

**The Economics of Excise Taxes on Tobacco Sales
at CLBDFS and their Economic Impacts**

Submitted to

Frontier Duty Free Association (FDFA)

Submitted by

Econometric Research Limited

September - 2024

1.0 - Introduction

The Canadian land border duty free sector was created by the federal government in 1982 as a response to the loss of significant Canadian economic benefits to less regulated and lower priced U.S. duty free shops and retailers. Stringent federal laws, regulations and policies were enacted to ensure that Canadian Land Border Duty Free Shops (CLBDFS) would repatriate sales from the USA, without diverting sales away from Canadian domestic retailers including Provincial liquor boards.

It is imperative to recognize that duty free shop sales are considered “deemed exports” by the Canadian Border Services Agency (CBSA), with all transactions rigorously verified and sanctioned as exports. Duty free stores are formally designated as exporters by CBSA, underscoring their pivotal role in facilitating cross-border trade. Operating under licenses granted by CBSA and regulated by the Customs Act, duty free shops adhere to stringent regulations governing site management, inventory control, reporting, and storage to ensure compliance with export regulations which are detailed in a formal Export Construct from CBSA.

To ensure the impact of land border duty free shops would be to recover sales otherwise lost to the United States, the stores must operate from secure sites at the border that can only be accessed by cross border travelers. Duty Free stores are subject to oversight and audit by local customs authorities. After making purchases, customers must exit the duty-free property by traveling directly to the United States. Duty Free customers are then subject to U.S. customs inspection, and if they return to Canada they are subject to inspection by Canada Customs officers. Given these and other inconveniences of crossing the border, duty free shopping is not a casual endeavor that might divert sales away from Canadian non-duty-free retailers, or that would make the shops a viable source of supply for would-be smugglers.

A defining characteristic of CLBDFS is the fact that they are licensed under the CBSA. Failure to comply with established government laws, regulations and policies could result in loss of license to operate. All sales are verified and stamped as exported by the CBSA. Their sales to outside Canada augment Canadian exports and leverages domestic production by providing outlets not otherwise available to Canadian producers. Duty free shops can only sell to travellers who are leaving Canada; therefore 100% of their sales are exported.

When illicit tobacco markets emerged in the 1990’s, these same regulations enabled CLBDFS to also serve as a competitive deterrent to the migration of sales away from legal channels to illicit retailers who do not adhere to Canadian government controls over sale of tobacco products. These important government controls ensure duty free and domestic legal retailers do not sell tobacco to minors, and that the sales environment adheres to product display requirements imposed by health authorities.

Tobacco smuggling into Canada became a significant problem in the 1990’s. This culminated in 2001 following the government discovery of significant smuggling volumes of domestically made products. Canadian made tobacco products were being sold to export markets in higher than historic proportions and many of these products were subsequently smuggled back into Canada as part of the illicit market. This ultimately resulted in a significant settlement between the Canadian tobacco companies and the government, but to limit the possibility of this reoccurring in the future,

the government introduced the *Special Excise Duty on Tobacco* (Export Tax) to all exported tobacco products, including those sold to Canadian Duty Free Shops.

The Export Tax was implemented as a preventative measure, and the federal government readily admits that the land border duty free sector has always been highly compliant with Canadian laws and regulations and has never been a source of supply for smugglers. At the time of imposition of the tax in 2001, CLBDFS accounted for only a fraction of 1% of Canada's total domestic market for tobacco. When first implemented the Export Tax was set below the domestic tax on tobacco applicable to non-duty-free retailers, so duty free shops could still be competitive with U.S. duty free shops and retailers, and to some extent illicit tobacco sellers.

The Export Tax differed from Canadian domestic market excise rates at inception, but these taxes were eventually harmonized to the same rate and pegged to Canadian inflation adjustments every year. The tax that started out at \$10.00 per carton in 2001 increased to \$37.15 per carton in April 2024. In 2024 alone the tax was raised by 17.34% or \$5.49 per carton. CLBDFS feel the magnitude of the tax increases is harming their competitiveness versus lesser taxed U.S. duty free, U.S. domestic, and illicit tobacco markets. As a result, it is believed the tax is resulting in a net loss in Canadian tax revenues derived from the duty-free sector, and harmful impacts on Canada's health strategy since consumers are purchasing more and more cigarettes from less regulated U.S. retailers and from totally unregulated illicit tobacco channels.

CLBDFS also promote the sale of Canadian-made products from local suppliers, which amplifies the financial and employment benefits to Canada. They set aside significant retail space as an investment to promote sales of Canadian-made cigarettes, liquors, wines, beers, gifts and souvenirs. They have created a national award through their industry association – the Frontier Duty Free Association – for the stores that are outstanding in promoting Canadian-made goods, and suppliers who offer new and exciting Canadian-made goods for sale at the shops. The industry has always exceeded any stipulated legal or regulatory requirements to promote Canadian-made merchandise.

Duty free sales are tax and duty free and therefore consumers expect savings. If taxes are imposed on the CLBDFS market without similar imposition to the markets it competes with, then CLBDFS will lose sales and those sales will be transferred to less expensive jurisdictions outside the CDN government purview. This forfeits Canada's chance to benefit from these sales and the attendant and derivative benefits of sustaining Canadian jobs, incomes and taxes.

The Coronavirus pandemic has ravaged economies, disrupted global supply chains, claimed many lives, stressed the over-crowded health systems everywhere and destroyed numerous livelihoods. Its negative impacts were particularly drastic on the travel industry and tourism. Duty free shops were hard hit losing over \$146 million of their sales (almost 90% of pre-covid sales) from 2019 to 2020.

Before the pandemic, the Canadian land border duty free sector had over \$156 million in annual sales, sustaining large income streams and full-time jobs for many Canadians. The pandemic exacted a heavy toll on these shops reducing their sales to only \$9.3 million in 2020 and to \$34.1 million in 2021. Recently, their sales volumes started to recover and a new sense of optimism is beginning to be realized. This optimism is now threatened by imposition of significant increases

to the excise tax levied on duty free tobacco sales in April 2024. Imposition of these taxes on duty free, which is basically and decisively an export industry, negates the well-considered competitive balance that was implicit in the original duty free industry model established in 1982. The declining competitiveness of duty-free tobacco prices vis a vis illicit and US channels, now threatens to further divert the benefits formally conferred on Canada from duty free shops, to US retailers and illicit tobacco retailers. The tax increases also work against Canadian health goals by migrating tobacco sales to lesser regulated and controlled retail environments. Duty Free operators have noted their sales of cigarette cartons have declined by as much as 50-70% since 2002 owing to the Special Excise Tax increases, and that these sales are being lost to U.S. and illicit sellers.

Econometric Research Limited (ERL) has been retained by the Frontier Duty Free Association (FDFA) and is tasked with benchmarking the economic impact of the operations of the CLBDFS to outline what is at stake in sustaining the normal operations of the industry and what could be lost by introducing new excise taxes and other measures that could derail the normal and healthy operations of the sector. As part of this mandate, ERL will explore the effects of reducing the tax of \$37.15 per carton of cigarettes, to see if such a reduction can be justified on the basis of increasing economic and other benefits to Canada. It will also consider options for a more rational process of adjusting the excise tax charged to CLBDFS over time. Duty Free shops do not compete for sales with Canadian domestic retailers. Therefore, it makes no sense to raise the Export Tax based on Canadian inflation levels and budgetary rate hikes for the Canadian domestic market. Since duty free shops compete specifically with U.S. duty free shops, retailers and illicit tobacco retailers, it is the relative price changes in these sectors that should influence the maintenance or the increases in the Export Tax charged to CLBDFS.

Econometric Research Ltd. will use standard regression analysis to quantify these expected consequences using CRA data from 2001 to 2018 (we excluded the data pertaining to the pandemic). The preliminary results demonstrate strong statistical evidence that lower domestic cigarette prices increase sales of duty free tobacco products, and other duty free products and these sales are further augmented by any increase in the spread between Canadian and US prices. Furthermore, the strong statistical evidence is clear that excise taxes added to Canadian duty free cigarette prices will reduce sales at CLBDFS and divert sales to US locations and increase the sale of contraband products.

Canadian Land Border Duty Free Shops have appreciated and welcomed the improved sales' picture that the end of the pandemic has already engendered. More pronounced and more appreciated is the demonstration of a strong complementarity relationship between liquor and duty free products and tobacco sales

It would be reasonable to expect, barring any major negative reversal of trends and tax shocks that the increased sales occurring now as pandemic effects are waning down could ultimately provoke the CLBDFS to hire more people. But even when these expectations do not materialize, already the increased sales of Canadian products have generated employment impacts that ERL's models have been able to identify and quantify below.

2.0 – Tobacco Sales at Canadian Land Border Duty Free

Shops

Tobacco sales at CLBDFS are a major component of their total sales. In the early 2000s they represented 26.5% of total sales (Figure 1 and Table 3). This share declined over the years as cigarette smoking per capita declined both in Canada and in the US (from 30 cigarettes per capita in 2002 to 21 cigarettes per capita in 2021 in Canada, and in the US per capita smoking declined even more precipitously from 78 cigarettes in 2002 to 41.3 cigarettes in 2021 (Table 5). By 2018 CLBDFS tobacco sales represented 22.3% of total sales and by 2023 they accounted for 22.1% (Table 3). The CLBDFS sales noted above include the Export Tax, and therefore over time more and more of the noted total sales dollars are attributable to excise/export taxes.

Table 1a
CLBDFS Sales by Major Category
(Dollars)

Year	Tobacco			Alcohol			Perfume		
	Imported	Domestic	Total	Imported	Domestic	Total	Imported	Domestic	Total
2002	\$11,686,220	\$48,186,563	\$59,872,783	\$52,238,998	\$24,216,047	\$76,455,045	\$35,277,358	\$1,458,220	\$36,735,578
2003	\$9,970,811	\$46,192,984	\$56,163,795	\$46,624,972	\$22,099,557	\$68,724,529	\$28,537,105	\$1,205,280	\$29,742,385
2004	\$8,783,547	\$39,788,358	\$48,571,905	\$46,153,048	\$23,042,414	\$69,195,462	\$27,508,216	\$1,499,193	\$29,007,409
2005	\$7,462,654	\$38,273,734	\$45,736,388	\$44,463,480	\$21,847,615	\$66,311,096	\$24,773,157	\$1,209,056	\$25,982,213
2006	\$5,561,658	\$35,431,754	\$40,993,412	\$41,305,002	\$20,868,787	\$62,173,789	\$22,803,870	\$1,077,525	\$23,881,395
2007	\$18,954,412	\$21,766,266	\$40,720,678	\$37,510,581	\$19,553,406	\$57,063,987	\$22,146,479	\$873,337	\$23,019,817
2008	\$24,252,299	\$14,053,777	\$38,306,076	\$34,309,408	\$18,335,554	\$52,644,962	\$20,306,294	\$771,264	\$21,077,558
2009	\$23,288,802	\$14,061,607	\$37,350,410	\$37,330,057	\$18,456,385	\$55,786,442	\$19,589,724	\$721,242	\$20,310,966
2010	\$24,627,650	\$15,692,519	\$40,320,169	\$36,237,474	\$18,177,709	\$54,415,183	\$19,083,613	\$757,591	\$19,841,204
2011	\$23,980,443	\$17,181,015	\$41,161,458	\$35,292,155	\$17,553,439	\$52,845,594	\$20,403,026	\$740,801	\$21,143,826
2012	\$24,180,458	\$16,587,592	\$40,768,050	\$36,795,849	\$17,716,760	\$54,512,609	\$22,197,867	\$868,764	\$23,066,631
2013	\$23,190,388	\$16,575,632	\$39,766,020	\$37,182,972	\$17,089,487	\$54,272,459	\$23,118,317	\$932,063	\$24,050,381
2014	\$22,574,027	\$16,920,111	\$39,494,137	\$37,264,744	\$16,637,311	\$53,902,054	\$22,149,069	\$1,048,765	\$23,197,834
2015	\$20,274,684	\$15,880,740	\$36,155,424	\$42,876,743	\$17,690,900	\$60,567,643	\$21,545,851	\$1,017,034	\$22,562,885
2016	\$18,638,303	\$15,254,622	\$33,892,925	\$48,952,937	\$18,946,891	\$67,899,829	\$21,411,351	\$904,759	\$22,316,111
2017	\$19,288,582	\$14,505,711	\$33,794,293	\$49,850,495	\$18,629,859	\$68,480,355	\$20,499,979	\$758,184	\$21,258,163
2018	\$20,207,633	\$14,844,487	\$35,052,120	\$50,476,106	\$17,876,399	\$68,352,505	\$20,423,652	\$649,590	\$21,073,241
2019	\$19,738,164	\$14,499,616	\$34,237,780	\$50,747,081	\$17,972,367	\$68,719,448	\$21,707,680	\$690,429	\$22,398,109
2020	\$1,184,290	\$869,977	\$2,054,267	\$3,044,825	\$1,078,342	\$4,123,167	\$1,302,461	\$41,426	\$1,343,887
2021	\$4,342,396	\$3,189,916	\$7,532,312	\$11,164,358	\$3,953,921	\$15,118,279	\$4,775,690	\$151,894	\$4,927,584
2022	\$10,461,227	\$7,684,797	\$18,146,024	\$26,895,953	\$9,525,354	\$36,421,307	\$11,505,071	\$365,927	\$11,870,998
2023	\$14,803,623	\$10,874,712	\$25,678,335	\$38,060,311	\$13,479,275	\$51,539,586	\$16,280,760	\$517,822	\$16,798,582

Source: CRA data up to 2018, 2019 to 2023 are estimated by CLBDFS

CLBDFS domestic cigarette products accounted for 80% of total tobacco sales but declined to 40.7% in 2012, then increased slightly to 45% in 2016 and dropped again to 42.3% in 2023 (Table 2 and Figure 2). The share of domestic Alcohol declined during the same period from 31.7% in 2002 to 26.2% in 2023.

This Report has also demonstrated that CLBDFS' tobacco sales were also compromised by the Federal Excise tax, as this tax constituted a tax on exports. Tobacco industry data gathered from JTI and RBH reveals that the volume of cartons of cigarettes purchased by duty free shops have declined by over 58% between 2015 and 2023. Not only has this resulted in a significant decline in duty free tobacco sales, but as shown in this report, it is also having a significant negative impact on sales of other complimentary duty free products as well and has decreased the economic impact footprint of the CLBDFS industry on the Canadian economy.

Table 1b
CLBDFS Sales by Major Category
(Dollars)

Year	Other			Grand Total		
	Imported	Domestic	Total	Imported	Domestic	Total
2002	\$20,942,280	\$31,788,976	\$52,731,256	\$120,144,857	\$105,649,806	\$225,794,663
2003	\$15,873,188	\$24,371,600	\$40,244,789	\$101,006,076	\$93,869,422	\$194,875,498
2004	\$17,180,825	\$22,642,929	\$39,823,753	\$99,625,635	\$86,972,894	\$186,598,528
2005	\$16,095,737	\$19,766,974	\$35,862,711	\$92,795,028	\$81,097,379	\$173,892,407
2006	\$15,047,156	\$17,890,263	\$32,937,419	\$84,717,686	\$75,268,329	\$159,986,015
2007	\$14,399,886	\$15,239,597	\$29,639,483	\$93,011,358	\$57,432,607	\$150,443,965
2008	\$13,999,266	\$13,531,040	\$27,530,306	\$92,867,268	\$46,691,635	\$139,558,903
2009	\$14,283,567	\$12,930,920	\$27,214,487	\$94,492,151	\$46,170,154	\$140,662,305
2010	\$14,314,628	\$12,947,104	\$27,261,732	\$94,263,365	\$47,574,922	\$141,838,287
2011	\$15,186,157	\$12,466,415	\$27,652,572	\$94,861,781	\$47,941,670	\$142,803,451
2012	\$15,688,353	\$12,435,845	\$28,124,197	\$98,862,527	\$47,608,960	\$146,471,487
2013	\$15,928,916	\$12,124,534	\$28,053,449	\$99,420,593	\$46,721,716	\$146,142,309
2014	\$15,445,417	\$11,746,610	\$27,192,027	\$97,433,256	\$46,352,796	\$143,786,053
2015	\$16,927,484	\$12,870,462	\$29,797,946	\$101,624,762	\$47,459,136	\$149,083,898
2016	\$17,931,004	\$14,389,131	\$32,320,135	\$106,933,596	\$49,495,403	\$156,429,000
2017	\$17,696,839	\$15,042,240	\$32,739,080	\$107,335,895	\$48,935,995	\$156,271,890
2018	\$17,684,870	\$14,778,008	\$32,462,878	\$108,792,260	\$48,148,484	\$156,940,744
2019	\$15,655,845	\$13,931,059	\$29,586,904	\$107,848,771	\$47,093,471	\$154,942,242
2020	\$939,351	\$835,864	\$1,775,214	\$6,470,926	\$2,825,608	\$9,296,534
2021	\$3,444,286	\$3,064,833	\$6,509,119	\$23,726,730	\$10,360,564	\$34,087,293
2022	\$8,297,598	\$7,383,461	\$15,681,059	\$57,159,848	\$24,959,540	\$82,119,388
2023	\$11,741,884	\$10,448,294	\$22,190,178	\$80,886,578	\$35,320,103	\$116,206,681

Source: CRA data up to 2018, 2019 to 2023 are estimated by CLBDFS

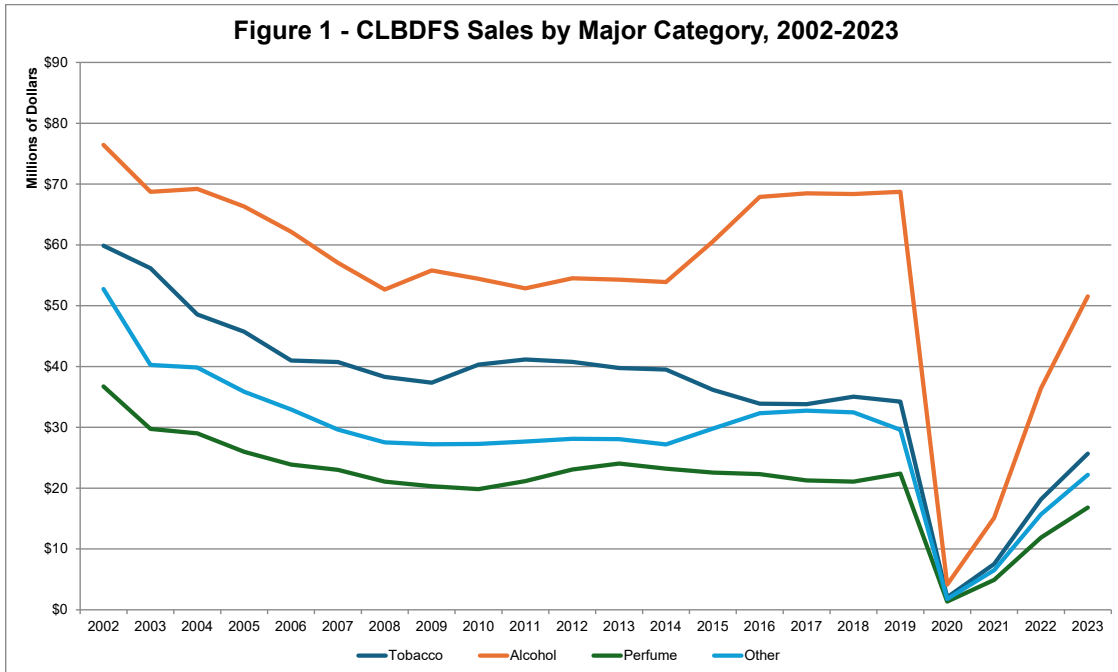


Table 2
CLBDFS Sales by Major Category
 (Shares of Category Subtotals)

Year	Tobacco		Alcohol		Perfume		Other		Grand Total	
	Imported	Domestic	Imported	Domestic	Imported	Domestic	Imported	Domestic	Imported	Domestic
2002	19.5%	80.5%	68.3%	31.7%	96.0%	4.0%	39.7%	60.3%	53.2%	46.8%
2003	17.8%	82.2%	67.8%	32.2%	95.9%	4.1%	39.4%	60.6%	51.8%	48.2%
2004	18.1%	81.9%	66.7%	33.3%	94.8%	5.2%	43.1%	56.9%	53.4%	46.6%
2005	16.3%	83.7%	67.1%	32.9%	95.3%	4.7%	44.9%	55.1%	53.4%	46.6%
2006	13.6%	86.4%	66.4%	33.6%	95.5%	4.5%	45.7%	54.3%	53.0%	47.0%
2007	46.5%	53.5%	65.7%	34.3%	96.2%	3.8%	48.6%	51.4%	61.8%	38.2%
2008	63.3%	36.7%	65.2%	34.8%	96.3%	3.7%	50.9%	49.1%	66.5%	33.5%
2009	62.4%	37.6%	66.9%	33.1%	96.4%	3.6%	52.5%	47.5%	67.2%	32.8%
2010	61.1%	38.9%	66.6%	33.4%	96.2%	3.8%	52.5%	47.5%	66.5%	33.5%
2011	58.3%	41.7%	66.8%	33.2%	96.5%	3.5%	54.9%	45.1%	66.4%	33.6%
2012	59.3%	40.7%	67.5%	32.5%	96.2%	3.8%	55.8%	44.2%	67.5%	32.5%
2013	58.3%	41.7%	68.5%	31.5%	96.1%	3.9%	56.8%	43.2%	68.0%	32.0%
2014	57.2%	42.8%	69.1%	30.9%	95.5%	4.5%	56.8%	43.2%	67.8%	32.2%
2015	56.1%	43.9%	70.8%	29.2%	95.5%	4.5%	56.8%	43.2%	68.2%	31.8%
2016	55.0%	45.0%	72.1%	27.9%	95.9%	4.1%	55.5%	44.5%	68.4%	31.6%
2017	57.1%	42.9%	72.8%	27.2%	96.4%	3.6%	54.1%	45.9%	68.7%	31.3%
2018	57.7%	42.3%	73.8%	26.2%	96.9%	3.1%	54.5%	45.5%	69.3%	30.7%
2019	57.7%	42.3%	73.8%	26.2%	96.9%	3.1%	52.9%	47.1%	69.6%	30.4%
2020	57.7%	42.3%	73.8%	26.2%	96.9%	3.1%	52.9%	47.1%	69.6%	30.4%
2021	57.7%	42.3%	73.8%	26.2%	96.9%	3.1%	52.9%	47.1%	69.6%	30.4%
2022	57.7%	42.3%	73.8%	26.2%	96.9%	3.1%	52.9%	47.1%	69.6%	30.4%
2023	57.7%	42.3%	73.8%	26.2%	96.9%	3.1%	52.9%	47.1%	69.6%	30.4%

Source: Table 1

Table 3
CLBDFS Sales by Major Category Total
 (Shares)

Year	Tobacco	Alcohol	Perfume	Other
2002	26.5%	33.9%	16.3%	23.4%
2003	28.8%	35.3%	15.3%	20.7%
2004	26.0%	37.1%	15.5%	21.3%
2005	26.3%	38.1%	14.9%	20.6%
2006	25.6%	38.9%	14.9%	20.6%
2007	27.1%	37.9%	15.3%	19.7%
2008	27.4%	37.7%	15.1%	19.7%
2009	26.6%	39.7%	14.4%	19.3%
2010	28.4%	38.4%	14.0%	19.2%
2011	28.8%	37.0%	14.8%	19.4%
2012	27.8%	37.2%	15.7%	19.2%
2013	27.2%	37.1%	16.5%	19.2%
2014	27.5%	37.5%	16.1%	18.9%
2015	24.3%	40.6%	15.1%	20.0%
2016	21.7%	43.4%	14.3%	20.7%
2017	21.6%	43.8%	13.6%	21.0%
2018	22.3%	43.6%	13.4%	20.7%
2019	22.1%	44.4%	14.5%	19.1%
2020	22.1%	44.4%	14.5%	19.1%
2021	22.1%	44.4%	14.5%	19.1%
2022	22.1%	44.4%	14.5%	19.1%
2023	22.1%	44.4%	14.5%	19.1%

Source: Table 1

Alcohol sales at CLBDFS increased their share in total sales during the same period from 33.9% in 2002 to 43.6% in 2018 and to 44.4% in 2023 (Table 2 and Figure 2). Another interesting fact is the rise of the share of alcohol in total sales from 33.9% in 2002 to 44.4% in 2023 (Table 3).

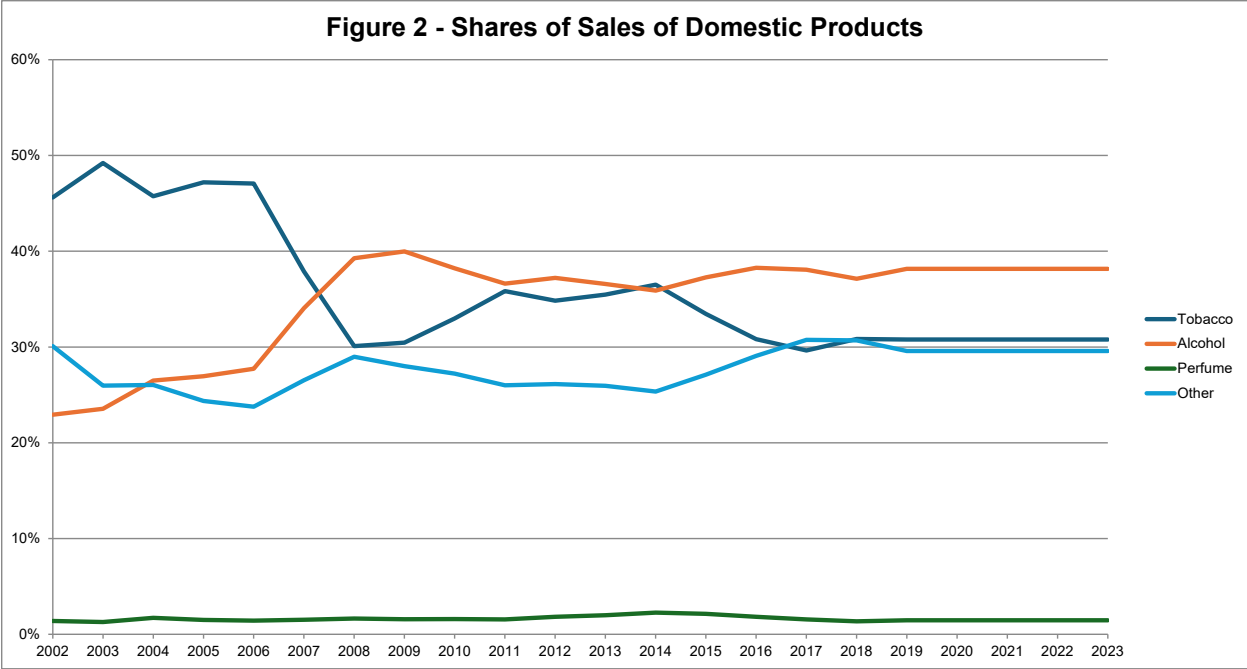
A critical fact that has characterized duty free sales alluded to earlier is the complementarity of sales. There is ample evidence provided by the examination of invoices at CLBDFS of the prevalence of multiple product sales on these invoices. Those that buy alcohol also typically buy cigarettes and perfumes and vice versa. This phenomenon is tested in section 3 by using regression techniques to gauge the correlation of sales of one product with the sale of other products, as well as testing the stability of the ratio of tobacco sales to overall sales.

The next section is devoted to a quantitative estimation of the sensitivity of tobacco sales at CLBDFS to price changes in the non-duty-free Canadian domestic market, US prices of these products, the exchange rate and a host of control variables such as per capita consumption of cigarettes in Canada and the US. A special emphasis is put on the sensitivity of these sales to changes in the Special Duty on Exported Tobacco given the centrality of this issue to this study.

Table 4
CLBDFS Shares of Sales of Domestic Products
(Shares)

Year	Tobacco	Alcohol	Perfume	Other
2002	45.6%	22.9%	1.4%	30.1%
2003	49.2%	23.5%	1.3%	26.0%
2004	45.7%	26.5%	1.7%	26.0%
2005	47.2%	26.9%	1.5%	24.4%
2006	47.1%	27.7%	1.4%	23.8%
2007	37.9%	34.0%	1.5%	26.5%
2008	30.1%	39.3%	1.7%	29.0%
2009	30.5%	40.0%	1.6%	28.0%
2010	33.0%	38.2%	1.6%	27.2%
2011	35.8%	36.6%	1.5%	26.0%
2012	34.8%	37.2%	1.8%	26.1%
2013	35.5%	36.6%	2.0%	26.0%
2014	36.5%	35.9%	2.3%	25.3%
2015	33.5%	37.3%	2.1%	27.1%
2016	30.8%	38.3%	1.8%	29.1%
2017	29.6%	38.1%	1.5%	30.7%
2018	30.8%	37.1%	1.3%	30.7%
2019	30.8%	38.2%	1.5%	29.6%
2020	30.8%	38.2%	1.5%	29.6%
2021	30.8%	38.2%	1.5%	29.6%
2022	30.8%	38.2%	1.5%	29.6%
2023	30.8%	38.2%	1.5%	29.6%

Source: Table 1



3.0 – Determinants of CLBDFS Tobacco and Other Product Sales: A Regression Analysis

This section is devoted to a quantitative analysis of the determinants of tobacco sales at CLBDFS with the view to gauge the sensitivity of these sales to Canadian domestic tobacco prices, US domestic prices and the Canadian excise tax. The regression equations also include a set of control variables that typically affect this demand such as per capita consumption of cigarettes, complementary sales and the Canadian- US dollar exchange rate. These variables are used to isolate the effects of the tax from those of other typical determinants.

The demand for cigarettes, as any other product demand, is generally sensitive to its own price changes, other prices and a host of other control factors. Tobacco product sales at CLBDFS reveal that it is also sensitive to these prices in neighbouring jurisdictions as any export commodity. In what follows we specify tobacco demand functions that take into account these sensitivities and responses in order to show how the imposition of a tax can critically curtail the demand for products at Canadian duty free shops when a similar tax is not imposed in the export market and an illicit market exists. Significant diversion of sales to US neighbouring jurisdictions is noted and equally also to the illicit market. The regression results are unequivocal about these diversions and equally supported by the data presented in this section.

Table 5
Data Used in the Regression Equations

Year	Avg Canada Price ¹	Avg US Price ²	Price Differential	Exchange Rate ³	Canada per Capita use ⁴	Michigan per Capita use ⁴	Excise Tax
2002	\$53.78	\$68.20	-\$14.42	0.636723	30	78.1	\$15.00
2003	\$63.81	\$60.30	\$3.51	0.718459	29	72.3	\$15.00
2004	\$69.61	\$66.00	\$3.61	0.770234	27.8	68.5	\$15.00
2005	\$71.99	\$61.70	\$10.29	0.826569	28.7	57.9	\$15.00
2006	\$74.08	\$60.00	\$14.08	0.881772	28.3	56.5	\$15.00
2007	\$77.59	\$57.20	\$20.39	0.935147	28.3	55	\$15.00
2008	\$77.22	\$57.30	\$19.92	0.944173	27.2	52.4	\$15.00
2009	\$76.83	\$69.80	\$7.03	0.880059	26.5	50.6	\$15.00
2010	\$79.17	\$64.00	\$15.17	0.970701	27.6	48.8	\$15.00
2011	\$83.11	\$62.60	\$20.51	1.011464	25.8	46.4	\$15.00
2012	\$84.41	\$63.80	\$20.61	1.00023	27.4	46.7	\$15.00
2013	\$86.06	\$67.60	\$18.46	0.971164	25.4	45.4	\$15.00
2014	\$91.74	\$71.70	\$20.04	0.905912	25.3	44.5	\$21.03
2015	\$96.07	\$85.20	\$10.87	0.782992	25.2	44.5	\$21.03
2016	\$100.62	\$88.60	\$12.02	0.755107	25.1	44.9	\$21.03
2017	\$105.62	\$87.10	\$18.52	0.771282	25	44.4	\$21.56
2018	\$114.90	\$87.50	\$27.40	0.771588	23.2	42.5	\$23.85
2019	\$119.79	\$94.10	\$25.69	0.753598	21.4	41.3	\$24.38
2020	\$126.29						
2021	\$136.13						
2022							
2023							

Source: <https://www.ofx.com/en-ca/forex-news/historical-exchange-rates/cad/usd/>,
<https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000201&cubeTimeFrame.startMonth=01&cubeTimeFrame.startYear=1995&cubeTimeFrame.endMonth=12&cubeTimeFrame.endYear=2022&referencePeriods=19950101%2C20221201>
<https://www.canada.ca/en/public-health/services/reports-publications/health-promotion-chronic-disease-prevention-canada-research-policy-practice/vol-41-no-10-2021/cigarette-affordability-canadian-provinces-10-year-review.html>

Notes: 1 - Average Price of a carton of cigarettes in Canada, CAD\$
2 - Average price of a carton of Cigarettes in the U.S. in CAD\$ using Michigan to represent the U.S.
3 - US\$ to buy 1 CAD\$

3.1 Price Elasticities of the Demand for Tobacco from CLBDFS

In Table 5 we display the data used in the regression equations and their sources. We basically used CRA and Statistics Canada data sources for the years 2002 to 2019. We avoided the Pandemic years since these represented outliers years where travel at the border was almost literally came to a standstill.

First, the demand for cigarettes at CLBDFS is quite sensitive to its own domestic price changes and to the prices across the border. The regression demand equations were estimated by regressing sales of tobacco products at CLBDFS on Canadian domestic prices of cigarettes and US prices across the border, both in linear and log linear forms. The linear specification allows us to estimate

the marginal effects of cigarette price changes on the sale of cigarettes at these shops. The log-linear allows us to estimate the price elasticities of these sales. Price elasticities measure the percentage change in the quantity demanded relative to a percentage change in the domestic price. A demand is said to be price elastic if the percentage change in quantity demanded is larger than the percentage change in prices, and is price inelastic if the percentage change in quantity demanded is less than the percentage change in prices.

Second, we estimated the responsiveness of tobacco sales at CLBDS to the imposition of the tax and to the price spread between Canadian domestic tobacco prices and US domestic prices corrected for exchange rate changes while taking into account of changes in per capita use of tobacco in both countries.

The results in Table 6 show that these sales are negatively affected by domestic price increases but positively affected by US price increases. Since the export tax on CLBDFS sales is now harmonized with the Canadian domestic excise tax rate, and both are increased annually based on inflation rates, any increase in Canadian domestic prices is also an increase in CLBDFS' which results in a decrease in CLBDFS sales, as sales are transferred to lower price jurisdictions such as the U.S. market or illicit channels. The coefficients are statistically significant with high t-values (these suggest that the individual variables are important determinants of tobacco sales and changes in their values are statistically significant in determining changes in sales). We also calculated the coefficient of Multiple Determination also known as the R^2 . This statistic signifies the extent to which the variables used to explain variations in the demand for tobacco at CLBDFS are significant determinants of change.

Changes in the domestic price of tobacco have negative effects on tobacco sales, as predicted by demand theory and as this price variable has a t-score of 5.3, which is significant at the confidence level of 99%, this prediction is certain to be confirmed in practice. The US price effect is positive and significant with a t-score of 2.1, signifying that a rise in US tobacco prices will increase sales of tobacco at CLBDFS and vice versa.

The R^2 is high (87%) suggesting that 87% of variance in tobacco sales at the CLBDFS is explained by these two variables. Furthermore, we estimated the demand for tobacco products at the Canadian shops using a set of other variables including the excise tax.

The relevance of these regression results cannot be exaggerated. They ascertain that any change in domestic tobacco prices that lead to higher levels (due for example to an increase in excise taxes) will reduce sales at CLBDFS and so does narrowing the difference between domestic prices and US prices. Actually, the results in Table 7 below reveal that a 10% increase in domestic prices of cigarettes at the CLBDFS would lead to a 7.9% decrease in sales.

Similarly the results presented in Table 7 suggest that a rise in the US price of cigarettes would increase sales at the CLBDFS. A 10% increase in US cigarette prices, other things being equal, will increase sales of cigarettes at CLBDFS by 1.8%. Put differently, any decrease in the relative prices of cigarettes in the US will reduce Canadian sales by 1.8%.

Table 6 Linear Regression of Total Tobacco Sales (Y3) on Canadian Cigarette Prices (X1) and U.S. Cigarette Prices (X2)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	64363387.76	5496758.14	11.70934	6.04E-09	52647325.1	76079450.4	52647325.12	76079450.39
X1	-515500.0041	96766.73799	-5.32724	8.46E-05	-721753.424	-309246.58	-721753.424	-309246.584
X2	291251.7092	138561.3584	2.101969	0.052859	-4084.83519	586588.254	-4084.83519	586588.2536

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	6.76953E+14	3.38E+14	23.0909	2.6364E-05
Residual	15	2.19877E+14	1.47E+13		
Total	17	8.96829E+14			

SUMMARY OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.868808965
R Square	0.754829017
Adjusted R Square	0.722139553
Standard Error	3828633.81
Observations	18

Table 7 Log-Linear Regression of Total Tobacco Sales (Y3) on Canadian Cigarette Prices (X1) and U.S. Cigarette Prices (X2)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	20.25276584	0.476367731	42.51498	3.33E-16	19.2310587	21.274473	19.23105867	21.27447301
X1	-0.791483658	0.22254509	-3.55651	0.00316	-1.2687954	-0.3141719	-1.2687954	-0.31417191
X2	0.180291955	0.234542687	0.768696	0.454847	-0.32275208	0.68333599	-0.32275208	0.683335987

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	0.210889071	0.105445	19.38591	9.2487E-05
Residual	14	0.07614929	0.005439		
Total	16	0.28703836			

SUMMARY OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.857150467
R Square	0.734706923
Adjusted R Square	0.696807912
Standard Error	0.073751169
Observations	17

3.2 Relative Price Elasticities of the Demand for Tobacco from CLBDFS

To gauge the effects of narrowing the price difference of cigarettes between US and Canada we constructed a variable X3 which is the Canadian price of a pack of cigarettes minus the US price in Canadian dollars using the relevant exchange rate (Table 8). The results indicate that narrowing this spread by aligning Canadian prices to US prices would increase Canadian sales of tobacco at CLBDFS. The coefficient of X3 is negative and highly statistically significant with t-score of 4.5 that suggests that narrowing the differential will increase CLBDFS' sales of tobacco and vice versa

if the spread were to increase. The percentage decline in CLBDFS sales is due to a widening of the price differential between US and Canadian prices (When Canadian prices rise on account of the Excise Tax, but US prices do not change). The exchange rate is defined as the number of US dollars needed to purchase one Canadian dollar, which means an increase in this variable represents an appreciation of the Canadian dollar. The results in Table 8 indicate that a depreciation of the Canadian dollar (becoming cheaper) will increase the sale of tobacco products in Canadian shops but this variable is not statistically significant given its low t-score of 0.65.

Per capita use of cigarettes has declined in both Canada and US during the study period. We used these prevalence indicators to control for the observed decreases in tobacco sales during this period, but added the excise tax variable. The results in Table 9 show that sales of tobacco would have decreased regardless of price given heightened health concerns about smoking, but the excise tax has a negative effect on sales. A rise in the excise tax will lead to a decrease in tobacco sales in the CLBDFS

The R^2 is quite high at about 94% and remains high (87%) even when adjusted for the decrease in degrees of freedom as the number of parameters is increased.

Table 8 Linear Regression of Total Tobacco Sales (Y3) on Canadian to U.S. Cigarette Price Differential (X3) and the Exchange Rate (X4)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	43217446.3	9699437.69	4.455665	0.000462	22543584.3	63891308.4	22543584.25	63891308.37
X3	-630407.543	138102.8533	-4.56477	0.000372	-924766.81	-336048.279	-924766.807	-336048.2793
X4	8136113.57	12453952.5	0.653296	0.523454	-18408858	34681085	-18408857.8	34681084.97

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	5.67951E+14	2.84E+14	12.95197	0.00054006
Residual	15	3.28879E+14	2.19E+13		
Total	17	8.96829E+14			

SUMMARY OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.79579342
R Square	0.63328717
Adjusted R	0.58439212
Standard Error	4682441.41
Observations	18

Table 9 Linear Regression of Total Tobacco Sales (Y3) on Canadian to U.S. per Capita Use (X6) and the Excise Tax (X7)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	10976754.4	6835434.842	1.60586	0.129147	-3592630	25546139	-3592630.11	25546138.9
X6	613640.028	73130.12533	8.39107	4.76E-07	457766.86	769513.2	457766.8552	769513.2
X7	-103793.56	220666.0196	-0.47036	0.644861	-574132	366544.93	-574132.048	366544.927

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>significance F</i>
Regression	2	7.92074E+14	3.96E+14	56.70858	1.014E-07
Residual	15	1.04756E+14	6.98E+12		
Total	17	8.96829E+14			

<i>SUMMARY OUTPUT</i>	
<i>Regression Statistics</i>	
Multiple R	0.93978359
R Square	0.88319319
Adjusted R	0.86761895
Standard Error	2642672.7
Observations	18

3.3 Price Elasticities of the Demand for Imported and Domestic Tobacco Sales at CLBDFS

Tobacco sales at CLBDFS include both tobacco products produced in Canada and imported tobacco. In what follows we present price elasticity estimates of the demand for tobacco products imported and those that are produced in Canada. The distinction is relevant given that CLBDFS were created to, whenever possible to increase the sales of Canadian-made products.

The elasticity regression results in tables 10 and 11 are for imported tobacco sales while those in tables 12 and 13 are for domestically produced tobacco. Imported tobacco product sales at CLBDFS are also price sensitive exhibiting; however, a different structure than that exhibited by total tobacco sales. Higher domestic prices increase sales of these products (assuming that the imported tobacco prices remain unchanged), and so will a rise in US prices. The t-scores on these parameters are significant and so is the R^2 . In all cases here the t-scores and the R^2 are lower than the corresponding values of these parameters associated with domestic tobacco product sales at CLBDFS. This is perhaps to the absence of control variables that typically increase the regression precision.

The positive price elasticity exhibited by the sales of imported tobacco products is due to the fact that the incentive to import products is higher when their domestic prices are higher. What is perhaps more interesting are the high elastic demands for these products. This is a reflection of the fact that these imported products are treated as substitutes to domestically produced products.

Table 10 Linear Regression of Imported Total Tobacco Sales (Y1) on Canadian Cigarette Prices (X1) and the Exchange Rate (X4)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-25570315.5	10569617.59	-2.41923	0.028724	-48098922	-3041708.8	-48098922.07	-3041708.84
X1	174645.4484	65116.59073	2.682042	0.017062	35852.7207	313438.176	35852.72068	313438.1761
X4	34038181.36	10310213.69	3.301404	0.004845	12062481.1	56013881.6	12062481.08	56013881.64

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	3.78805E+14	1.89E+14	8.750102	0.00303067
Residual	15	3.24686E+14	2.16E+13		
Total	17	7.03491E+14			

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.733801368
R Square	0.538464447
Adjusted R	0.476926374
Standard Error	4652499.186
Observations	18

Table 11 Log-Linear Regression of Imported Total Tobacco Sales (Y1) on Canadian Cigarette Prices (X1) and the Exchange Rate (X4)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	9.518576386	2.179365372	4.367591	0.000644	4.844302548	14.1928502	4.844302548	14.19285022
X1	1.685213258	0.496071602	3.397117	0.004338	0.621245489	2.74918103	0.621245489	2.749181027
X4	2.333729035	0.769381524	3.033253	0.008942	0.683569785	3.98388828	0.683569785	3.983888285

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	1.91977457	0.959887	8.251306	0.004290787
Residual	14	1.628641762	0.116332		
Total	16	3.548416332			

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.735542603
R Square	0.541022921
Adjusted R	0.475454767
Standard Error	0.341074119
Observations	17

Table 12 Linear Regression of Domestic Tobacco Sales (Y2) on Canadian Cigarette Prices (X1) and U.S. Cigarette Prices (X2)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	53906103.82	11212284.21	4.807772	0.00023	30007685.74	77804521.9	30007685.74	77804521.9
X1	-859209.5985	197384.7385	-4.35297	0.000568	-1279925.21	-438493.99	-1279925.21	-438493.987
X2	594707.9051	282637.3821	2.104137	0.052644	-7719.414507	1197135.22	-7719.41451	1197135.22

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	1.61661E+15	8.08E+14	13.25294	0.000484019
Residual	15	9.14858E+14	6.1E+13		
Total	17	2.53147E+15			

SUMMARY OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.799127917
R Square	0.638605428
Adjusted R	0.590419486
Standard Error	7809645.124
Observations	18

Table 13 Log-Linear Regression of Domestic Tobacco Sales (Y2) on Canadian Cigarette Prices (X1) and U.S. Cigarette Prices (X2)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	23.421515	1.88420875	12.43042	5.94E-09	19.38028916	27.4627408	19.38028916	27.4627408
X1	-2.844571923	0.880247294	-3.23156	0.00603	-4.732514601	-0.9566292	-4.7325146	-0.95662925
X2	1.418177538	0.92770218	1.528699	0.148615	-0.571545748	3.40790082	-0.57154575	3.40790082

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	1.584923003	0.792462	9.312515	0.002679414
Residual	14	1.191349591	0.085096		
Total	16	2.776272594			

SUMMARY OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.755567087
R Square	0.570881623
Adjusted R	0.509578997
Standard Error	0.291712871
Observations	17

Table 14 Linear Regression of the Ratio of Total Tobacco Sales (Y3) over Total Sales (Y6) on Price Differential (X3) and the Exchange Rate (X4)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	6.459656825	0.473453656	13.64	7.3E-10	5.45051424	7.46879941	5.450514245	7.468799405
X3	0.031105976	0.006741143	4.614	0.00034	0.01673757	0.04547438	0.016737569	0.045474384
X4	-3.53319491	0.607908369	-5.812	3.4E-05	-4.8289209	-2.2374689	-4.828920924	-2.23746889

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	1.911510509	0.956	18.2953	9.4711E-05
Residual	15	0.783606079	0.052		
Total	17	2.695116588			

SUMMARY OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.842169612
R Square	0.709249655
Adjusted R	0.670482942
Standard Error	0.228561601
Observations	18

Domestically produced tobacco sold at CLBDFS exhibit price elastic demands. This is to be expected given that these products are considered substitutes to imported tobacco. Sales of domestic tobacco react negatively to domestic price changes and positively to US price changes as expected. Both variables are statistically significant with high t-scores and the estimated equation has a relatively high R^2 .

3.4 Complementarity of Sales of Tobacco and Duty Free Other Products

It is seldom the case that border crossing travellers that purchase duty free products buy one single product. Any examination of the invoices of duty free purchases reveals a strong complementarity of purchases. This suggests that there exists a strong affinity of product purchases at duty free shops, which fact suggests that increasing taxes or prices on a line item is likely to affect the demand for a number of other products.

In what follows we test the hypothesis of complementarity of purchases at CLBDFS using two specifications. First, we used the ratio of tobacco purchases to total duty free purchases as the dependent variable in a number of regression equations in order to probe the stability of this ratio and our capacity to find its likely determinants. Secondly, we ran a few regression equations where we used the purchases of tobacco at CLBDFS as the dependent variable and used total duty free purchases at the same shops as the independent variable with a few control variables in order to probe the extent and nature of the connectivity of these purchases.

The regression results in Table 15 show clearly that this ratio (Y3) is a stable function that the price differential X3 and the control variable Canadian per capita consumption of cigarettes (X5) explain 85% of the variance of this ratio. In addition the price differential X3 and the per capita consumption of cigarettes have the right signs and both have high and significant t-score values.

Table 15 Linear Regression of the Ratio of Total Tobacco Sales (Y3) on Price Differential (X3) and Canada per Capita Use (X5)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	8344543.516	17643615.77	0.473	0.64306	-29261933	45951020.3	-29261933.31	45951020.34
X3	-368276.866	134880.6971	-2.73	0.01548	-655768.27	-80785.466	-655768.2667	-80785.46564
X5	1436688.77	614190.8339	2.339	0.03358	127571.997	2745805.54	127571.9967	2745805.544

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	6.48997E+14	3E+14	19.6402	6.4694E-05
Residual	15	2.47833E+14	2E+13		
Total	17	8.96829E+14			

SUMMARY OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.850680167
R Square	0.723656747
Adjusted R Square	0.68681098
Standard Error	4064748.962
Observations	18

Furthermore the log-linear specification results in Table 16 suggest that the elasticity of demand of the share of tobacco in total duty free sales at CLBDFS with respect to the price differential and to the prevalence rates are both inelastic with values less than 1.

Table 16 Log-Linear Regression of the Ratio of Total Tobacco Sales (Y3) on Price Differential (X3) and Canada per Capita Use (X5)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	14.91818327	1.05268888	14.17	1.1E-09	12.6603902	17.1759764	12.66039017	17.17597636
X3	-0.08920827	0.039805427	-2.241	0.04175	-0.1745824	-0.0038341	-0.174582417	-0.003834117
X5	0.861562769	0.30415996	2.833	0.0133	0.20920453	1.513921	0.209204535	1.513921003

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	0.190101805	0.095	13.7277	0.000501
Residual	14	0.096936555	0.007		
Total	16	0.28703836			

SUMMARY OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.813810241
R Square	0.662287108
Adjusted R Square	0.614042409
Standard Error	0.083210814
Observations	17

Furthermore, the addition of the excise tax variable increases the goodness of fit of the equation to 96.5% with the added insight that the excise tax on tobacco affects negatively this ratio (Table 17).

Table 17 Linear Regression of the Ratio of Total Tobacco Sales (Y3) on Total Sales (Y6), Price Differential (X3), the Exchange Rate (X4) and the Excise Tax (X7)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-41868266.5	28824526.07	-1.453	0.17006	-104139869.2	20403336.2	-104139869.2	20403336.16
Y6	0.359512438	0.062817712	5.723	7E-05	0.223803022	0.49522185	0.223803022	0.495221855
X3	-107648.311	130965.1909	-0.822	0.42592	-390581.4043	175284.783	-390581.4043	175284.7829
X4	35887273.47	17659478.81	2.032	0.06309	-2263711.047	74038258	-2263711.047	74038257.99
X7	-178561.055	411272.5436	-0.434	0.67129	-1067061.367	709939.258	-1067061.367	709939.2576

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	8.3435E+14	2E+14	43.4001	2.12673E-07
Residual	13	6.24799E+13	5E+12		
Total	17	8.96829E+14			

SUMMARY OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.964537443
R Square	0.930332478
Adjusted R Square	0.908896318
Standard Error	2192292.159
Observations	18

Table 18 Linear Regression of the Sales of Products Other than Tobacco (Y6-Y3) on Sales of Tobacco (Y3), Price Differential (X3) and the Exchange Rate (X4)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	162914441.8	16067310.92	10.1395	7.87E-08	128453487.2	197375396	128453487.2	197375396
y3	1.148677686	0.280593016	4.09375	0.001095	0.546865519	1.75048985	0.546865519	1.75048985
X3	71310.3377	231977.5746	0.307402	0.763063	-426232.0762	568852.752	-426232.0762	568852.752
X4	-109838314.8	13725302.37	-8.00262	1.36E-06	-139276160.6	-80400469	-139276160.6	-80400469

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	4.53512E+15	1.51E+15	58.38191	3.69824E-08
Residual	14	3.62508E+14	2.59E+13		
Total	17	4.89763E+15			

SUMMARY OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.962280104
R Square	0.925982998
Adjusted R Square	0.910122212
Standard Error	5088559.286
Observations	18

Table 19 Log-Linear Regression of the Sales of Products Other Than Tobacco (Y6-Y3) on Sales of Tobacco (Y3), Price Differential (X3) and the Exchange Rate (X4)

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	11.19303624	2.133783571	5.245629	0.000158	6.583277095	15.8027954	6.583277095	15.8027954
y3	0.408197255	0.118164593	3.45448	0.004271	0.152918172	0.66347634	0.152918172	0.66347634
X3	0.033445009	0.028647506	1.167467	0.26399	-0.028444164	0.09533418	-0.028444164	0.09533418
X4	-0.858800561	0.112066357	-7.66332	3.57E-06	-1.100905206	-0.6166959	-1.100905206	-0.61669592

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	0.156822913	0.052274	31.18967	3.30755E-06
Residual	13	0.021788173	0.001676		
Total	16	0.178611086			

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.93702365
R Square	0.878013321
Adjusted R Square	0.849862549
Standard Error	0.040939142
Observations	17

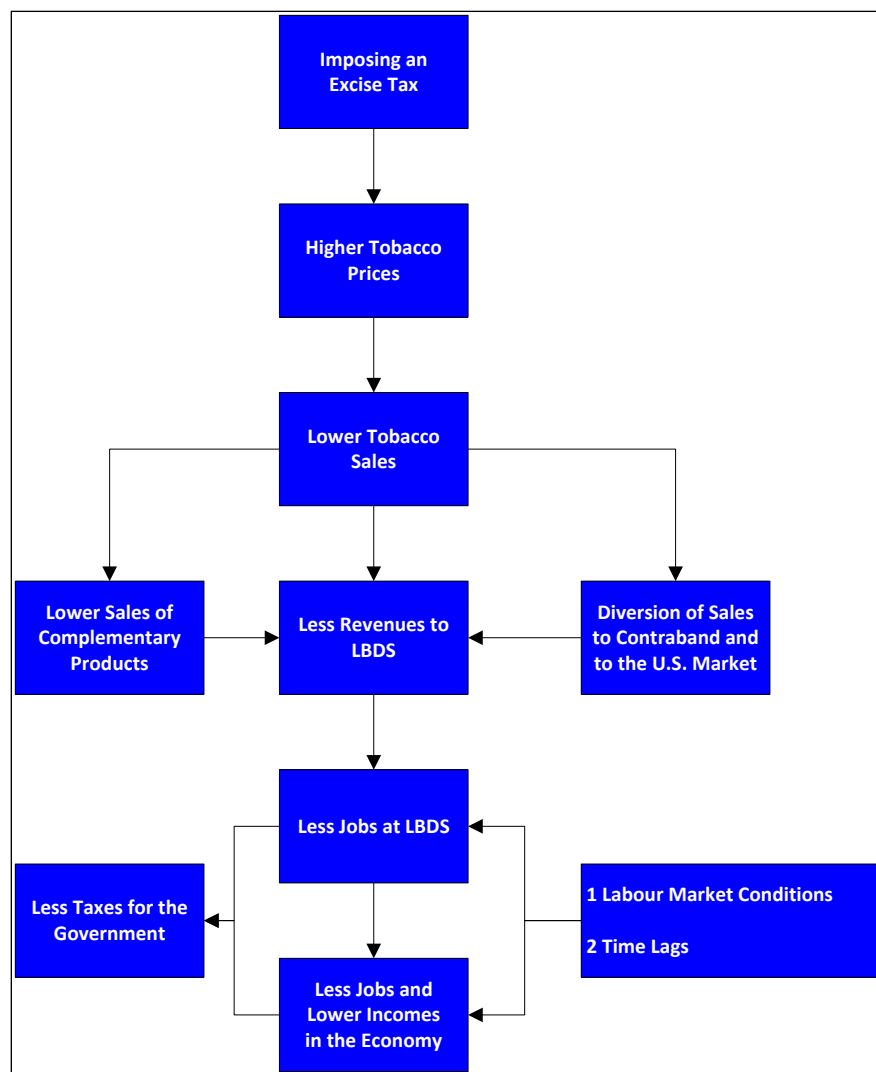
Alternatively, we examined the connectivity (complementarity) of duty free purchases of products other than tobacco with tobacco sales at CLBDFS over the period 2002 and 2018; the results in tables 18 and 19 show that the relationship is positive and significant in both the linear and log-linear specifications. This result is of crucial importance as it suggests that any reduction in the sale of tobacco products at the CLBDFS will induce decreases of sales of other items, magnifying the negative impacts of the special excise tax on tobacco exports.

The negative impacts of the Export Tax on tobacco sales at CLBDFS (exports) will not be restricted to sales of these products. Rather the economic impact results in the next section show clearly that the reduction in export sales of tobacco products at CLBDFS will also induce reductions in total sales and in the operations and economic viability of the duty free shops. These reductions in duty free sales will in turn translate into lost revenues at the CLBDFS and more importantly in lost jobs and incomes in the Canadian economy. What is perhaps less appreciated is the fact that if the intention of the government is to raise revenues by imposing the excise tax, the estimates presented in the next section indicate that this objective will be undermined by the reduction in total government revenues on account of the negative macroeconomic impacts of reduced operations directly of the CLBDFS and the spin-offs effects in the economy at large.

4.0 – The Economic Impact of the Land Border Duty Free Shops: Benchmarking the Industry Impacts

The economic impact consequences on increasing the Excise Tax on tobacco are driven by the expected drop in sales in tobacco and other duty free products as a consequence of the change in the excise tax on tobacco at CLBDFS as depicted schematically in Figure 3.

Figure 3
Land Border Duty Free Shops – Economic Impact Analysis
of Imposing a Higher Excise Taxes on CLBDFS Tobacco Exports



The analysis of the expected loss of economic activity in the land based duty free sector and the economy at large begins with estimating the economic contributions of the sector before and after the imposition of the higher excise tax. Total sales of CLBDFS exceeded \$156.9 million in 2018. A similar level of sales was achieved in 2019. The pandemic reduced sales drastically in 2020 and

2021, but the expectation is that the CLBDFS will recover their earlier levels of operation in 2024 and beyond (tables 1a, 1b and Figure 1).

This total volume of sales sustained significant impacts in the Canadian economy. These impacts are presented in 4 tables and 4 figures displayed below. A summary of these impacts include the following results displayed in Table 20 and Figure 4:

- The total Canadian income impact of the CLBDFS operations exceeded \$242.2 million, driven primarily by sales of alcohol, tobacco, perfumes/cosmetics/skincare products.
- Wages and salaries in Canada are augmented by over \$138.4 million sustaining an average wage of \$45 thousand.
- About 3,081 Canadians owe their full time equivalent jobs to the CLBDFS operations.
- All levels of government collect tax revenues on these sales' increases impacts to the tune of \$92.5 million, with the Federal government collecting \$56.3 million and the provincial governments collecting almost \$27.1 million, and local governments collecting \$9.1 million.

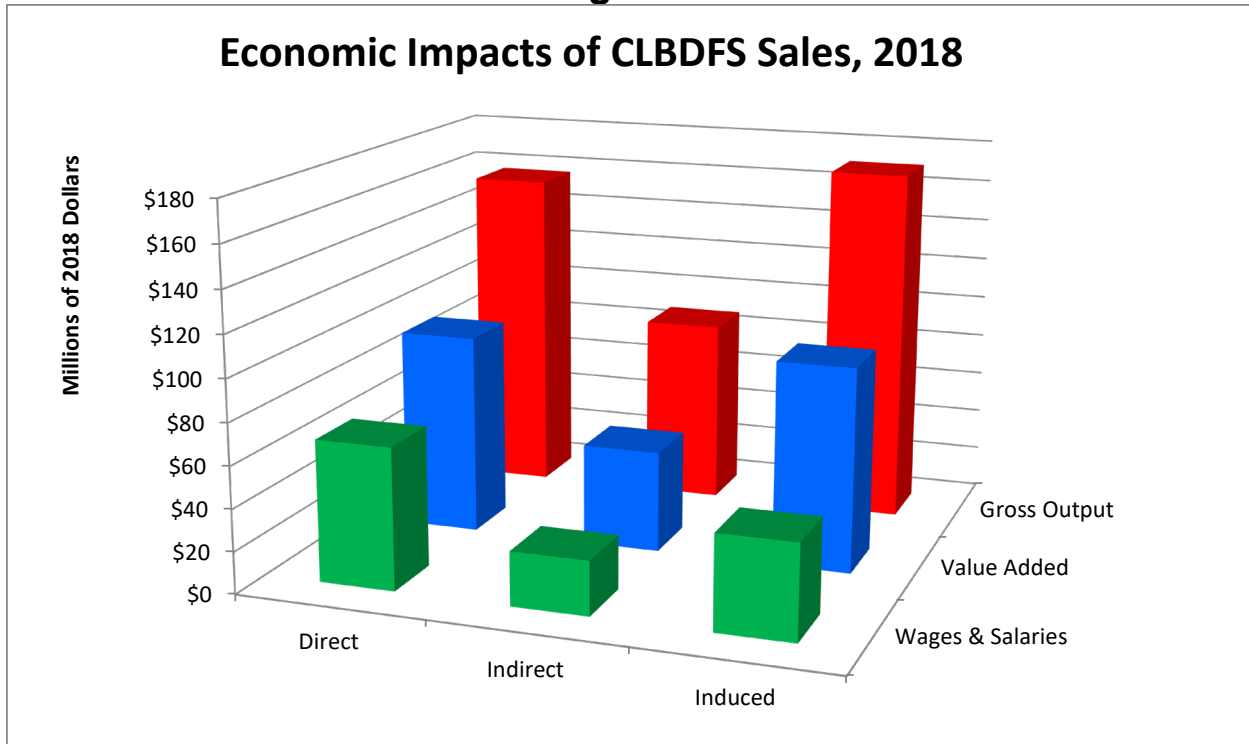
Table 20
Economic Impacts of CLBDFS Sales
(2018 Dollars)

Initial Expenditure	\$156,940,744
Value Added	
Direct	\$96,003,357
Indirect	\$48,466,779
Induced	\$97,812,314
Total	\$242,282,450
Multiplier	1.54
Gross Output	
Direct	\$156,940,744
Indirect	\$88,460,021
Induced	\$170,571,041
Total	\$415,971,806
Multiplier	2.65
Wages & Salaries	
Direct	\$67,586,396
Indirect	\$25,803,762
Induced	\$45,059,350
Total	\$138,449,508
Employment	
Direct	1,767.9
Indirect	403.7
Induced	909.8
Total	3,081.4
Multiplier	1.74
Taxes	
Federal	\$56,329,656
Provincial	\$27,083,224
Local	\$9,111,320
Total	\$92,524,200
Imports	
From Other Countries	\$38,967,266
Total	\$38,967,266

Source: Econometric Research Limited

\$44,930.72

Figure 4



4.1 The Tax Impacts

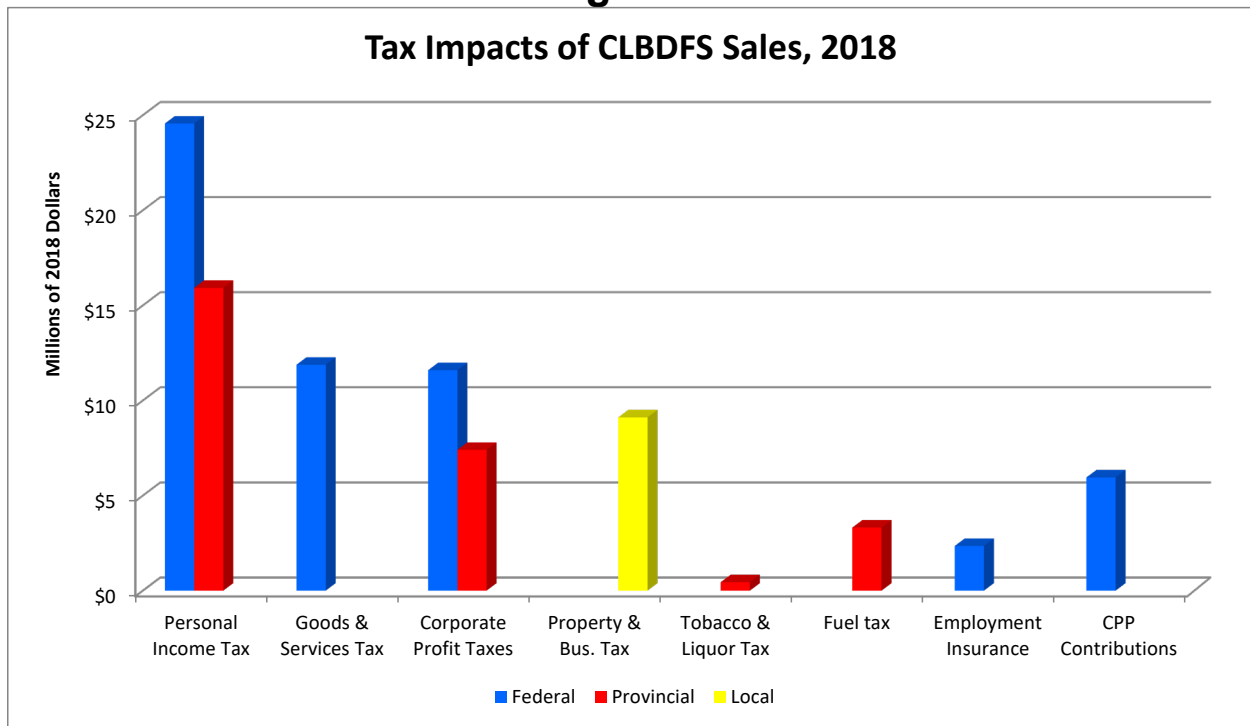
The tax revenues of the different levels of government by type of tax are presented in Table 21 and Figure 5. The largest tax revenues are derived from personal income taxes, with the federal government collecting \$24.6 million and the provincial governments collecting about \$16 million, for a total of \$40.5 million. Corporate profit taxes of about \$19 million represent the second largest source of government revenue. GST revenues contribute the third largest tax revenues of \$11.9 million.

Table 21
Tax Impacts of CLBDFS Sales, 2018
(2018 Dollars)

	Federal	Provincial	Local	Total
Personal Income Tax	\$24,558,998	\$15,919,036	\$0	\$40,478,034
Goods & Services Tax	\$11,877,632	\$0	\$0	\$11,877,632
Corporate Profit Taxes	\$11,590,645	\$7,402,473	\$0	\$18,993,118
Property & Bus. Tax	\$0	\$0	\$9,111,320	\$9,111,320
Tobacco & Liquor Tax	\$0	\$444,672	\$0	\$444,672
Fuel tax	\$0	\$3,317,043	\$0	\$3,317,043
Employment Insurance	\$2,350,037	\$0	\$0	\$2,350,037
CPP Contributions	\$5,952,344	\$0	\$0	\$5,952,344
Total	\$56,329,656	\$27,083,224	\$9,111,320	\$92,524,200

Source: Econometric Research Limited

Figure 5



These tax revenues are not collected on the sales of liquor or complementary products (they are tax-exempt) but on their economic impacts. They include tax revenues from personal income taxes on the direct, indirect and induced impacts of these sales on personal incomes. They also include tax revenues on spin-off effects on sales and profits.

4.2 The Employment Impacts

Over 3,081 person years of employment (Full-Time Equivalent Jobs) are generated and sustained by CLBDFS operations in Canada, of which over 1,768 person years will be direct employment. These person years are not only full-time job equivalent and recurrent; they could be multiples of these numbers if we were to express them in job numbers. A large contingent of these jobs, particularly the direct jobs are held by women and students who work part-time.

The sectoral distribution of the employment impacts reveals a diversified structure (Figure 6 and Table 22). However, a very large share of this employment is in the retail trade sector (1,860), which includes a sizeable employment complement onsite. To this number of positions another 147 person years are added in the accommodation and food services sector, 141 in finance, insurance and real estate, 129 in other services, 107 in administrative services and waste management, 100 in health care and social services, 96 in professional and business services, 74 in manufacturing, 60 in transportation and 59 in repair construction. A few other sectors are impacted but show only smaller numbers of full-time equivalent jobs such as arts and culture, and government health and education services, etc.

Figure 6

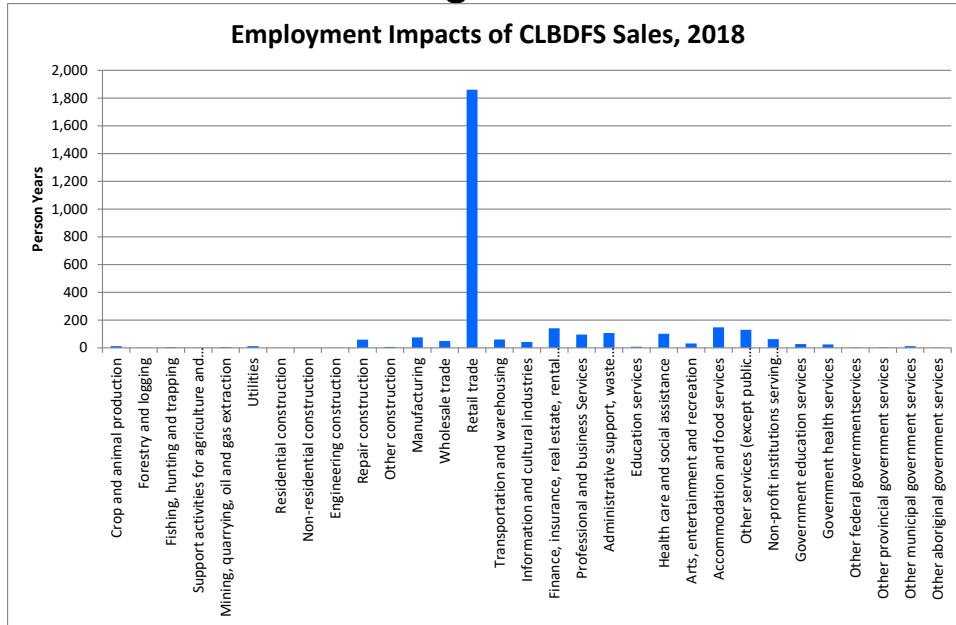


Table 22
Employment Impacts of CLBDFS Sales, 2018
(Person Years)

Crop and animal production	12.57
Forestry and logging	1.82
Fishing, hunting and trapping	4.81
Support activities for agriculture and forestry	0.63
Mining, quarrying, oil and gas extraction	4.92
Utilities	12.47
Residential construction	0.00
Non-residential construction	0.00
Engineering construction	0.00
Repair construction	59.32
Other construction	6.24
Manufacturing	74.78
Wholesale trade	48.55
Retail trade	1,860.18
Transportation and warehousing	59.67
Information and cultural industries	42.25
Finance, insurance, real estate, rental and leasing	141.43
Professional and business Services	95.61
Administrative support, waste management	107.21
Education services	7.62
Health care and social assistance	100.62
Arts, entertainment and recreation	30.89
Accommodation and food services	147.59
Other services (except public administration)	129.53
Non-profit institutions serving households	62.27
Government education services	27.31
Government health services	24.80
Other federal governmentservices	2.77
Other provincial government services	2.67
Other municipal government services	12.81
Other aboriginal government services	0.05
Total	3,081.39

Source: Econometric Research Limited

4.3 Gross Output, Sales and Revenue Impacts

The Canadian economy comprises many sectors and activities with extensive linkages and connections. The sale volume of \$156 million is leveraged to a total sale of \$416 million when the indirect and induced sales are included (Table 23 and Figure 7).

Table 23
Gross Output Impacts of CLBDFS Sales, 2018
(2018 Dollars)

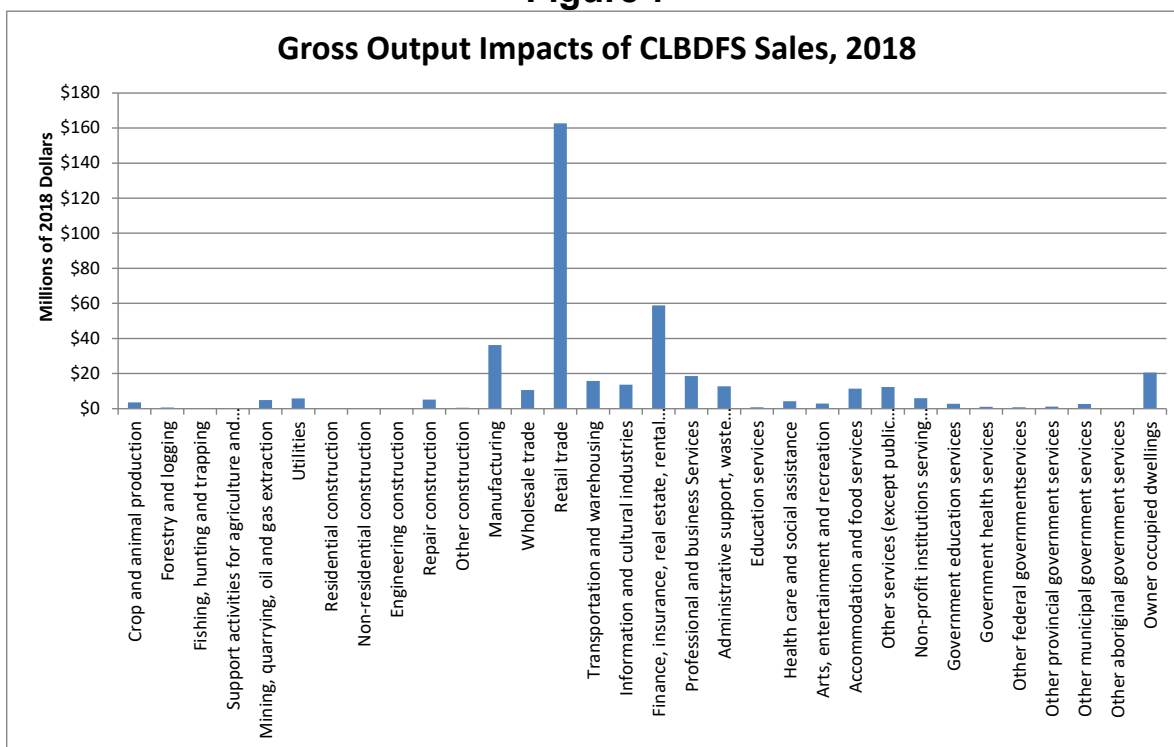
Crop and animal production	\$3,524,131
Forestry and logging	\$558,760
Fishing, hunting and trapping	\$187,247
Support activities for agriculture and forestry	\$180,721
Mining, quarrying, oil and gas extraction	\$4,851,097
Utilities	\$5,784,895
Residential construction	\$0
Non-residential construction	\$0
Engineering construction	\$0
Repair construction	\$5,071,653
Other construction	\$533,574
Manufacturing	\$36,305,586
Wholesale trade	\$10,579,628
Retail trade	\$162,630,220
Transportation and warehousing	\$15,814,789
Information and cultural industries	\$13,649,218
Finance, insurance, real estate, rental and leasing	\$58,905,097
Professional and business Services	\$18,493,701
Administrative support, waste management	\$12,652,814
Education services	\$770,893
Health care and social assistance	\$4,142,049
Arts, entertainment and recreation	\$2,897,820
Accommodation and food services	\$11,394,352
Other services (except public administration)	\$12,253,605
Non-profit institutions serving households	\$5,890,924
Government education services	\$2,761,401
Government health services	\$1,020,684
Other federal governmentservices	\$793,176
Other provincial government services	\$1,147,646
Other municipal government services	\$2,625,825
Other aboriginal government services	\$8,281
Owner occupied dwellings	\$20,542,017
Total	\$415,971,804

Source: Econometric Research Limited

Naturally the largest sales are accounted for by the retail sales sector, followed by finance, insurance and real estate. Manufacturing sales are also prominent and so are professional and business services, administrative support and waste management, accommodations and food services and a large set of service oriented sectors.

The gross output (sales) measure is often neglected in impact analysis studies as it suffers from the inclusion of many intermediate outputs and therefore it exaggerates the impacts on account of double counting. Nonetheless gross output measures are important indicators of economic activity and the relative contributions of sectors to taxes, revenues and employment. It is this consideration that explains why we have estimated this variable in this study. The contribution of about a half billion dollar in sales is a major impetus in the Canadian economy accounted for by the CLBDFS.

Figure 7



5.0 - Economic Impact Losses Associated with Imposing a Higher Excise Tax on CLBDFS Tobacco Sales

The analysis of the regression results in Section 3 reveals a high and statistically significant sensitivity of tobacco sales at CLBDFS to changes in domestic tobacco prices in the non-duty-free market, particularly when these changes are not matched by similar and equivalent changes in US prices.

Given that the demand for tobacco is found to be price inelastic, it follows that higher domestic tobacco prices trigger lower sales. Actually, the estimated price elasticity in Table 7 is $-.791$. This means that a 10% increase in domestic tobacco prices will reduce the sales of tobacco at CLBDFS by 7.91%. This is not the end of the negative impacts, given that the regression results also indicate a strong affinity of tobacco sales with the sale of other duty free products. Actually, the linear regression results in Table 18 and the elasticity estimates in Table 19 both indicate a positive and

statistically significant (high t-scores) association or complementarity (\$1.15) and a positive elasticity coefficient (0.41). This result suggests that a \$1 decrease in tobacco sales will trigger a \$1.15 decrease in the sales of other duty free products. Put differently, a \$1 decrease in tobacco sales will trigger a total decrease of \$2.15 in overall CLBDFS sales.

The Excise Tax on tobacco stood at \$31.66 per carton of cigarettes on April 1, 2023. There was an increase of \$1.49 per carton on April 1, 2024 reflecting the annual inflationary adjustment and another increase of \$4 per carton on April 17, 2024 of the Federal Excise tax. These changes raised the Excise tax per carton to \$37.15 or a total increase of \$5.49 per carton representing a 17.34% increase in the tax rate.

The change in the Excise Tax raised the price of a carton and alone is responsible for a decrease of duty free tobacco sales by 2.57% (This is the result of multiplying the percentage increase of the tobacco prices by the elasticity value of -0.791). Using this decline in expected tobacco sales amounting to \$0.88 million (total tobacco sales in 2019 were \$34.238 million, a level that we are assuming will be recovered once the pandemic effects are factored out. This represents a 2.57% decline in duty free tobacco sales which is equal to the \$0.88 million. The losses of tobacco sales also trigger losses in the sales of other duty free products as validated by the regression results in Table 18 which showed that for every dollar lost in tobacco sales another \$1.15 are lost in the sales of other duty free products (e.g., alcohol, perfumes, etc.). Multiplying the lost sales in tobacco by this parameter, we estimate the loss of sales of other duty free products by an average of \$1.01 million. Thus, the total expected loss of sales of duty free products (of tobacco and other complementary products) on account of the new excise tax would exceed \$1.89 million or a total of 1.22%.

These losses are real but they pale in relation to the economic losses the Federal Excise Tax on tobacco products sold by the CLBDFS has instigated. What follows is a discussion of the magnitude of losses that the imposition of the Federal Excise Tax has meant to the Canadian Economy. Put differently, the estimates below identify and quantify what the Canadian economy could gain if the Federal Export (Excise) Tax on duty free tobacco products is eliminated.

The estimates of gains or losses, that the imposition of the Excise Tax on duty free tobacco can be used to estimate any scaling of the tax. We will particularly consider reducing it; say to \$15 as an example of identifying the impacts of different values of the tax.

The elimination of the Federal Excise tax of \$37.15 per carton of cigarettes represents a decrease of 22.02% of the price of a carton. Using the price elasticity value of -0.791, this translates into an increase of duty free tobacco sales in the order of 17.4%. This would represent a total increase of sales by \$5.98 million in duty free tobacco sales. Given the complementarity of sales at duty free shops of other products, a total increase in the sales of other products by \$6.86 million is expected (this is equal to \$5.96 million times \$1.15). The combined sales increase is equivalent to \$12.82 million, or an 8.28% increase in total duty free sales. The magnitude of these positive economic impacts is also a result of the significant migration of sales back to duty free from U.S. retailers and from Illicit Channels.

The economic impacts of the increased sales of duty free products triggered by the elimination of the excise tax include the following:

- 1) A total of \$34.42 million gain in total economic activity.**
- 2) GDP of Canada will increase by \$20.05 million.**
- 3) Wages and Salaries (labour income) gains will exceed \$11.46 million.**
- 4) Employment gains will include 255 Full Time Equivalent Jobs.**
- 5) Total government tax revenues will increase by \$7.66 million with the Federal government gaining over half of this total at \$4.66 million.**

We also considered the impact of reducing the federal excise tax to \$15 instead of the full elimination of the tax. The following are the expected results:

- 1) A total of \$30.42 million gain in total economic activity.**
- 2) GDP of Canada will increase by \$17.72 million.**
- 3) Wages and Salaries (labour income) gains will exceed \$10.13 million.**
- 4) Employment gains will include 225 Full Time Equivalent Jobs.**
- 5) Total government tax revenues will increase by \$6.77 million with the Federal government gaining over \$4.12 million.**

6.0 Excise Taxes and Illicit Tobacco Sales

A number of academic studies have been conducted recently exploring the link between taxes on tobacco products, consumption rates and the use of contraband products. An interesting and relevant recent study was authored by Jean-Francois Ouellet, et. al.,¹ using a unique dataset compiled by Statistics Canada to estimate several models that explore consumers' behaviour towards cigarettes as taxes are reduced, their resort to consuming smuggled products, as well as a range of individual factors that typically influence their smoking behaviours. Their results confirm that consumption of smuggled cigarettes is "directly and strongly linked to the level of taxes and that this behaviour can be efficiently curbed by tax reduction." Actually, they estimated that tax cuts could explain about 17% a smoker's decision to stop regularly consuming smuggled cigarettes.

¹ Jean Francois Ouellet, M. Restuccia, A. Tellier and C. Lacroix. 2010. "The Impact of Cigarette Tax Reduction on Consumption Behaviour: Short-and Long-Term Empirical Evidence from Canada. Scientific Series. Montreal.

These findings were more recently confirmed by an Ernst & Young Study in September 2023.² The EY study found that the tobacco industry in Canada has notoriously grown underground in the last decade, without remitting so much as a dollar in provincial or federal taxes. The contraband tobacco industry in Canada is possibly costing the governments of British Columbia, Ontario and Newfoundland as much as **\$2.47 billion** in lost tax revenues between 2019 and 2022.

In an effort to reduce smoking rates, the Canadian federal and provincial governments have increased taxes on legal tobacco products. The result was that many smokers have sought cheaper tobacco on the illicit market instead. Unfortunately, these cigarettes are illegally sold, tax and duty free, without any Health Canada regulations or inspections and retail for a fraction of legal tobacco prices. The authors declared that “it is not surprising that the Canadian contraband tobacco market is growing at a pace that it is eclipsing the legal tobacco market in nearly every corner of the country”.³

In 2020, the Covid-19 Pandemic reduced travel to a trickle and with it the demand for illegal tobacco. When on-reserve cigarette factories and distribution networks re-opened in 2021, legal sales plummeted back down to pre-pandemic levels as the production and distribution of contraband tobacco products resumed.

The major driver of the explosive growth of illegal cigarettes in Canada once the Pandemic ended was again the significant price difference between tax-paid legal cigarettes and contraband cigarettes which could be purchased for only 40% of the legal priced and taxed cigarettes. EY Study estimates that in 2022 contraband cigarettes likely accounted for at least 32.1 percent of the total market in British Columbia and perhaps as much as 44.9 percent, at least 38.7 percent in Ontario and perhaps as much as 50.3 percent and at least 31.1 percent of the market in Newfoundland and perhaps as much as 44.2 percent.

6.1 Summary of the Convenience Industry Council of Canada (CICC) Recommendations for Governments to Combat Contraband Tobacco Sales:

1. Increase Policing Resources
2. Increase Enforcement and Penalties
3. Public Awareness
4. Regular and Public Reporting
5. Greater Federal-Provincial Coordination

7.0 Conclusions

² Ernst & Young. September 2023. “Contraband Tobacco in British Columbia, Ontario and Newfoundland & Labrador.

³ Christian Leuprecht, May 2018. “Cause and Effect: Why Higher Taxes Require Better Contraband Enforcement to Reduce Smoking” Macdonald-Laurier Institute Commentary.

Throughout years the CLBDFS' operations made valuable income, sales, employment and tax impacts in the Canadian economy. While these impacts may not be sizeable, the comparative multipliers associated with them are significant and generally above industrial multipliers. Being driven by exports these impacts represented incremental impacts that are difficult to replace.

The potential impacts of the CLBDFS could be much larger, if and when, their operations recover from the pandemic and they can resume their normal growth. Equally important and relevant are the deliberate support programs they can receive from the governments, especially refraining from imposing any additional constraints or taxes on their operations that could undermine their critical role as export nodes and increase the diversion of sales to illegal, unsupervised and untaxed sources and US sales of similar products.

The employment impacts supported by the CLBDFS are unique in that they generate good and sustainable multiple opportunities to the youth, females and disadvantaged groups, given their hours of work and nature of the jobs.

The regression results demonstrated beyond doubt that the export potential is critically dependent on prices of the duty free products remaining competitive with the prices of these products across the border and with contraband sales. Actually, the results indicate a high rate of sensitivity of sales to the spread of prices (difference) between those in Canada and those in the US. The wider the difference (Canadian duty free prices being lower than those across the border), the higher are the Canadian duty free sales and the higher are the economic benefits derived on these sales in Canada.

The CLBDFS are at a critical juncture of their development as they strive to recover from the drastic impacts of the Pandemic. This is where government support can be especially effective. The results of this Report suggest that the best support involves eliminating or at least reducing the Federal Excise Tax, so that the CLBDFS can compete on a level playing field with the US competitors and the contraband alternatives.