constant thereby squeezing processor margins.

The EMI Composite Index, from Express Markets Inc., is a measure of a specific subset of chicken products representing a measure of processing margins for poultry and egg processors. The Index dropped 23% from the beginning of March 2020 to the end of April 2020 and despite general easing of lockdown restrictions, in early 2021 the Index remains at its lowest levels in the last 5 years (CPEPC, 2020). In the fall of 2020, chicken production returned to pre-pandemic levels
(up 2% from the same time in 2019) but wholesale prices remained low, exacerbating the squeeze discussed earlier (Agriculture & Agri-Food Canada, 2020b). In addition, increasing restrictions associated with the second wave of the pandemic late in 2020 resulted in large surpluses of chicken in Eastern Canada and processors selling product (whole birds) in some cases at prices in the spring that were less than the live price paid to farmers. Production plans have since subsequently scaled back for early 2021.

2.3 Farm level

The dumping of milk and disposal of eggs that occurred during the initial lockdown period in 2020 was one of the high-profile events that gave rise to concerns surrounding the resiliency of the agri-food supply chain. The sudden and dramatic shift in consumption from the hospitality to the food retail sector required processors and distributors to adjust the volume and nature of their product lines, as discussed above. Given the time required to make these adjustments and that milk is perishable so it cannot be stored while changes are made, some products were disposed of, including the dumping of milk (Weersink et al., 2020).

The changes in milk demand resulting from COVID-19 pushed milk production lower in April and May 2020. While production was higher than previous years in the first 3 months of 2020, Canadian milk output fell from over 800,000 kiloliters in March to less than 750,000 kiloliters in April- a level consistent with the 5-year average (see Figure 5). Since that time, monthly milk production in 2020 has increased and was approximately 4% higher than the 5-year average for the last half of 2020 (Statistics Canada, 2020c).

The higher demand for raw milk from higher retail butter demand was encouraged through incentive days rather than additional quota allotments. Since dairy quota is represented as kilograms of butterfat per day, incentive days allow producers to produce an additional day amount of production without having to own additional quota, providing an opportunity to sell more milk than one’s quota allows. This provides increased income for producers who are over producing, but does not penalize farmers who are not. Given concerns about the volatility of demand under COVID-19, incentive days offer increased flexibility to meet demand without affecting the balance sheets of farmers by issuing or taking away quota. The Dairy Farmers of Ontario issued three incentive days in September, October, and November 2020 and 4 days for those months in 2021 with only marginal changes in quota allotments (Dairy Farmers of Ontario, 2020).

The farm price for milk in Canada is based on a cost-of-production (COP) formula with adjustments for the demand of different dairy product categories based on end usage, as well as inflation. Typically, the Canadian Dairy Commission
(CDC) conducts a COP study to determine how much to raise support prices to reflect changes in COP. In response to the pandemic, the Canadian Dairy Commission (CDC) decided not to use the usual pricing formula citing “various factors such as the COVID-19 pandemic.” Instead, the CDC, “held consultations and rendered a decision” which resulted in increasing the support price of butter from $8.5524 to $8.7149 per kg on February 1, 2021. The corresponding adjustment resulted in an increase of $1.46/hl in February 2020 to offset producer losses due to the pandemic and associated market trends (CDC, 2020). Estimating the cost of production (COP) that determines farm price is more difficult in volatile situations such as the pandemic as evidenced by the CDC’s decision to employ consultation rather than the usual COP survey. This approach to determining the farm price highlights a major difference in the supply management sectors from the other livestock sectors in which prices responded to market pressures from COVID-19 imposed adjustments, as discussed in detail in other articles of this special issue (McEwan et al., 2021; Rude, 2021).

As with milk, overall chicken production in Canada for the first 3 months of 2020 was above that in 2019 (and the 5-year average), but it then fell sharply in April due to COVID-19 restrictions imposed further down the value chain (see Figure 6). National chicken production has been around 60 million per month since that time with a reduction during the summer months and levels slightly above 60 million and approaching the 5-year average for the fall months (Agriculture & Agri-Food Canada, 2020b). Compared to 2019, national chicken production in 2020 was 6% lower for May and June, 10% lower in July and August, and 2% lower for the remaining months (Agriculture & Agri-Food Canada, 2020b). In the period shortly after the start of the pandemic, allotments were cut, meaning fewer birds were being placed to be raised for meat. However, during summer and into fall 2020, optimism about the pace of reopening prompted allotments to increase (up 1.0% from base allocation levels) (CFO, 2020a). This optimism was hampered by the second wave in late 2020 and the subsequent lockdown reiterated the need to cut production, resulting in a 2.5% allocation cut (CFO, 2020b).

The arrival of a second-wave of COVID-19 and the associated renewed lockdowns resulted in an 8% reduction in production for January 2021 compared to a year earlier (CFO, 2021). Volatility in the sector remains, and the pace of reopening has driven boards to take ‘balanced’ approaches to decisions on allocation, weighing the risk of future demand for the duration of the pandemic with the need to ensure adequate domestic supply without the flexibility of policy tools like incentive days in dairy, as discussed above. Since price signals are not relayed along the supply chain given the use of administered prices, chick placement from hatcheries sent up the supply chain to processors did not necessarily reflect necessary production cuts, resulting in more chicks being born than can be processed at a profit once grown. To remedy this, processors have been encouraged to work closely with farmers to achieve target production by being flexible on processing dates to allow marketing of lighter birds (Deen, 2021).

Canadian egg production started 2020 at levels similar to previous years and rose by 7% in February compared to 2019 (see Figure 7). However, it fell back to the 5-year average in March and then declined sharply in April, a 42% drop compared to...
FIGURE 6  Total number of chickens produced by month in Canada Source: (Agriculture & Agri-Food Canada, 2020b)

FIGURE 7  Total number of eggs produced by month in Canada (‘000 boxes of 15 dozen) Source: (Agriculture & Agri-Food Canada, 2020c)

to April 2019 (Agriculture & Agri-Food Canada, 2020c). Production then rose over the next 2 months to levels close to the 5-year average but have since fallen and was approximately 25% lower in the last 5 months of 2020 than over the same period in 2019 (Agriculture & Agri-Food Canada, 2020c). Although not illustrated in Figure 7, the fall in egg production continues as the monthly total for January 2021 was 29% lower than a year earlier (Agriculture & Agri-Food Canada, 2020c). Thus, compared to dairy and chicken production, egg numbers have dropped significantly since the pandemic began, as eggs are more reliant on foodservice for consumption.

3  COMPARISON TO U.S. DAIRY AND POULTRY SECTORS

COVID’s timeline and the policy responses over the last year in Canada and the United States are similar. The hospitality sector was shuttered for extended periods resulting in comparable changes in the volume and form of dairy and poultry
products demanded by consumers. While the changes downstream in the supply chain are similar between the two countries, there are differences in the impacts on farms and processors due to the supply-managed marketing system for dairy and poultry in Canada.

The single-desk selling of milk in Canada results in a farm price that is moving slowly upward over time with little variation. In contrast, farm prices for milk in the United States are determined largely by market forces and tend to cycle in 3 year periods (Nicholson & Stephenson, 2015). U.S. farm milk prices had started to rebound from one of these cycles beginning the last half of 2019 and into 2020. The supply of milk increased with the increase in the farm milk price. The demand changes resulting from COVID caused prices and production to fall dramatically in April and May of 2020 before rebounding to rates of increases seen earlier in the year (Weersink et al., 2020).

Milk dumping occurred in both countries during the initial disruptions caused by COVID-19 but significantly less than feared and was restricted to early April. The extent of dumping was less in the Canadian system as the single desk selling allowed production to be readily diverted across users within the province and transportation coordinated from the farm to these processors (Saba, 2020). The majority of milk in the U.S. is sold through marketing cooperatives and dumping is more likely to occur depending on the degree of specialization in production for the hospitality sector and the location. The U.S. Northeast has been most vulnerable to dumping in the past as a means to deal with market losses, and its dumping spiked to 6% of total milk production in April but returned to normal levels in May (Weersink et al., 2020). Dumping was lower than expected as many of the cooperatives processed milk targeted for fluid use into storable commodities rather than dumping it. Similarly, the CDC extended its purchase of excess butter and cheese (AAFC, 2020a).

As mentioned earlier, the matching of supply to the changing demand resulting from COVID-19 occurred in Canada through adjustments in quota allotments at the farm level. Over-quota shipments were penalized in some provinces from April to June to reduce excess supply and incentive days were used to in the fall to increase milk supply in the short term. In the U.S., many dairy cooperatives moved to a two-tier pricing system as a means of discouraging production. The first tier ties a market price to a base production level and the second tier reduces the price if production is in excess or shares market losses on a pro rata basis. The two-tier, cooperative pricing system originated in COVID-19 but is likely to continue in the future if milk production needs to be constrained again.

The changes in poultry demand stemming from the shift in consumption from hospitality to retail required a reduction in poultry planned for production. Consequently, the number of broiler chicks hatched dropped in April and May in both countries (USDA, NASS, 2020). While hatching levels came back to 2019 levels in the summer of 2020 in the United States, production numbers were still down in Canada.

Poultry production in the U.S. is fully integrated with integrators owning the birds and providing inputs such as feed while farmers are paid a fee for the provision of management and facilities. The integrators tend to be input suppliers, such as feed mills, and not agents from further downstream the supply chain. The integration means that broiler farmers in the U.S., as well as those in Canada under supply management, do not face the same market price risks faced by farmers of other commodities. Poultry farmers in both countries still face production risk that influences revenue and U.S. farmers face additional contract risk from changes in the terms of arrangement with an integrator including dissolution of the contract itself.

Poultry processors in both countries were shutdown temporarily due to COVID-19 outbreaks with workers in the facilities. The impacts tended to be worse in the United States. As discussed above, the outbreaks decreased production capacity and increased costs due to enhanced safety protocols. The bottleneck in the supply chain created by the outbreaks at the processing level created disruptions downstream particularly for the integrated system in the U.S. Downstream retail poultry prices increased with the temporary shortages, and farm returns fell. In contrast to Canada where much of the costs of the disruptions stemming from COVID-19 were borne by the processing sector, these costs were felt further upstream in the U.S. poultry supply chain. The extent of the farm-level impacts in the U.S. depended on the extent to which the sales channel of the farmer’s integrator was focused on the hospitality sector. In contrast, the single desk selling agency and the pooling of returns (and losses) mitigates this risk to producers.

4 CONCLUSIONS

The dairy and poultry sectors responded quickly to the initial adjustments in the quantity and nature of food products forced by the shutting of the hospitality sector and the subsequent switch to buying food from grocery stores. In addition, these sectors were less affected by the labor availability and health issues from COVID-19 that plagued others, such as red meat processors. While the overall impacts were less than most other parts of the agri-food system, some elements of
supply managed products, particularly poultry processors, have experienced a reduction in returns and are still adjusting to the new demand and supply situation. The extent of the impact is correlated with the degree to which the supply chain further upstream was connected to the downstream hospitality sector.

Rather than the minor adjustments and volatility related to COVID-19, the more significant longer-term impacts on these sectors moving forward are likely associated with trade agreements and consumer concerns about production processes. The Canada-United States-Mexico Agreement (CUSMA), the Comprehensive and Progressive Transpacific Partnership (CPTPP), and the Canada-EU Comprehensive and Economic Trade Agreement (CETA) implemented in 2020, 2018, and 2017, respectively, allow for greater imports of dairy and poultry products into Canada. The “Buttergate” affair in the winter of 2021 stemming from concerns about the spreadability of butter and linkage to the use of palm products to dairy cows highlighted the growing interest by consumers in how their food is grown and the increasing role of social media in determining consumption choices.

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