

Technical Annex to the *Viewpoint*
“Ending Supply Management with a Quota Buyback”

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The Benefits of Liberalization

As a result of import barriers blocking the entry of foreign goods and limits on domestic production, the system of supply management prevents the supply of goods from increasing. As such, the elimination of supply management would reduce prices by allowing foreign goods to enter into Canada. Given the size of the Canadian economy in the global economy, it will act as a price-taker in the sense that production and consumption decisions in Canada will not have any effect in determining prices.

This means that prices between Canada and other countries will converge. In this Annex, we assume that Canadian prices will converge toward American prices. However, convergence can be minimized by transport costs and other regulatory factors unrelated to supply management.

The scenario of full convergence was the one upon which Cardwell, Lawley, and Xiang relied.¹ For the period they used, the savings for an average Canadian family represented \$444 (measured as the average price gap from 2009 to 2011). Updating their calculation to the present day, we find savings of \$478 based on a 3-year average (2014-2016). Given the number of households in Canada, this represents a savings of \$6.73 billion per year.²

However, this hypothesis is optimistic. A more conservative one is to use the difference observed with other agricultural goods. Most commonly traded goods (often used by farmers unions in defense of supply management)³ are indeed a little more expensive in Canada (always by less than 15%) but nowhere near as expensive as supply-managed goods (always by close to or above 50%) (see Table 1).

¹ Ryan Cardwell, Chad Lawley, and Di Xiang, “Milked and Feathered: The Regressive Welfare Effects of Canada’s Supply Management Regime,” *Canadian Public Policy*, Vol. 41, No. 1, March 2015, pp. 1-15.

² There were 14,072,080 private households in 2016. The amount was indexed by using a weighted price index to capture the price variation for each individual supply-managed product. Statistics Canada, Census Profile, 2016 Census, Total - Private households by household size, April 14, 2017; Statistics Canada, CANSIM Table 326-0020: Consumer Price Index, 2009-2016.

³ Alain Bourbeau, “Un filet de sécurité essentiel,” *La Presse*, September 7, 2016.

Table 1: Price differences between Canada and the United States for select agricultural goods (April 2016 to March 2017)

Non-Supply-Managed Goods				Supply-Managed Goods		
Round steak	Ground beef, regular	Pork chops	Bread	Milk	Eggs	Chicken, fresh, whole
6%	13%	15%	9%	166%	49%	80%

Note: U.S. prices are U.S. city average for non-supply-managed goods. Others are Midwest Urban average.

Sources: Statistics Canada, CANSIM Table 326-0012: Average retail prices for food and other selected items, April 2016 to March 2017; Bureau of Labor Statistics, Average Retail Food and Energy Prices, U.S. and Midwest Region, April 2016 to March 2017; Agriculture and Agri-Food Canada, Statistics and Market Information, Poultry and egg sector, Weighted Average Retail Poultry and Table Egg Prices, May 9, 2017; Federal Reserve Bank of St. Louis, Canada / U.S. Foreign Exchange Rate, April 2016 to March 2017.

Average price over a short period of time can be affected by random noise. Therefore, we use a 15-year average of the retail price gap between Canada and the United-States (U.S. city average). In doing so, we obtain a 12% gap (which incorporates the effects of the 26.5% tariff that is levied at the Canadian border when imports of certain byproducts exceed a certain amount.⁴

As such, a conservative estimate would lead to Canadian prices just 12% higher than U.S. prices, and reduces the savings to \$391 per household per year or \$5.51 billion per year on total.

To measure the long-term gains to the Canadian economy, one must generate the present value of the savings. The idea behind present value calculations is that one will prefer one dollar now to one dollar in the future as the present dollar can be invested now. As such, the low and high estimates of the long-term benefits range between \$110.1 billion and \$134.5 billion (with a discount rate of 5%).

Table 2: Long-term present value of benefits to the Canadian economy of liberalization under different actualization scenarios (billions of dollars)

Discount Rate	Low	High
3%	\$183.573	\$224.174
4%	\$137.680	\$168.130
5%	\$110.144	\$134.504

Source: Authors' calculations

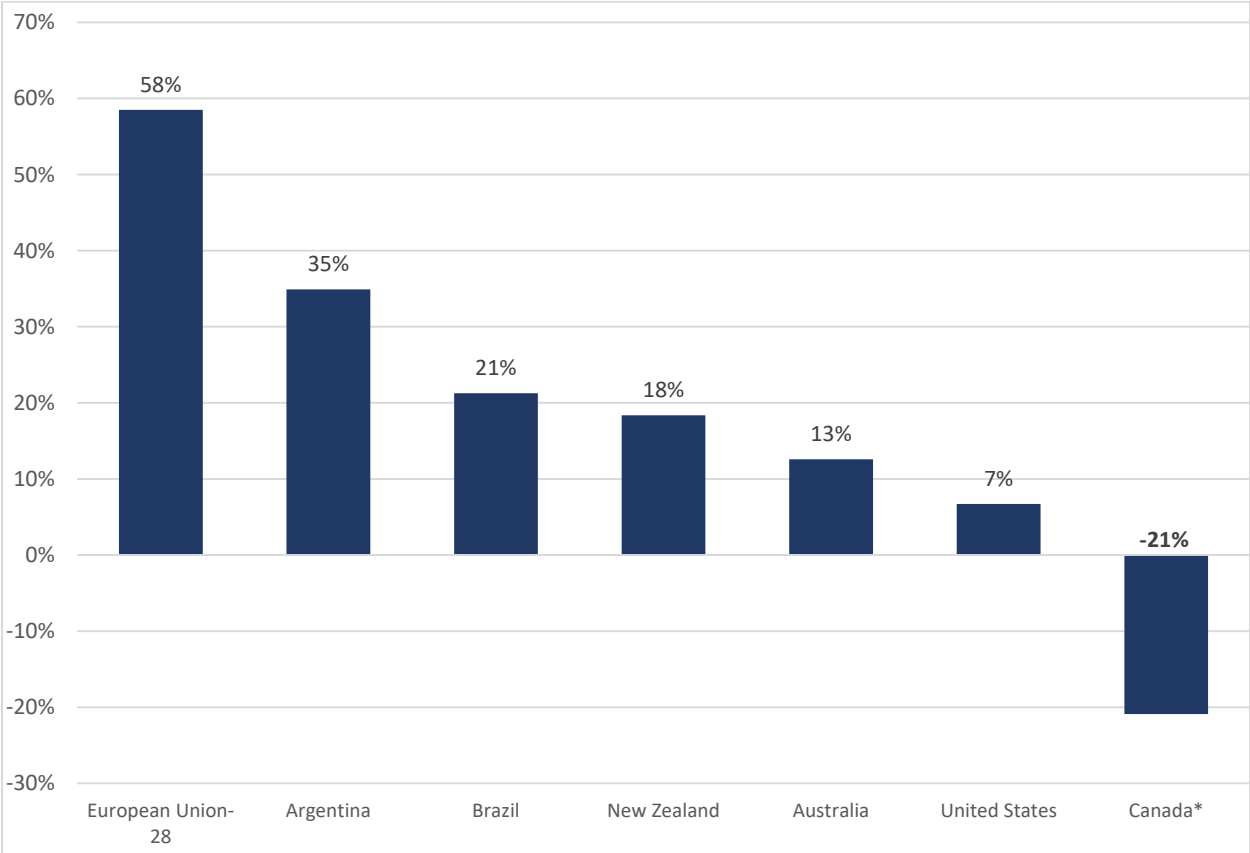
However, our estimates of the benefits are still *very* conservative. Indeed, we are assuming no effects on producers from liberalization, even if there is a wide literature on the benefits that producers could harness. First of all, there could be a reorganization of production within Canada to those places where farming is most efficient (the current system of supply management also prevents the sale of permits across provincial lines), thus generating increases in production to the benefit of farmers.⁵ Secondly, farmers may have benefited from artificially higher prices, but they have also been excluded from foreign markets because of their limited competitiveness. In recent years, the rapid enrichment of many formerly

⁴ Canada Border Services Agency, "Customs Tariff Schedule: Chapter 2 - Meat and edible meat offal," January 1st, 2017.

⁵ Alex W. Chernoff, "Between a cap and a higher price: Modelling the price of dairy quotas under price ceiling legislation," *Canadian Journal of Economics*, Vol. 48, No. 4, November 2015, pp. 1403-1429.

poor areas of the globe has led to a rapid increase in demand for food products, notably chicken and milk. While countries like the United States and New Zealand were able to meet this booming demand and are expected to keep growing their exports in years to come, Canada is missing the boat and as such, its farmers will be deprived of access to substantial foreign markets to improve their earnings (see Figure 1).⁶ These facts suggest that we are underestimating the potential benefits of liberalization to the Canadian economy.

Figure 1: Growth of dairy product exports according to the OECD, 2015-2025



Notes: Starting point is an average from 2013 to 2015. *In accordance with the Nairobi Agreement, Canada will lose its export entitlement for class 5(d) in 2021.

Source: OECD and FAO, OECD-FAO Agricultural Outlook 2016-2025, Database, July 4, 2016.

⁶ Colin Carter and Pierre Mérel, "Hidden costs of supply management in a small market," *Canadian Journal of Economics*, Vol. 49, No. 2, May 2016, pp. 555-588.

Should the Government Compensate According to Market Value?

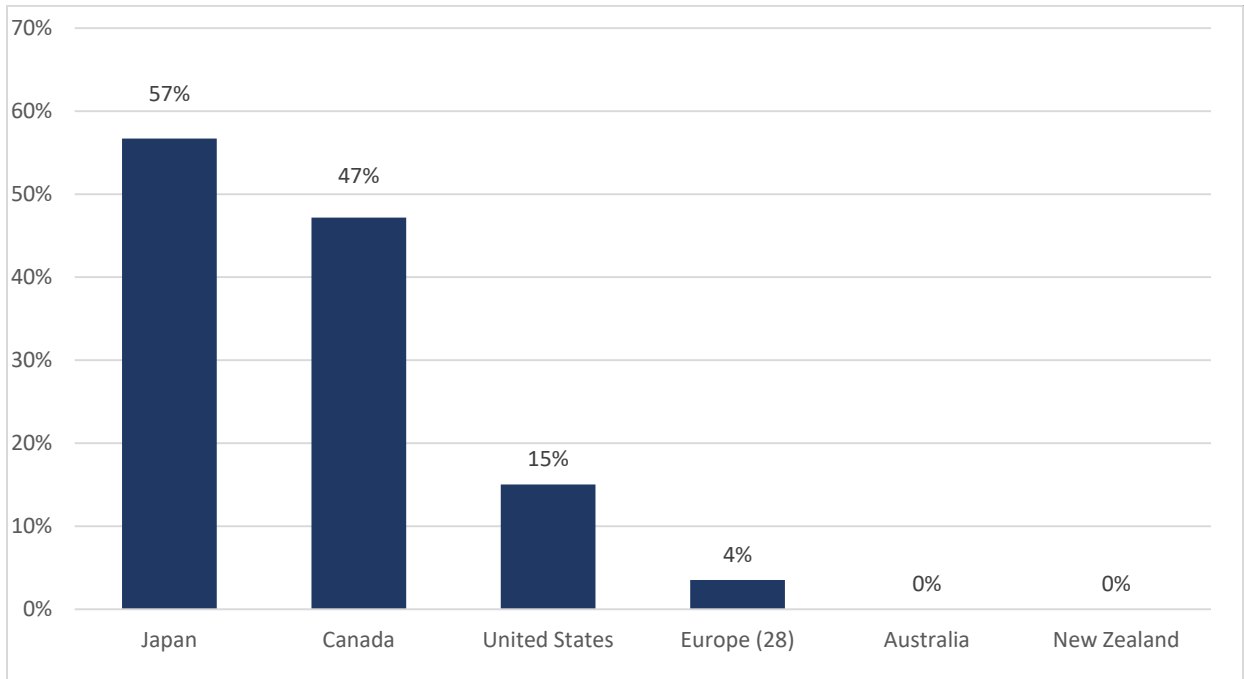
Most proponents of supply management quote the market value of the permits. For this *Viewpoint*, we have considered—as most economists do—that compensation at full accounting value was more appropriate. There are three reasons for this.

The first is that there is an issue of fairness at play that militates against full compensation at market value. Farmers who obtained their quotas at low cost or for free at the beginning of the supply management system have benefited from higher prices ever since. Compared to a younger farmer who recently acquired his quota at full price, it would be unfair to offer full market compensation to both.

Second, the older farmers have had ample opportunity to reap the benefits of higher prices. The price paid to Canadian dairy producers at farm gate is among the highest in the developed world, behind only Japan, which benefits from extremely high subsidies. This comparison is based on the level of support that producers receive from different targeted government measures for dairy producers. In Japan, the ratio of Producer Single Commodity Transfers (PSCT) represented 57% of the total production value at farm gate for the year 2015. For the same year, Canada was not too far, with a ratio of 47%. By contrast, this ratio was 0% in Australia and New Zealand, which fully liberalized their dairy sectors (see Figure 2). This support is either paid by taxpayers, or by consumers in the form of higher retail prices. Indeed, we have a different picture if we control for different measures that represent a direct or indirect form of support to dairy producers (see Figures 3 and 4). Since the value of production at farm gate would be considerably lower without the supply management system and the presence of prohibitive tariffs on imports, there is no doubt that Canadian dairy farmers have collected a substantial economic rent since 1971. That rent easily offsets the costs of borrowing money for the acquisition of quotas.

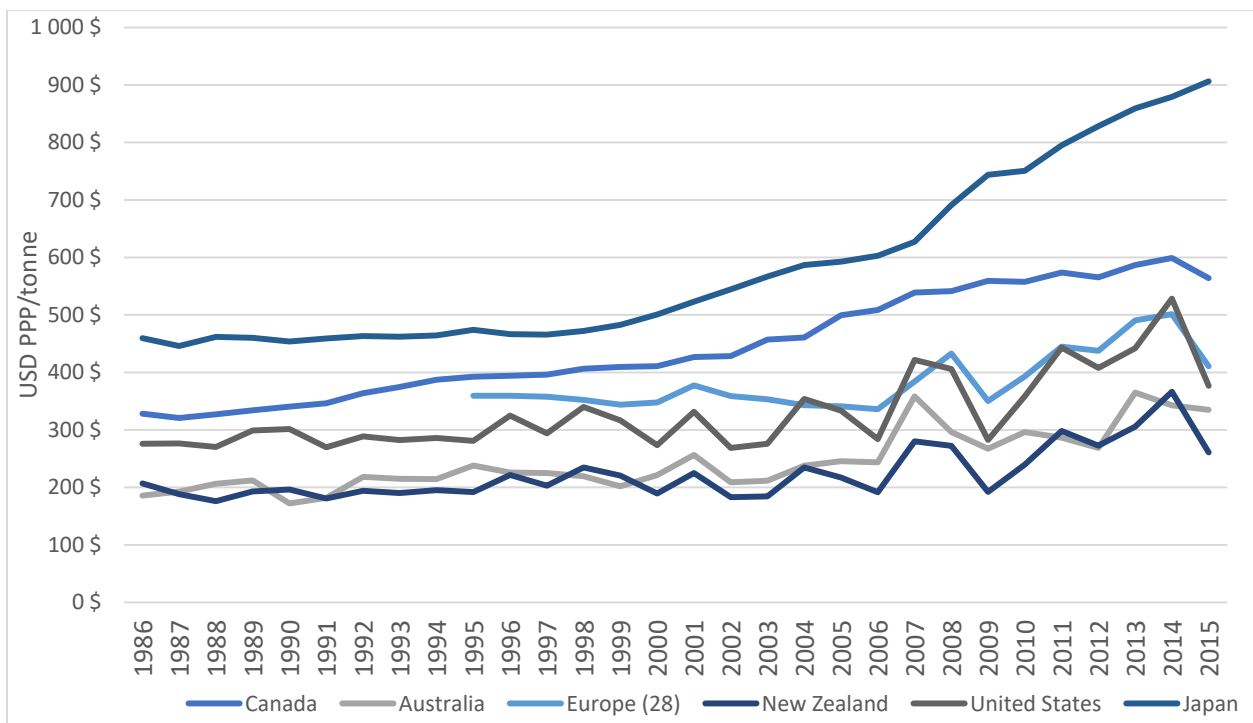
Finally, even at full market value compensation, the benefits of liberalization would outweigh the costs. When recomputed at market value, the highest annual compensation required stands at \$4.242 billion. This is well below our *lowest* estimate of benefits to the Canadian economy, which itself stands at \$5.914 billion. As such, even compensation at market value would not warrant the rejection of liberalization, although there is no theoretical or ethical grounds for compensation at market value.

Figure 2: Producer Single Commodity Transfers (PSCT) for milk as a ratio of the total production value at farm gate, 2015



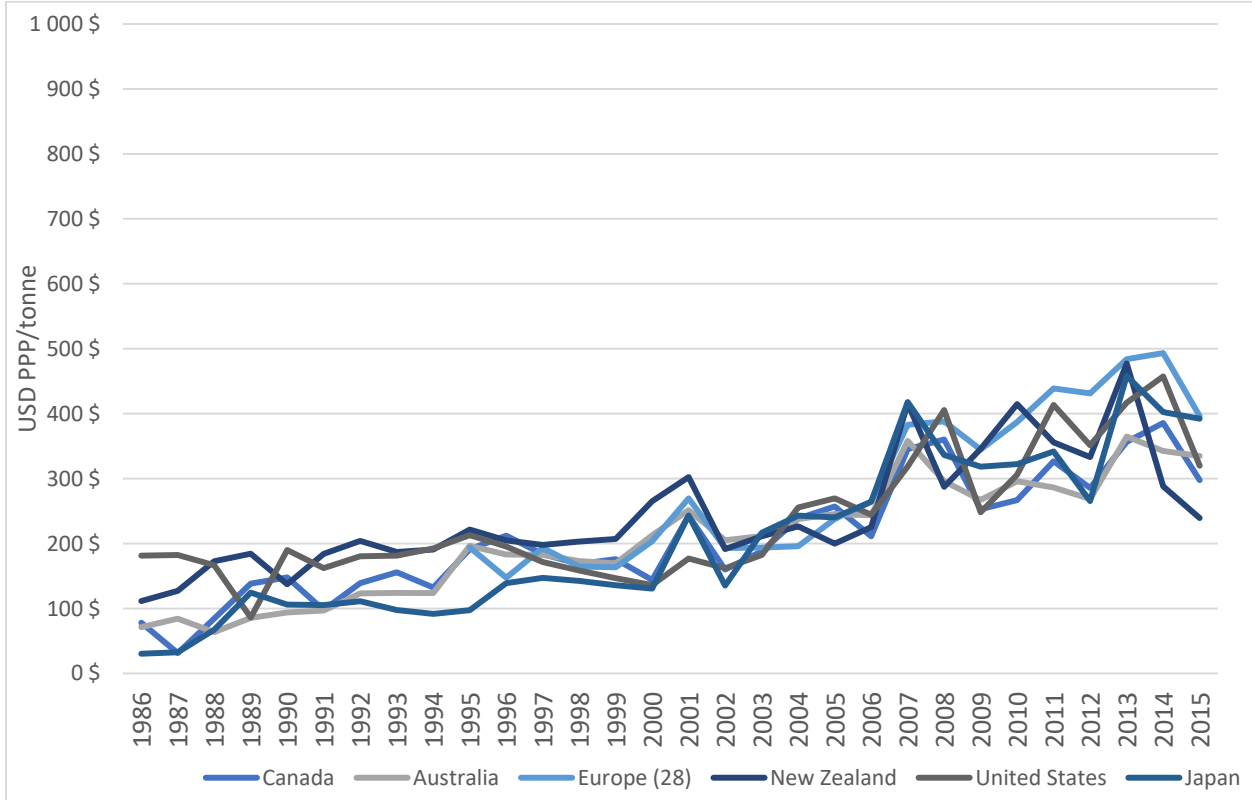
Source: OECD and FAO, OECD-FAO Agricultural Outlook 2016-2025, Database, July 4, 2016.

Figure 3: Value of production at farm gate for milk, in current USD PPP, 1986-2015



Sources: OECD and FAO, OECD-FAO Agricultural Outlook 2016-2025, Database, July 4, 2016; OECD, Purchasing power parities (PPP), Database, 2017.

Figure 4: Value of production at farm gate for milk minus PSCT, 1986-2015



Sources: OECD and FAO, OECD-FAO Agricultural Outlook 2016-2025, Database, July 4, 2016; OECD, Purchasing power parities (PPP), Database, 2017.

The Costs of Liberalization

The balance sheet data of Canadian farms collected by Statistics Canada shows that, for 2015, the value of the permits stood at \$34.39 billion.⁷ Their accounting value, at 38% of market value, would be \$12.91 billion.

If the government decides to reimburse this now, this is the actualized cost as it stands. Under this scenario, the cost is borne immediately and as such there is no net benefit from liberalization in the first year. However, as time passes the benefits will continue to accumulate and they will overtake the costs. The benefits are thus reaped later.

Farmers would much prefer \$12.91 billion now than the same amount at some point in the future. As such, abolishing the permits now and giving them \$12.91 billion over ten or fifteen years would mean considerable lost opportunities for them. This means that, if the taxation option is followed, total compensation will exceed this amount. Assuming a 5% a discount rate over 10 years, yearly payments to farmers should amount to \$1.593 billion in order to conserve the present value of their assets. That periodic amount represents the burden of a hypothetical tax whose proceeds would finance annual payments to farmers.

Table 3: Value of periodic payments needed to fully compensate farmers for the present value of their quotas (millions), (accounting value of quotas)

Duration	Discount Rate	Annual Payment to Farmers
15 years	3%	\$1,050
15 years	4%	\$1,117
15 years	5%	\$1,185
10 years	3%	\$1,470
10 years	4%	\$1,531
10 years	5%	\$1,593

Source: Authors' calculations

Estimating the Burden of the Transitory Tax

To finance the annual payments over ten years needed to compensate farmers for the present value of their quotas, the total revenue generated by tax would—depending on the discount rate and the duration of compensation—have to be somewhere between \$1.050 and \$1.593 billion per year. This is well below our *conservative* range of benefits, which is between \$5.51 and \$6.725 billion.

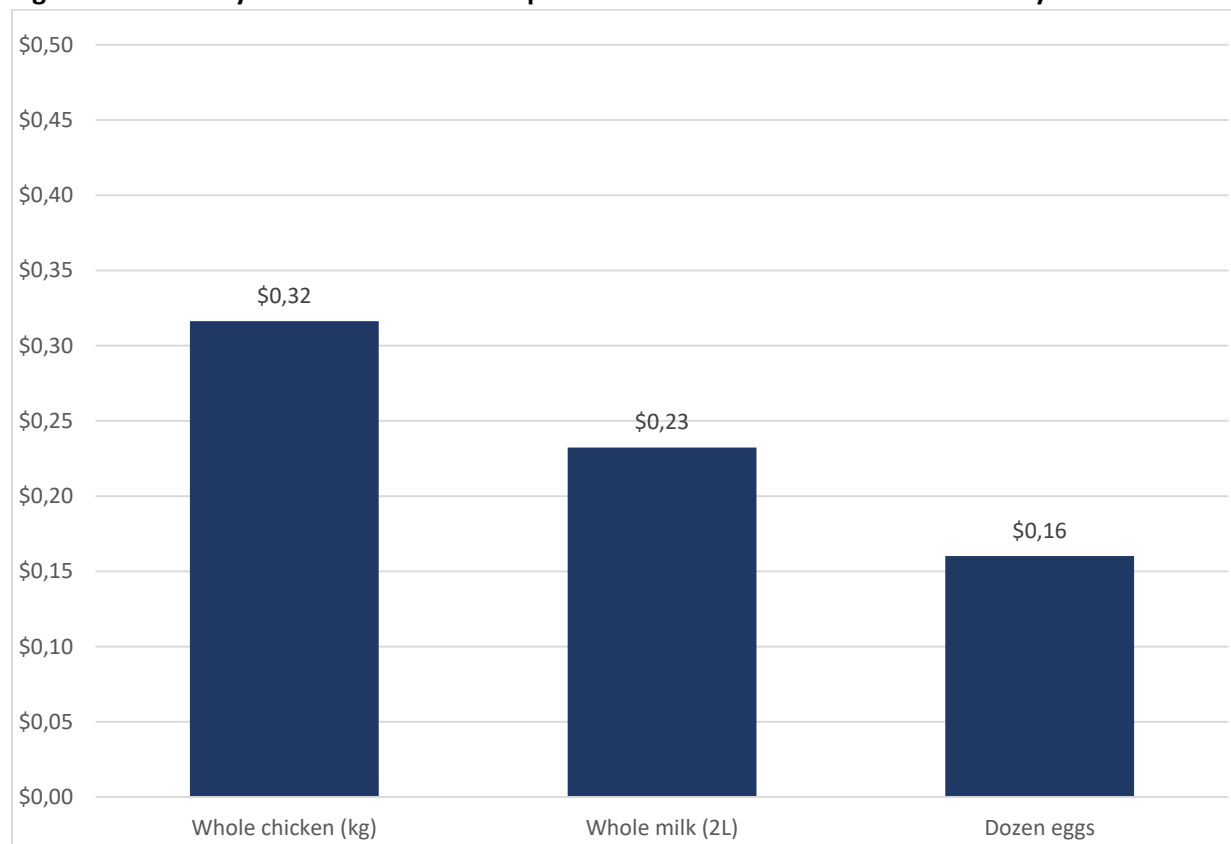
To estimate the tax on key products currently under supply management, the burden of compensation per year has to be divided according to the proportions of household expenditures on each of these goods. For example, household spending on chicken represented 22.2% of total expenditures on supply managed goods. As a result, the tax must generate \$25.17 per year on chicken for the compensation at accounting value⁸. Given the consumption of 80 kg of chicken per year, the tax would represent 32 cents

⁷ Statistics Canada, CANSIM Table 002-0020: Balance sheet of the agricultural sector, at December 31, and ratios, 2015.

⁸ The proportion of taxes being levied on each product is based on the data of the Survey of Household Spending. Statistics Canada, CANSIM Table 203-0028: Survey of household spending (SHS), detailed food expenditures, Canada, regions and provinces, 2015.

per kg (see Figure 5).⁹ This scenario might overstate the size of the tax that will be needed. It presumes that demand will be constant in spite of the increase in supply. While the demand for most (although not all) goods under supply management is relatively inelastic, it is not perfectly inelastic and a reduction in price will generate an increase in quantity consumed.¹⁰

Figure 5: Transitory tax needed on certain products at a discount rate of 5% over 10 years



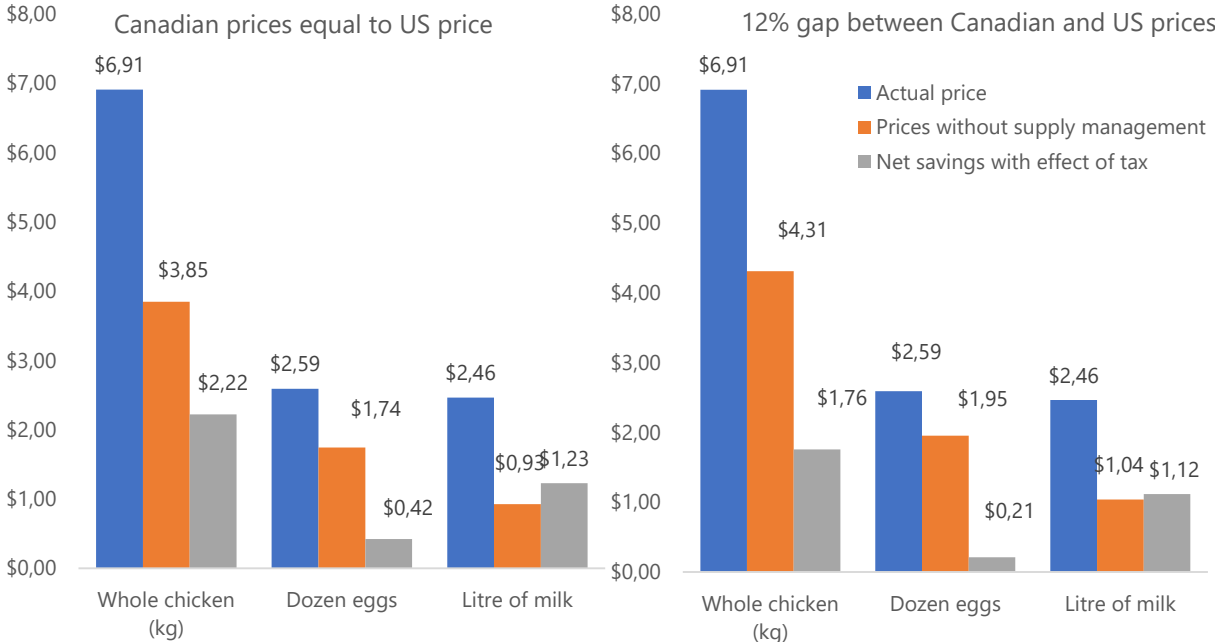
Sources: Author's calculation. Canadian Dairy Information Centre, Dairy Facts and Figures, Global Consumption of Dairy Products, December 8, 2016; Agriculture and Agri-Food Canada, Statistics and Market Information, Poultry and egg sector, Per capita consumption, March 31, 2017.

⁹ Agriculture and Agri-Food Canada, Statistics and Market Information, Poultry and egg sector, Per capita consumption, March 31, 2017.

¹⁰ Ryan Cardwell, Chad Lawley, and Di Xiang, *op. cit.*, footnote 1, p. 9.

As mentioned above, even the burden of taxes that would be needed to compensate farmers for their quotas at market values is smaller than the conservative estimated benefits of liberalization. This can be seen in Figure 6, where there is still a net savings to consumers, even with compensation at market value.

Figure 6: Net savings to consumers with 10-year exit plan and 5% discount rate



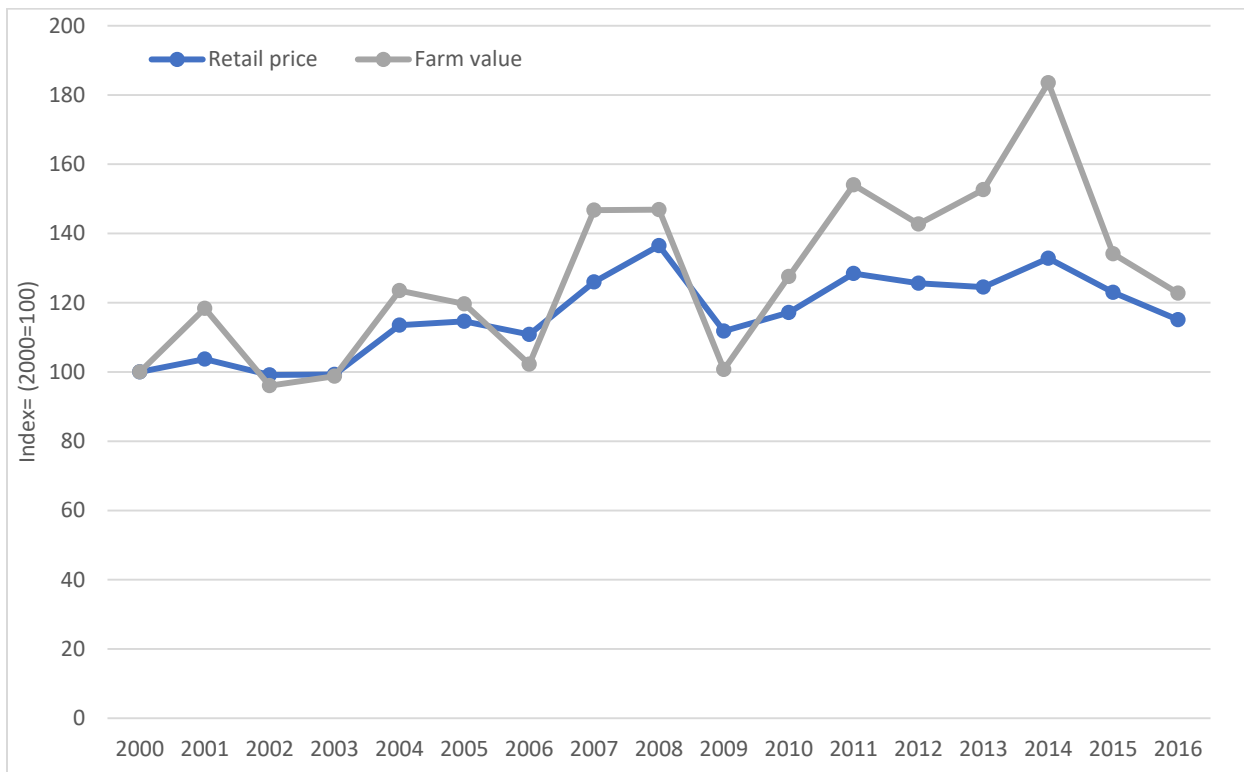
Notes: Prices are an average of the 12-month period from April 2016 to March 2017. For U.S. prices, we used an average for the Midwest region, where prices are generally higher than in the Northeast. See Cardwell (2015, p. 11).

Sources: Canadian Dairy Information Centre, Dairy Facts and Figures, Global Consumption of Dairy Products, December 8, 2016; Agriculture and Agri-Food Canada, Statistics and Market Information, Poultry and egg sector, Weighted Average Retail Poultry and Table Egg Prices, May 9, 2017; Statistics Canada, CANSIM Table 326-0012: Average retail prices for food and other selected items, April 2016 to March 2017; Bureau of Labor Statistics, Average Retail Food and Energy Prices, U.S. and Midwest Region, April 2016 to March 2017; Federal Reserve Bank of St. Louis, Canada / U.S. Foreign Exchange Rate, April 2016 to March 2017.

The Effect of Liberalization on Retail Prices

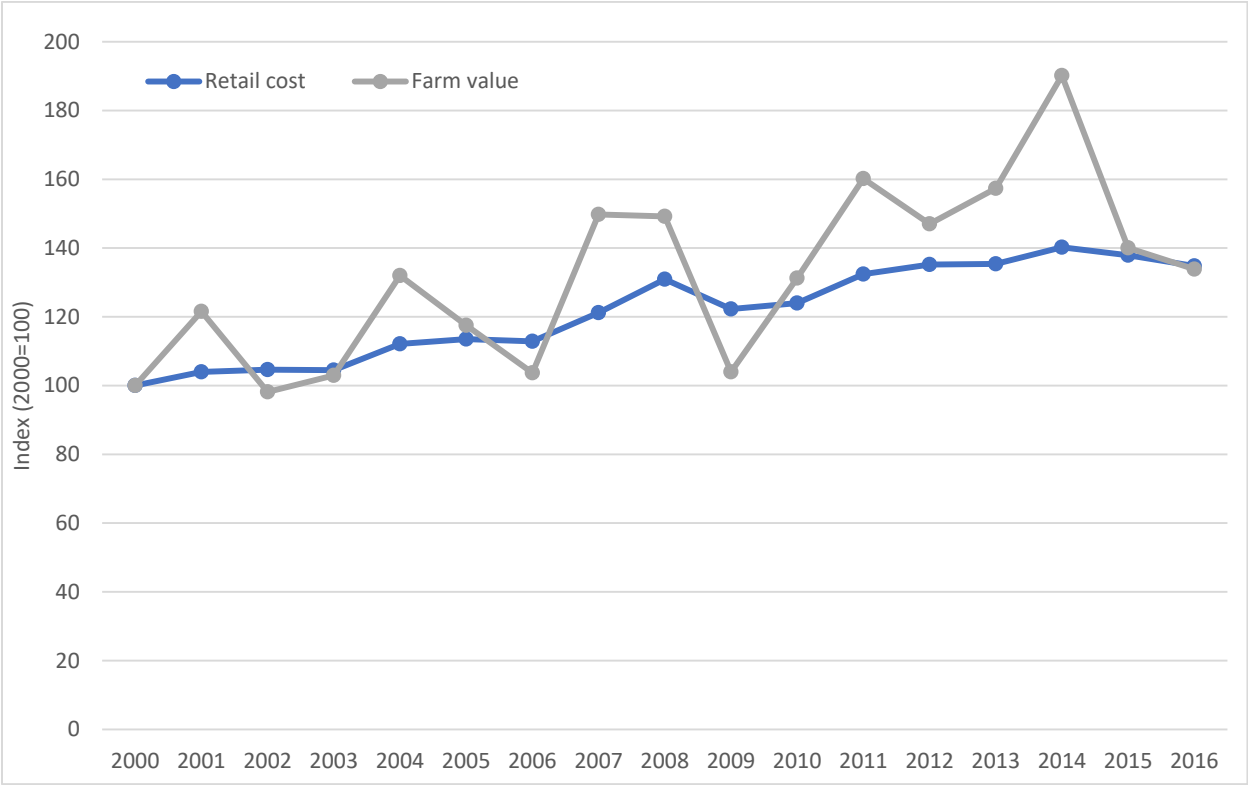
Some might be inclined to believe that a reduction of the farm gate price would not necessarily lead to a retail price reduction for consumers. However, there is a very strong link between these two prices. Indeed, when we look at the evolution of the farm gate and retail prices paid for a gallon of milk, we can see that the curves follow each other quite closely. From 2000 to 2016, the coefficient of correlation between the two variables was 0.8934. The portion of farmers' revenue in the retail price remained relatively stable at a little under 50%. When we repeat the same exercise with a basket of dairy products, there is a similar tendency with a coefficient of correlation of 0.8088. Because dairy products require additional processing, the ratio between the farm gate price and the retail price is smaller than for whole milk, but just as stable, at a little over 30% (see Figures 7 and 8.)

Figure 7: Evolution of the farm gate and retail prices of milk in the United States, 2000-2016



Source: USDA, Economic Research Service, Price Spreads from Farm to Consumer, Whole milk, one gallon, March 6, 2017.

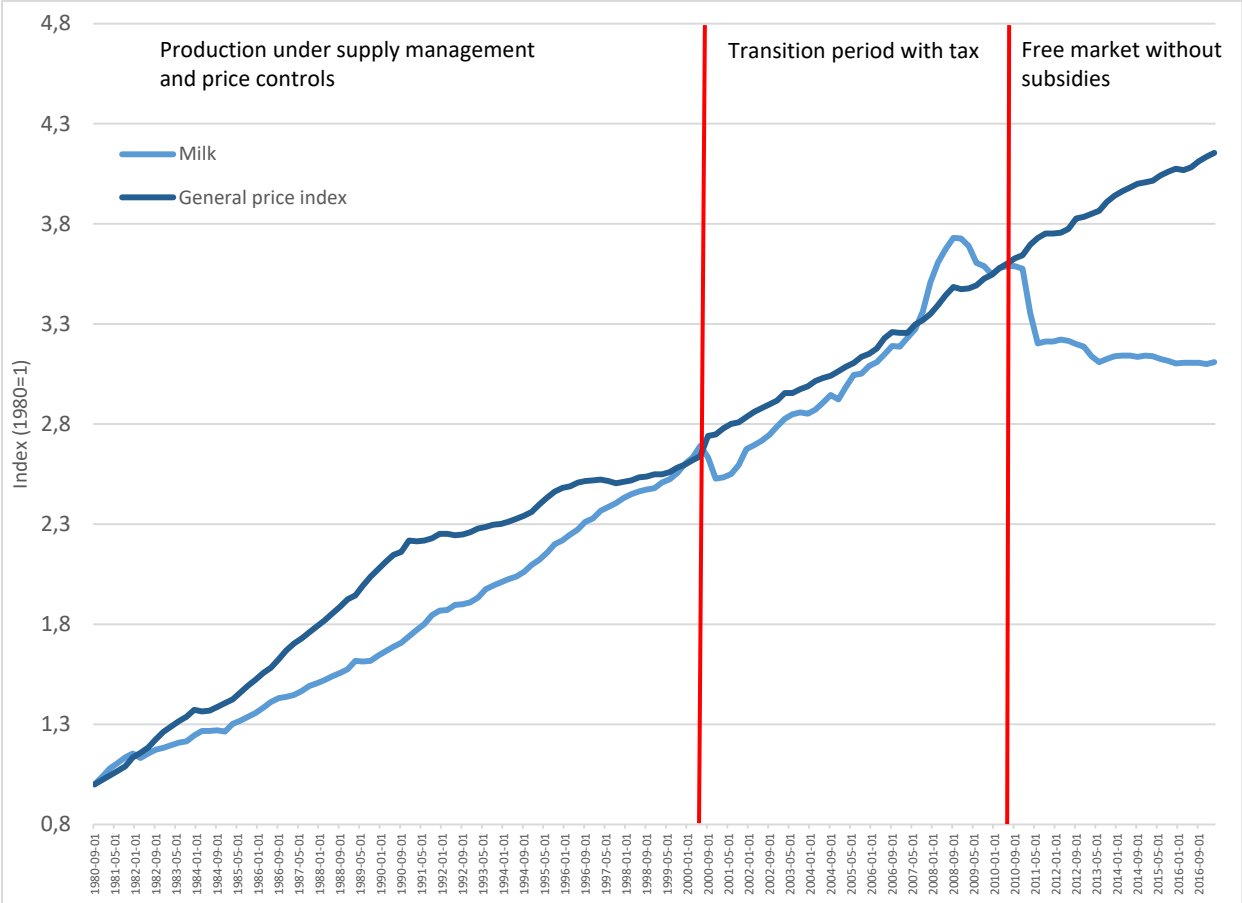
Figure 8: Evolution of the farm gate and retail prices of dairy products in the United States, 2000-2016



Source: USDA, Economic Research Service, Price Spreads from Farm to Consumer, Milk and dairy basket, March 6, 2017.

Moreover, the Australian example confirms the hypothesis that retail prices would go down following the liberalization of sectors under supply management in Canada. Indeed, there was a substantial and almost immediate reduction following the transition period during which an \$0.11/litre tax was applied (see Figure 9). In addition, the reduction of the milk price index following the end of the transition period occurred in a context of particularly high global farm gate milk prices (2012 to 2014).

Figure 9: Evolution of the milk price index and the general price index, Australia, September 1980 to March 2017



Source: Australian Bureau of Statistics, TABLE 13. CPI: Group, Expenditure Class and Selected Analytical Series Index Numbers, Seasonally adjusted, Weighted Average of Eight Capital Cities, Series ID A3604690T and TABLES 3 and 4. CPI: Groups, Weighted Average of Eight Capital Cities, Index Numbers and Percentage Changes, Series ID A2325846C, September 1980 to March 2017; David Harris, "An agriculture case study on policy reform and adjustment: The Australian dairy industry," Document prepared for the APEC Study Centre training course – Managing industry adjustment to trade reform, D.N. Harris & Associates, November 2004, pp. 7 and 11.