

## Economic Thoughts on the Potential Implications of COVID-19 on the Canadian Dairy and Poultry Sectors

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### ABSTRACT

The dumping of milk, the offering of hospitality size goods in grocery stores, and the closure of processing facilities are examples of the disruptions caused by the pandemic to the dairy, poultry, and egg sectors. These supply management sectors, however, are more resilient to the impacts of COVID-19 than other sectors as producers are generally more financially stable, losses are pooled, and production/marketing efforts are coordinated.

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## Résumé

Le déversement de lait, l'offre de produits grand format dans les épiceries et la fermeture des installations de transformation sont des exemples des perturbations causées par la pandémie dans les secteurs des produits laitiers, de la volaille et des œufs. Ces secteurs sous gestion de l'offre, cependant, résistent mieux aux impacts du COVID-19 que d'autres secteurs, car les producteurs sont généralement plus stables financièrement, les pertes sont partagées sur l'ensemble et les efforts de production / commercialisation sont coordonnés.

## INTRODUCTION

COVID-19 has shaken the world. The death toll continues to increase, as does the unemployment level as non-essential businesses are forced to shut down in an effort to slow the transmission of the disease. Excluded from the mandatory closures are those industries involved in the production and distribution of food, including dairy and poultry. While the food supply chains continue to operate, the shocks imposed on the economy by the pandemic have impacted all components of the agri-food sector.

In this paper, we discuss the repercussions of COVID-19 on the supply chain for dairy and poultry in Canada. Although there are significant short-term disruptions as highlighted by the dumping of milk and the temporary closure of poultry processing facilities, the focus on a domestic market by these sectors along with the stability and coordination of its supply management marketing systems has mitigated, to an extent, the economic implications of COVID-19. The discussion highlights the importance of distinguishing between the farm output (i.e., milk, chicken, and eggs) and the products stemming from that output, the difference in the demand for those products for home consumption versus dining out, and the difference in the distribution systems for grocery retailers and the hospitality industry.

## FOOD DISTRIBUTION CHAINS AND COVID-19 SHOCKS

Governments in Canada have imposed strict measures to reduce the spread of COVID-19. Movement has been severely curtailed as the population has been told to stay home except for trips to grocery stores or pharmacies, which are the only retail outlets operating at close to normal. The restrictions have significantly limited the ability to purchase food away from home, and, even if the hospitality sector was open for business, the economic fallout from the pandemic has lowered the discretionary spending of many Canadians. The consumption patterns for dairy and poultry products have been altered as a result, with implications for the whole value chain. These impacts are discussed below, along with the adjustments required for each part of the distribution system to deal with COVID-19 directly or indirectly through actions to lower its transmission rate.

### *Retail*

The first change stemming from COVID-19 is the reduction in the demand by the hospitality sector and a corresponding increase at the food retail sector. Canning et al. (2016) and Kelly et al. (2015) calculated the overall farmer share of the food dollar spent at home versus away from home for Canada (17%) and the United States (14%). The farm share of expenditures on food for home consumption is approximately 22% across both countries, but it is 4% in the United States and 7% in Canada for meals consumed away from home. Using these values, it is estimated that Canadians spend approximately one-third of their food budget at restaurants and bars, Americans spend approximately 40%. The percentage is higher if beverages are included in the calculations.

The one-third reduction in total consumer food dollar from food services would be expected to shift to food retail. The extent of the change in sales in grocery stores for the

week ending March 14th in 2020 compared to 2019 is illustrated in Figure 1. Overall sales were 46% higher in grocery stores - significantly higher than the 33% suggested if expenditures were simply shifted from hospitality to grocery. As discussed *elsewhere in this issue*, panic and hoarding behaviour without limits on number of items purchased led to sales 16% higher than that for the typical busiest week of the year in early December (Statistics Canada, 2020). Recent reports suggest that the extent of the increase in sales at grocery stores has fallen after consumers loaded up in mid-March, but the volume is still higher than previous years.

The resulting higher demand at grocery stores requires greater staff to meet the higher total volume and the higher percentage of online sales with pickup as consumers want to avoid physically entering the store. Food retail stores have also limited shopping hours to allow more time to restock shelves and deal with the increase in nightly shipments to deal with the larger volume.

Milk sales in grocery stores increased by 31% from the same week a year earlier, while butter increased by 76%, reflecting an increase in baking at home and hoarding of more storable products. It is expected that fluid milk sales will continue at this rate as the higher milk consumption by individuals at home offsets a decline in food service demand (i.e., school lunch programs). In general, the use of creams and cheeses by the hospitality sector is greater than the corresponding at-home demand, so the initial 44% increase in sales of cheese in the middle of March 2020 compared to 2019 is not expected to continue.

The volume of fresh chicken sold in grocery stores increased by 50% in mid-March 2020 compared to the same week a year earlier (Statistics Canada, 2020). Weekly retail chicken sales figures through Nielsens from the Chicken Farmers of Canada (CFC) are lower than those reported by Statistics Canada, but the CFC has more recent data. Of particular note

is the further increase in chicken sales at grocery stores for the week ending March 21 but then a reduction the following week. Discussions with industry personnel suggest that, eventually, total chicken sales will fall compared to pre-COVID-19 as the increase in sales at grocery stores will not offset the loss from food services.

In addition to a change in the volume of chicken sold, there has been a change in the demand for chicken products associated with the shift away from hospitality services to grocery stores. Prices for various chicken parts in the northeast United States over the last 4 months are illustrated in Figure 2, with the black vertical line indicating the date when New York declared a state of emergency (March 12<sup>th</sup>). The relative price movements of alternative chicken parts for the northeast US are consistent with changes noted through discussions with industry personnel in Canada. Wing consumption primarily occurs outside the home, and the sharp drop in wholesale wing prices corresponds to the reduction in food service demand. The price for chicken breasts has also fallen due to lower relative use of chicken at home versus dining out and the smaller desired size of chicken breasts at the grocery store versus restaurants. Chickens (and parts) sold to the retail chain are generally smaller than those sold into food service.

The consumption pattern for eggs has also changed as a result of the spread of COVID-19. Pre-crisis, 70% of egg consumption was in shelled eggs and the remainder was through breaker eggs, which are eggs in liquid form (not in shell) used in baking, food manufacturing, and the hospitality sector. Liquid eggs are usually broken from shells that are still intact but that have a visible flaw. In times of normal demand, unflawed eggs are sometimes also broken to serve this market. If breaker demand decreases below a threshold, there will be blemished eggs for which there is no demand.

Given the closure of most hotels, restaurants, and convention centres, breaker egg demand fell between 40% to 60% in the 3 weeks leading up to April 7<sup>th</sup> (Bill Mitchell, personal discussions, April 2020). This loss of demand has not been compensated by increases in demand from the shell market, which increased by 67% in grocery stores for the week ending March 14<sup>th</sup> compared to the previous year (Statistics Canada, 2020). While prices for chicken parts have fallen (Figure 2), the wholesale prices for eggs in the US have tripled from mid-March to early-April (Urner-Barry, 2020). Lusk (2020) offers several potential reasons for the price increase, ranging from hoarding behaviour, the approaching of Easter, the difficulty of switching the distribution chain from hospitality to grocery, and industry concentration. Grocery store shelves should replenish as limits are imposed on the number of eggs that can be purchased and supply chains adjust, with part of the adjustment involving the size of the egg cartons offered for sale.

### *Distribution*

The shift from food service to food retail and its impact on the type and amount of product required alters the whole supply chain, which cannot adjust instantaneously as the system tends to be operating near capacity with minimal inventory carryover. It also requires an adaptation or re-allocation in the food distribution system that tends to focus on either food retail or food service sectors. The major grocery chains rely on their own distribution systems. Processors, including dairy and poultry, tend to ship their products in bulk to distribution centres for the chain, and the needs of individual stores within that chain are gathered and shipped from these warehouses.

In contrast, the distribution system for the hospitality sector is not vertically integrated, and the companies that focus on away-from-home outlets are distinct from the

system serving grocery stores. The two large players in food service distribution, Sysco and Gordon Food Services controls more than two thirds of the market share, with the remainder covered by regional companies. The shut-down of restaurants and conference centres has forced these companies to shift focus. However, it takes time to establish new relationships with agents at the food retail level and to change their operations to meet requirements of new customers at a different part of the value chain (Blaze Baum et al., 2020). It is not expected that these distributors will make significant inroads into the retail market as the established and vertically integrated distribution for food retail adjusts.

### *Processor*

The impact of the changing volume and mix of their offering by individual processors will differ depending upon their portfolio of customers. Even when product changes are not required, alterations to packaging may be necessary. For example, a dairy processing plant sells cream to coffee shops in large bags that fit in dispensers, while sales to grocery stores are for households wanting small amounts in a carton that fits in a fridge. In some cases, both processors and retailers are adjusting in the short run. Sobeys is now selling flats of 30 eggs in addition to the typical dozen eggs offered in their stores. The flats from Burnbrae Farms, which is an egg producer and processor supplying to both food service and grocery stores, were originally intended for the hospitality sector (Blaze Baum et al., 2020). Another example are the boxes of 40 frozen chicken breasts now offered for sale in grocery stores that were originally slated for the food service sector. Chicken processing companies, according to industry personnel, are also simplifying their product offerings to increase operating capacity as they adjust to the higher volume from grocery stores.

In addition to the impacts of COVID-19 brought about by the changes in consumer demand discussed above, the processing sector is particularly vulnerable to disruptions caused directly by the virus. The processing sector has significantly less opportunity to physically distance its employees than other parts of the value chain. In addition, there is a relatively high degree of concentration, which means that product flows through a smaller number of players on the way to the consumer. If one of those processing plants were to close or be restricted, then there could be a disruption, with the extent of the impact being largest on perishable goods such as milk and smaller on chicken, which can be frozen and stored. The degree to which the flow would be altered by the closure of a processing plant also depends on the ease of finding other processors, which is influenced by the degree of specialization and concentration.

It is not expected that COVID-19 would cause long-term plant closures given businesses in food production are designated as essential. Sanderson Farms, which is located in Mississippi, was the first dairy or poultry processing company to experience a case of COVID-19. Management sent the employee home, along with others working in close proximity, but the plant remained open. More recently, an employee at a Tyson poultry processing plant in Georgia died from the virus, highlighting the difficulty of containing its spread in a meat processing plant (Jordan & Dickerson, 2020). The first Canadian poultry or dairy processing facility to be affected by staff contracting COVID-19 was a Maple Leaf plant in Brampton. Maple Leaf suspended operations on April 8<sup>th</sup> and will not open until an investigation and deep cleaning of the plant is completed (Maple Leaf, 2020). If the number of closures remains small, it is expected that animals or inputs can be rerouted to other facilities, which increases costs but maintains output. Further closures of other, larger



processing facilities could significantly disrupt the food distribution chains, leaving producers and their marketing boards searching for other outlets for their commodities.

It is more likely that there could be capacity constraints as plants adapt to provide protection and physical distancing between workers. There have been some reports of this in the dairy industry in Ireland, for example. Another issue could be employees refusing to come in to work because of the risk. Food processors often struggle to find sufficient labour under normal circumstances, and it would be difficult to replace skilled workers even in a period of high unemployment with COVID-19-related layoffs. As individual plants have different portfolios of products, individual plant closures or slowdowns could have an impact on the availability of specific dairy or poultry products.

### *Farm*

Dairy and poultry farms are operating as they were several months ago, aside from the social distancing occurring between visitors to the farm and the farm workforce. Input deliveries and output pickups can be done without direct contact among those involved. As discussed in Brewin (2020), the seeds, fertilizers, fuel, and pesticides are all in place for planting this spring. Similarly, the supply of feed and other inputs for livestock production have not been affected in the short run.

The most direct impact from COVID-19 on livestock feed thus far has not been on the supply of feed in aggregate but rather on the availability and, subsequently, the cost of certain ingredients, such as dried distillers grain (DDGs). The nearby futures price of crude oil fell from above \$60 (USD) per barrel at the beginning of the year to just above \$20 (USD) per barrel on March 23<sup>rd</sup>. Oil and ethanol prices are correlated, and the low returns have reduced

production of ethanol at plants continuing to operate and led to the closure of others. On March 27<sup>th</sup>, ethanol production plummeted to its lowest levels since June 2010. The fall in ethanol output means a corresponding fall in the supply of its by-products such as DDGs. The subsequent increase in DDG price alters the least-cost ration and feed costs for livestock farmers (Skinner et al., 2012). Prices for another common feed ingredient, wheat shorts, have also increased due to an increase in demand for flour with more in-home baking.

While production systems have not been altered in the short term by the pandemic, the level of output has been affected for both dairy and poultry. In the middle of March, it appeared that quota-free days (producers are allowed to ship milk in excess of their quota without penalty) might become available to dairy producers in some parts of the country as a means to create incentives to meet reduced overall supply of milk combined with a run on dairy products resulting from panic buying in the immediate onset of COVID-19. A few weeks later, dairy farmers were forced to dispose of certain milk shipments (DFO, 2020). We may see a return to quota-free days depending on total demand once the adaptation has taken place. Similarly, chicken farmers are being forced to shorten the production cycle with their current allotment of birds and will likely face smaller production quota levels along with raising smaller birds in the future (CFO, 2020).

The unfortunate situation of dumping raw milk is occurring as the supply chain adjusts to disruptions caused by COVID-19. Some dairy processors require less milk because hospitality customers are demanding less volume of specific goods (i.e., cream) and milk needs to be redirected to products and processors for whom demand is higher. In some cases, the same product is required but the packaging is different (single-serving wraps of butter or large tubs for hospitality to 454g of butter for grocery stores). This production shift takes planning and time. There will also be logistical issues in redirecting supply to different

processors. The process of cutting production for food service is quicker than that of ramping up production for retail.

While dairy processors can typically adapt to small increases or decreases, the enhanced demand on retail lines combined with the shutting down of food service lines takes time. During the adjustment, cows continue to be milked and milk is stored by farmers in tanks large enough to hold a maximum of 72 hours of production. The raw, unpasteurized milk is brought by transporters to processors, who now do not have sufficient storage to keep excess milk as they shift their operational focus. Typically, fluid milk goes from a farm bulk tank to a retail fridge in a matter of days, but there is no buffer capacity to hold milk that is not immediately processed. Since milk is produced on the farm daily, milk needs to be dumped to make room for new production.

The phenomenon of dumping milk is not unique to Canada as up to 7% of all milk produced in the United States was dumped in first week of April (Jordan & Dickerson, 2020). The problem will be particularly acute in markets like Wisconsin with a high proportion of processors focused on products (i.e., cheese) particularly affected by the reduction in demand by the hospitality sector. If the need for milk by these processors is lowered and fluid milk processing happens in other states, those dairy farmers will struggle to quickly find alternative markets. Milk dumping is likely to continue, and dairy farm returns will subsequently fall. In contrast, the Canadian single-desk selling system for dairy, poultry, and egg farmers works in conjunction with processors to coordinate production and marketing, as evident by the joint statement on the milk supply situation issued by the Dairy Farmers of Canada and Dairy Processors of Canada (DPAC, 2020). The Canadian system, with central selling and transportation coordination, as well as more localized provincial production, may facilitate quicker adaptation and reallocation than in the US.

Producers in supply managed industries are paid based on a cost of production formula and, as such, are less susceptible to the cyclicity of commodity prices. There continues to be an ongoing debate as to the value of supply management. In this circumstance, however, the stability provided by the system insulates producers against the potential disruption. The milk that is dumped at the farm level will be paid for. Returns are pooled across all processors and classes of milk. Milk is priced to processors based on end-use, with fluid milk products being the highest class. Milk is allocated on demand to the highest classes, and then allocated based on historical shares in the lower classes. Producers are paid a pooled price based on all the milk sold, so it doesn't matter where an individual producer's milk is shipped and which producers were required to dump milk. In the US, on the other hand, the loss is incurred by the dairy farmer and/or the cooperative in the region in which processor demand is significantly reduced. This would be similar in Canada for products that do not have central desk selling.

## CONCLUSIONS

There have been some clear and significant disruptions to dairy and poultry supply chains that can be directly attributed to challenges arising from COVID-19. The structure of supply management in dairy, poultry, and eggs may allow the industries to recover more quickly from the disruptions caused by the pandemic. Producers in the supply managed sectors are generally more financially stable, which should allow them to weather any decreases in returns more easily than producers in other sectors. Losses are shared across individual producers and marketing/transport is coordinated, providing resilience within the system. The supply chain has adapted relatively quickly in the short term to both shortages

and surpluses, resulting in the changes in volume and nature of products offered through the shift from hospitality to grocery.

There are several longer-term implications on the dairy and supply managed sectors arising from the pandemic. One relates to what will be the new ‘normal’ once businesses, including restaurants, return. By then, the volume and nature of demand for dairy and poultry products may be altered permanently, or at least become slow to adjust due to income effects associated with the job losses suffered by a large number of Canadians. The resulting adaptation over the longer term will be easier to manage based on both experience and rate of change. Second, the process of automation will accelerate at all levels of the supply chain. The movement to labour-saving technology will be spurred by the increase in wages paid to workers during the crisis and an increased reliance on machines not vulnerable to disease. The third implication is the enhanced desire for local production as opposed to dependence on global distribution chains to supply goods, from food to safety masks. Since the supply managed sectors already have a focus on domestic production, the impact of such a shift in preferences will not significantly impact its supply chain but could have implications for other sectors.

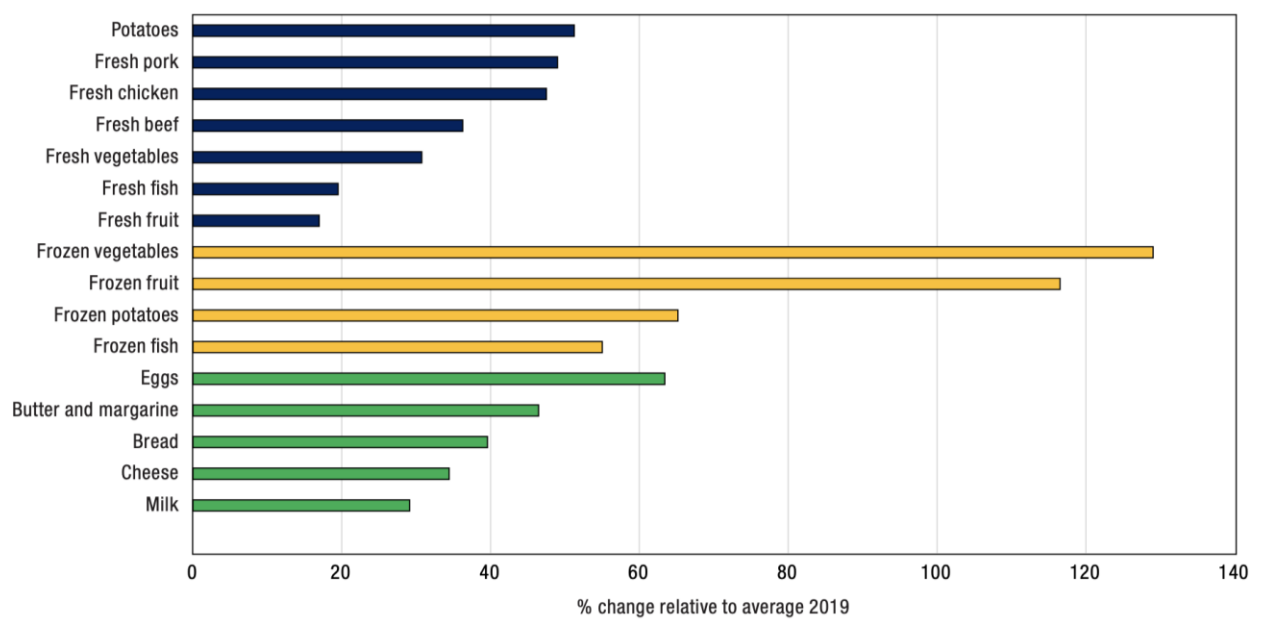
## REFERENCES

- Blaze Baum, K., Silcoff, S., & Krahshinsky Robertson, S. (2020, April 7). As restaurants close and demand for groceries surges, food distributors shift their focus to retailers. *Globe and Mail*. <https://www.theglobeandmail.com/business/article-as-restaurants-close-and-demand-for-groceries-surges-food/>
- Canning, P., Weersink, A., & Kelly, J. (2016). Farm share of the food dollar: An IO approach for the United States and Canada. *Agricultural Economics*, 47(5), 505-512.
- Chicken Farmers of Ontario. (2020). Production planning during COVID-19. *COVID-19 Information*. <https://www.ontariochicken.ca/Farmer-Member-Resources/COVID-19-Information/Production-Planning-During-COVID-19>
- Dairy Farmers of Ontario. (2020, March 31). *Letter to producers, from Murray Sherk, Chair, Dairy Farmers of Ontario*. <https://files.constantcontact.com/577a9199701/f220719d-14f6-4619-ae88-67215e9c615d.pdf>
- Dairy Processors Association of Canada. (2020, April 2). *Joint DPAC-DFC statement on milk supply situation*. <http://www.dpac-atlc.ca/media/joint-dpac-dfc-statement-milk-supply-situation/>
- Jordan, M., & Dickerson, C. (2020, April 9). Poultry worker death highlights the spread of coronavirus in meat plants, *New York Times*. <https://www.nytimes.com/2020/04/09/us/coronavirus-chicken-meat-processing-plants-immigrants.html?referringSource=articleShare>
- Kelly, J., Canning, P., & Weersink, A. (2015). Decomposing the farmer's share of the food dollar. *Applied Economic Perspectives and Policy*, 37(2), 311-331.
- Lusk, J. (2020, April 7). Meat and egg prices following the COVID-19 outbreak. *Blogpost*. <http://jaysonlusk.com/blog/2020/4/5/food-sales-and-prices-following-covid-19-outbreak>
- Maple Leaf Foods. (2020, April 8). Doing our Part During the COVID-19 Pandemic. *Around the Table- Blog*. <https://www.mapleleaffoods.com/stories/our-operational-status-during-covid-19-pandemic/>
- Newman, J., & Bunge, J. (2020, April 11). Farmers dump milk, break eggs as coronavirus restaurant closings destroy demand. *Wall Street Journal*. <https://www.wsj.com/articles/farmers-deal-with-glut-of-food-as-coronavirus-closes-restaurants-11586439722>
- Urner B. (2020, April 8). *Egg Benchmark Update*. <https://www.urnerbarry.com/>

Skinner, S., Weersink, A., & deLange, C.F. (2012). Impact of dried distillers grains with solubles (DDGS) on ration and fertilizer costs of swine farmers. *Canadian Journal of Agricultural Economics*, 60(3), 335-356.

Statistics Canada. (2020, April 8). Canadian Consumers Prepare for COVID-19. *Price Analytical Series*.

**Fresh and frozen foods, percent change in sales for the week ending March 14th relative to average 2019**



**Note:** Data are experimental and are subject to revision.  
**Source:** Consumer Prices program, special tabulation.

Figure 1. Fresh and frozen foods, percent change in sales for the week ending March 14<sup>th</sup> in 2020 compared to 2019

Source: Statistics Canada (2020)

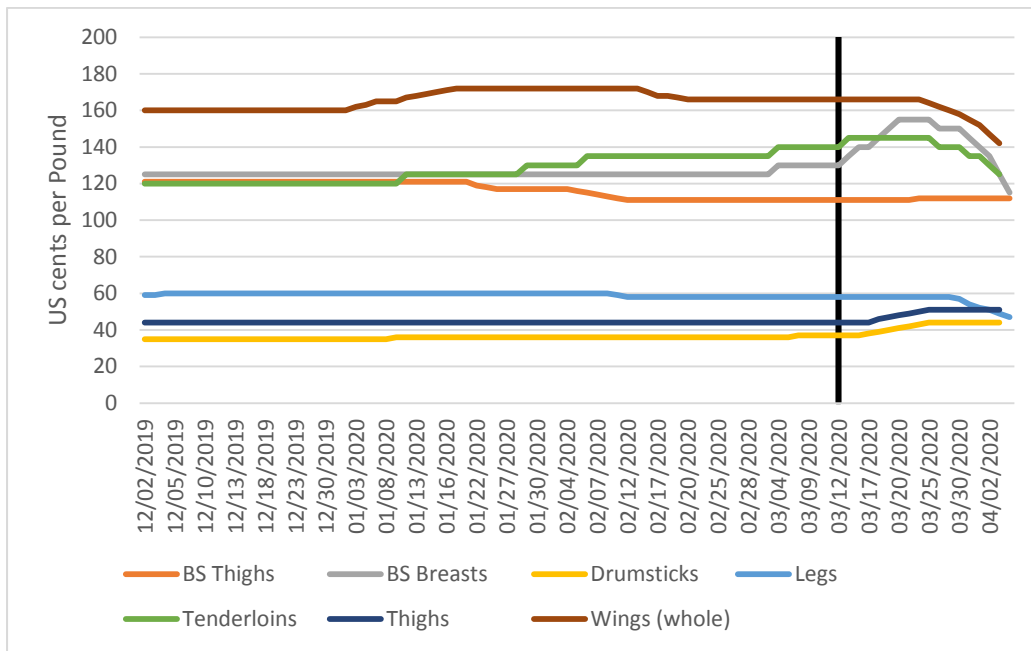


Figure 2. Daily Northeast US chicken part prices, December 2, 2019, to April 6, 2020