



Across the Cabot Strait

The Impact of a Rise in Ferry Service Fees on
Newfoundland and Labrador's Economy

Presented to: Hon. Gerry Byrne, PC, MHA, Minister of Fisheries and Land
Resources

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Preface

This research was undertaken by The Conference Board of Canada for the Hon. Gerry Byrne, PC, MHA, Minister of Fisheries and Land Resources for the province of Newfoundland and Labrador. In keeping with Conference Board guidelines for financed research, the design method of research, as well as the content of this study, were determined by the Conference Board. The research was conducted by Sam Goucher, Senior Economist, under the guidance of Pedro Antunes, Chief Economist at the Conference Board of Canada.

About the Conference Board

The Conference Board of Canada is the foremost independent, not-for-profit, applied research organization in Canada. We help build leadership capacity for a better Canada by creating and sharing insights on economic trends, public policy issues, and organizational performance. The Conference Board's Economics knowledge areas employ roughly 35 professional economists, who combine their knowledge across regions and sectors to produce their forecasts. The Board has constructed and maintains econometric models of the national and regional economies and a one-of-a-kind, comprehensive quarterly database of the provincial economies in Canada. The Conference Board of Canada was established in 1954, and is affiliated with the U.S.-based Conference Board, Inc., which serves some 2,000 companies in 60 nations

Executive Summary

Newfoundland and Labrador is harder to reach than many of Canada's other provinces. After all, Newfoundland is an island and both Newfoundland and Labrador are remote, with many parts of the province not easily accessible by road, water or other modes of transportation. Because of this, when the province entered into the constitution, the ferry service was given special constitutional status. The Newfoundland Act of 1949 states that "Canada will maintain in accordance with the traffic offering a freight and passenger steamship service between North Sydney and Port aux Basques,..."¹

Marine Atlantic, a federal crown corporation, currently provides ferry service on the constitutionally required route as well as a seasonal summer service between North Sydney and Argentia in Southeastern Newfoundland. Revenues from commercial and passenger fares fall well shy of Marine Atlantic's expenditures and the Corporation receives sizeable federal government subsidies to maintain operations.

Since its inception in 1986, Marine Atlantic has raised commercial and passenger fees at a pace well above inflation. We find that if fees had grown at the rate of inflation, current passengers and commercial vehicles fares would be nearly halved. This is important because Marine Atlantic is essentially the only game in town—for most imported and exported goods, and for many passengers and tourists, there are few or no options to the ferry service. As such, changes to Marine Atlantic fares can result in important repercussions for the province's economy.

This report evaluates the direct economic contribution of Marine Atlantic services to Newfoundland and Labrador's economy, as well as the impact of a change in ferry service fees on the province's economy. Our estimates suggest that Marine Atlantic's real GDP has grown at a 0.7 per cent clip over the past five years—directly contributing roughly 0.16 per cent to Newfoundland and Labrador's GDP in 2017. Moreover, through its supply chain, Marine Atlantic's operations support many more jobs and economic activity across the Atlantic provinces and other regions in Canada.

Using the Conference Board of Canada's economic model of the Newfoundland and Labrador economy, we also quantify the impact of a change in ferry service fees on the province's economy. For the purpose of our analysis, we conduct three separate simulations. In the first scenario, we assume that ferry service fees are brought back to their 1992 rates and from then on grow at 75 per cent of the rate of inflation; this is comparable to the toll increases on the Confederation Bridge, which connects Prince Edward Island to New Brunswick. In the second scenario, we provide an estimate (or rule of thumb) of future changes in the economy associated with a 5 per cent lift in ferry fees. In the third scenario

¹ Miscellaneous provisions of the British North America Act, 1949 - Enactment No. 21. See : <http://www.justice.gc.ca/eng/rp-pr/csj-sjc/constitution/lawreg-loireg/p1t213.html>

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(located in Appendix B), we assume that ferry service fees are brought back to their 1986 inflation-adjusted values—a 45 per cent drop from 2017 rates.

Simulation results suggest that under the first scenario, the drop in fares would lift real GDP in Newfoundland and Labrador by \$145.6 million and lead to the creation of 1,237 jobs in the first year of the simulation—equivalent to about 0.4 of GDP and 0.6 per cent of employment in 2017.

An increase in households' purchasing power makes the largest contribution to the boost in real economic activity, as real consumer spending rises by \$98.6 million in the first year of the simulation. More important is the positive impact of lower transportation fees on Newfoundland and Labrador's export competitiveness—both in terms of goods and service sector exports. Overall, the volume of goods and service sector exports is raised by \$54.8 million and \$41.8 million, for a cumulative gain of more than \$96.6 million over the two years of the simulation. The boost to competitiveness and increase in economic activity stimulates business investment. Real private capital investment rises by \$17.9 million in year one of the simulation, and this expands to a gain of \$47.8 million in the second year of the simulation, as investment spending typically lags economic activity. The decrease in import prices and increase in aggregate demand within the province results in a boost to imports that mitigates the overall effect on real GDP.

On an industry basis, production gains are felt across a wide range of both goods- and service-producing sectors, reflecting the broad range of transport services provided by Marine Atlantic. The lion's share of industry impacts will be felt in the wholesale and retail trade sectors, along with other commercial services, reflecting the boost in consumer and tourism spending. The increase in exports and investment will benefit goods production (manufacturing, primary sector, and construction) as well as services such as finance, insurance, real estate and transportation.

Simulation results suggest that a permanent drop in fares would significantly lower price levels in the near term, but not have a lasting impact on inflation. Moreover, other adjustments to the economy will dampen the positive impact of the drop in fares on real GDP in year two of the simulation and thereafter. Still, the impact on real GDP and prices is not negligible given that the effects are attributed to a single corporation lowering its service fees.

In the second scenario, the simulation reveals that for a 5 per cent increase in ferry fees, the economy responds with an overall decline of 13.0 million in real GDP. This reduces the number of workers by about 110 and scales down household consumption by 8.8 million.

Over the years, passenger and commercial ferry service rates have increased at a pace well above inflation. Our analysis shows that this has contributed to lifting prices in Newfoundland and Labrador and has eroded real household incomes and the competitiveness of the province's export and tourism sectors.

1. Introduction

Since 1986, Marine Atlantic Inc., a federal Crown corporation, has provided ferry service through the constitutionally required route, as well as other ferry services throughout Atlantic Canada.² Currently, the company operates only two routes across the Cabot Strait, transporting people, vehicles and goods between North Sydney and Argentia (southeast Newfoundland) and between North Sydney and Port aux Basques (southwest Newfoundland). The shorter 96-nautical-mile North Sydney to Port aux Basques service is provided daily and year-round, while the longer 280-nautical-mile service to Argentia is provided three times weekly over the summer months.

Marine Atlantic maintains these services through a difficult maritime route, in one of the harshest marine environments in the country. It uses four hybrid ships that can carry cargo, cars and trucks and provide passenger accommodations. Marine Atlantic's crew and ships operate in both pleasant summer conditions and harsh winter weather. Severe winter winds, huge waves and ice build-up can make operations unpredictable during the winter months and, to cope with these adverse conditions, the corporation has invested heavily in high-end ferries.

Over the years, easing passenger demand has resulted in a steady decline in the number of single crossings. In 2017–18, Marine Atlantic ran 1,685 single crossings—down from 1,908 in 2011–12—representing an average decline of 2.1 per cent annually. Commercial vehicle traffic has declined at a 2.0 per cent rate over the same period, while passenger vehicle traffic dropped about 0.7 per cent on average. Faced with weakening traffic volumes, Marine Atlantic has relied on fare increases to boost its revenues, maintain services and raise salaries. Over the 2008 to 2017 period, commercial fares increased by 3.3 per cent annually for the year-round Port aux Basques service, while fares for the seasonal Argentia service rose by 2.3 per cent annually. While passenger prices have risen slightly below inflation over the same period, in total, ferry service fees have grown an average 3.3 per cent—compared to overall inflation of 1.9.

Overall, fare increases (in the midst of declining passenger levels) have helped Marine Atlantic grow its own source revenues by about 1.9 per cent annually over this period. Still, in order to make ends meet, Marine Atlantic relies on substantial annual subsidies from the federal government. Federal funding averaged about 1.66 times own-source revenues over the past four years.

The employment and other activity generated by Marine Atlantic's operations have a major direct impact on the economies of Nova Scotia and Newfoundland and Labrador. In addition, marine transportation typically has important supply chain impacts, benefiting supplier industries across the Atlantic (and other) provinces. But more importantly for

² Previous to 1986 the ferry service was provided by CN Marine; in 1986 CN Marine was restructured and renamed Marine Atlantic.

Newfoundland and Labrador, the ferry service is critical to the province's trade as it is essentially the only economically viable way to bring some goods in and out of the province.

The purpose of this report is to evaluate the direct economic contribution of Marine Atlantic services to Newfoundland and Labrador's economy as well as the impact of a change in ferry service fees on the province's economy. Because Marine Atlantic relies so heavily on federal subsidies to maintain operations, private sector service providers are likely unable to compete at current rates. For some travelers and light, high value cargo, air transport may be an option, but for other travelers (especially those bringing their vehicles) and low value or heavier cargo, the Marine Atlantic service is essentially the only option. This suggests that rate increases must be fully absorbed, pushing up the cost of goods sold in the province, eroding the competitiveness of exports and the competitiveness of the province's tourism industry.

Rather than focusing on the impact of past increases in ferry service fees, we look ahead, to assess the impact on Newfoundland and Labrador's economy if ferry service fees were significantly reduced. If ferry service fees had been in line with the federal government's PEI Confederation Bridge rate deal, where annual rate increases could rise by no more than 75 per cent of overall inflation, they would be roughly 56 per cent lower than they are today. We rely on the Conference Board's macroeconomic model of the provincial economy to quantify the potential impact on Newfoundland and Labrador of a reduction in service fees back to inflation-adjusted 1992 levels using the Confederation Bridge formula.

Section 2 provides an overview of Marine Atlantic's direct economic contribution to the economies of Newfoundland and Labrador and Nova Scotia. In Section 3, we discuss the main assumptions and implications of a significant decrease in ferry service fees on Newfoundland and Labrador's economy. Section 4 offers some concluding comments.

2. Marine Atlantic's Contribution to Newfoundland and Labrador's Economy

Statistics Canada does not isolate and report on the value of the marine transportation industry for the provinces of Nova Scotia and Newfoundland and Labrador. In this section, we rely on publicly available data from Marine Atlantic's annual reports to estimate the direct economic contribution of the corporation's activities on these two provinces.

There are a number of ways to quantify the economic activity or GDP associated with a particular sector. For our purpose, the simplest is the concept of value added. For each stage of processing, the value directly attributed to that stage, or industry, can be determined by the total revenues earned, less input costs (excluding labour and depreciated capital). Adding up the value added across all industries in a specific region determines the GDP for that region. To estimate Marine Atlantic's GDP, revenues include the sizeable

federal government subsidies. Thus, Marine Atlantic's direct GDP can be approximated by summing the wages the corporation pays with the reported allowance for the amortization of capital.

Table 1 displays a few financial statistics about Marine Atlantic's operations. Over the past six years, total own-source revenues for the corporation have grown at an average pace of 1.9 per cent annually. While this more-than-covers growth in overall expenditures, it would still leave Marine Atlantic with a sizeable deficit in the absence of the federal subsidy it receives annually. For example, in 2017–18, Marine Atlantic recorded an operating deficit of \$124.6 million, but received \$146.8 million in government funding, leading to a \$22.1 million surplus.

Over the past six years, just over half of total expenditures have been on wages, pensions and amortization of capital—those components that account for the corporation's direct GDP. Other expenditures result in supply chain impacts recorded in other industries.

The expenditure data displayed in Table 1 are the main source for building the direct real

Table 1: Marine Atlantic Operations
(Fiscal year ending March 31; 000s of dollars)

	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Average Annual Growth
Total revenues (excluding government funding)	107,273	104,886	105,357	109,461	113,917	112,615	
		-2.2	0.4	3.9	4.1	-1.1	1.0
Expenditures on wages and benefits	84,672	80,841	84,266	86,227	88,391	91,085	
		-4.5	4.2	2.3	2.5	3.0	1.5
Expenditures on employee future benefits (pensions)	19,387	18,374	6,855	13,764	9,025	7,389	
		-5.2	-62.7	100.8	-34.4	-18.1	-17.5
Amortization	24,797	35,345	32,792	31,632	39,144	45,166	
		42.5	-7.2	-3.5	23.7	15.4	12.7
Total expenditures	258,753	251,561	243,640	237,479	220,445	237,207	
		-2.8	-3.1	-2.5	-7.2	7.6	-1.7

Sources: Various Marine Atlantic Annual Reports

GDP estimates associated with Marine Atlantic operations. In order to be consistent with other economic data published by Statistics Canada, Marine Atlantic expenditure data were converted to a calendar year basis. Moreover, in order to assess Marine Atlantic's GDP contribution in a consistent manner over time, it is important to adjust for changes in prices.

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As such, each of the components—namely wages and capital—was adjusted for inflation using Statistics Canada's historical wage and investment deflators.³ The wage deflator grew at a subdued rate over the 2012-17 period, held down in-part by a weak economic performance. Investment on the other hand was strong, as mega-projects such as the Hebron offshore platform and Muskrat Falls station generated massive capital expenditures.

Lastly, for provincial data comparisons, we have relied on a simplifying assumption that the direct contribution to economic activity from Marine Atlantic operations is equally split between Newfoundland and Labrador and Nova Scotia. This likely underestimates economic activity in Newfoundland and Labrador, as corporate operations are located in St John's. Still, this potential bias affects only the provincial split; it does not affect our total GDP estimates, nor does it affect our analysis of the impact of ferry rate reductions on Newfoundland and Labrador's economy that follows in Section 3.

³ We relied on Statistics Canada's provincial deflators. Investment deflators for structures and machinery and equipment for Nova Scotia and Newfoundland and Labrador were used to deflate the depreciation of assets. We used nominal average weekly wages for Newfoundland and Labrador to deflate wages as they more closely tracked wage increases at Marine Atlantic.

**Table 2: Marine Atlantic GDP and Other Indicators
(Calendar year estimates)**

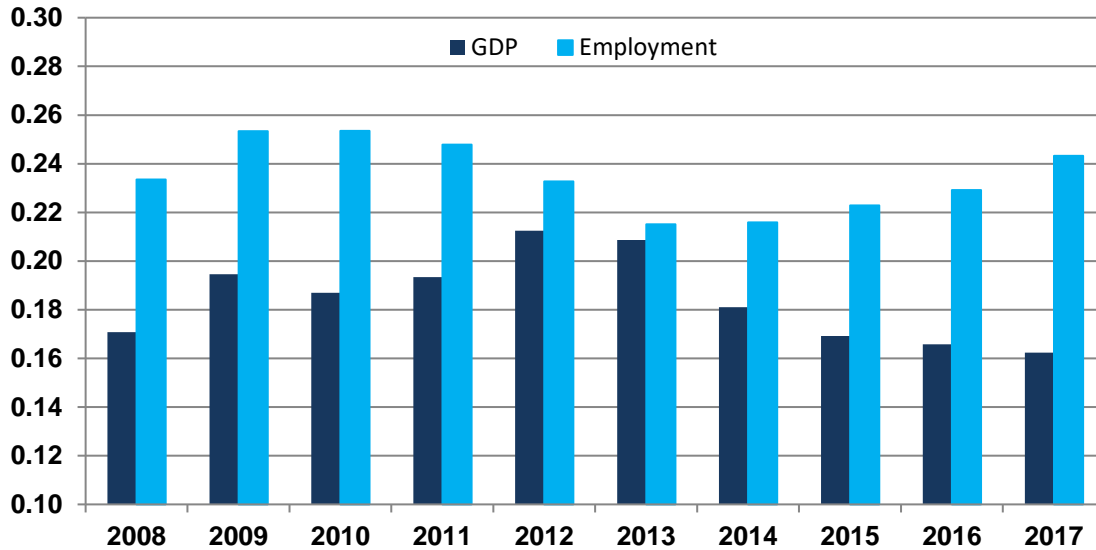
	2012	2013	2014	2015	2016	2017	Average Annual Growth
GDP Estimate							
Total real GDP estimate (2019 \$ millions)	131.0	135.1	131.8	125.8	130.6	135.8	
		3.1	-2.5	-4.6	3.9	3.9	0.7
Other indicators							
Passengers	355,179	330,425	309,736	325,795	328,262	328,145	
	-4.0	-7.0	-6.3	5.2	0.8	0.0	-1.6
Passenger vehicles	124,710	117,335	110,686	114,722	119,379	121,912	
	-3.3	-5.9	-5.7	3.6	4.1	2.1	-0.5
Commercial vehicles	103,183	98,837	96,013	95,824	94,823	92,162	
	0.6	-4.2	-2.9	-0.2	-1.0	-2.8	-2.2
Auto equivalent unit (passenger vehicle equivalent)	561,130	533,676	514,576	520,134	522,556	513,595	
	-0.4	-4.9	-3.6	1.1	0.5	-1.7	-1.8
Number of single crossings	1,841	1,736	1,623	1,662	1,697	1,689	
	-5.8	-5.7	-6.5	2.4	2.1	-0.5	-1.7
Employees (peak employment)	1,392	1,329	1,294	1,261	1,275	1,265	
	0.7	-4.6	-2.6	-2.5	1.1	-0.8	-1.9
Employees (full-time equivalent)	1,119	1,046	1,030	1,052	1,066	1,090	
	-2.6	-6.6	-1.6	2.2	1.3	2.3	-0.5
Total hours worked (000s) *	2,328	2,175	2,141	2,188	2,217	2,267	
	-2.6	-6.6	-1.6	2.2	1.3	2.3	-0.5
Average hourly compensation (excluding pension benefits)	36	38	39	39	40	40	
	4.1	3.3	3.6	0.6	1.1	0.6	1.8

Sources: Various Marine Atlantic Annual Reports

We estimate that real GDP associated with Marine Atlantic operations in both provinces was \$131.6 million in 2017, a 3.9 per cent gain from 2016. (See Table 2.) Between 2012 and 2017, growth averaged only 0.7 per cent annually. We assume that economic activity and employment directly associated with the transportation service is equally split between Nova Scotia and Newfoundland and Labrador. As such, Marine Atlantic's real GDP represents about 0.16 per cent of Newfoundland and Labrador's total GDP and 0.12 per cent of Nova Scotia's real GDP in 2017. (See Chart 1.) For both provinces the share has decreased since 2012. In terms of employment, Marine Atlantic's share of total employment (on a full-time equivalent basis) in Newfoundland and Labrador was 0.24 per cent in 2017, down slightly from the 0.20 per cent share during the 2012–14 period. The corporation accounted for 0.12

per cent of total employment in Nova Scotia in 2017, given that province's larger labour market.

Chart 1: Marine Atlantic Direct Contribution to Newfoundland and Labrador Economy (GDP and employment shares, per cent)



Sources: Various Marine Atlantic Annual Reports; Statistics Canada; The Conference Board of Canada.

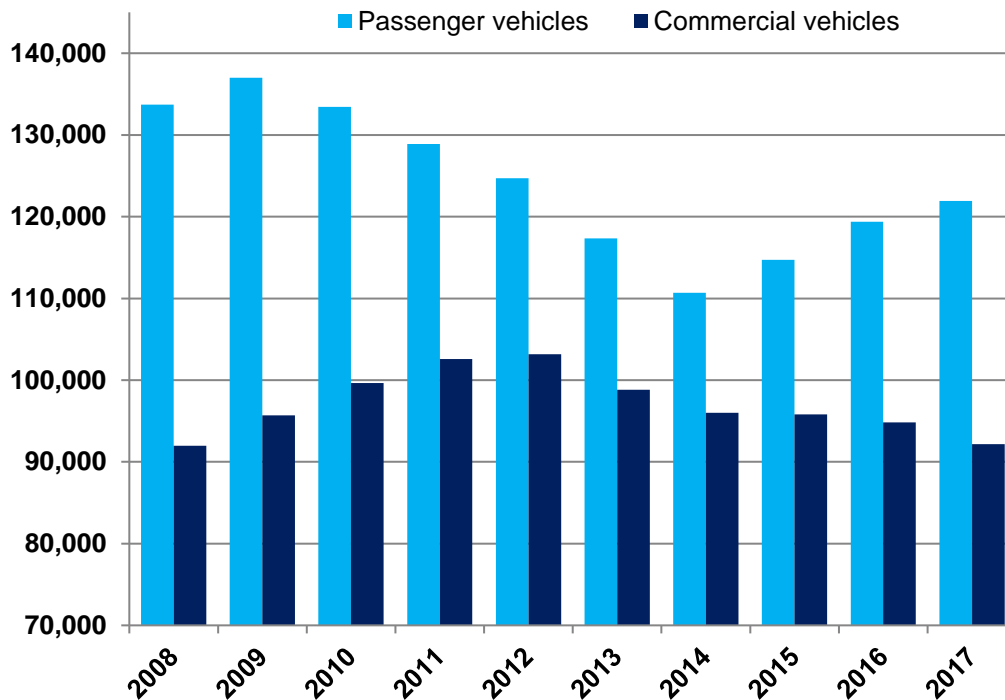
In addition to GDP estimates, Marine Atlantic reports on a wide range of other economic indicators, some of which are displayed in Table 2. The corporation has been struggling in recent years with a steady decline in passenger demand. Our calendar year estimates suggest that in 2012 nearly 355,179 passengers used the ferry service, but this number declined to just 328,145 passengers in 2017—a significant decline, but an improvement from the low traffic observed in 2014. However, tourism to the province has held up relatively well. From 2012 to 2017, total non-resident tourist visits rose by 1.8 per cent annually, while Marine Atlantic passengers dropped over the same period. This means that the share of tourists using the ferry service dropped by about 4.1 percentage points over this period. This may be due to ferry passenger fees increasing more quickly than airline fees, as strong competition and expanding capacity among air carriers has resulted in weak fare hikes among domestic and international carriers in recent years. Marine Atlantic's passenger fares have grown at a pace just below inflation since 2008; as such, declining passenger demand for the ferry service is likely more related to greater competition from air services or changing trends or preferences among travelers, rather than Marine Atlantic fare increases.

The decline in passenger service is mirrored by steady drops in the number of single crossings. In 2012, there were 1,841 single crossings, but that number fell to 1,689 by 2017,

representing average declines of 1.7 per cent annually. The decline in crossings has led to a drop in employment and the number of hours worked. The decline in employment is in spite of own-source revenue growth of about 1.4 per cent over the 2012-17 period.

Marine Atlantic is also experiencing difficulties with transport demand, as the number of commercial vehicles registered declines each year since 2012. In this case, solid price increases, coupled with a more challenging economic environment, are likely the cause. Over the 2008-17 period, commercial vehicle fees rose by an average of 3.5 per cent annually despite the fact that fuel surcharges have barely risen since 2008. Amid solid price increases and the recent decline in activity, the number of commercial vehicles crossing with Marine Atlantic is slightly below 2008 levels, posting average annual declines of 2.2 per cent. (See Chart 2.)

Chart 2: Marine Atlantic Traffic
(Number of vehicles, calendar year estimate)



Sources: Marine Atlantic Annual Reports; The Conference Board of Canada.

An aggregate measure of vehicle traffic suggests that both commercial and passenger vehicle traffic is in decline. In 2017, the auto equivalent unit measure of activity stood 8.5 per cent below 2012.

The fact that real GDP is rising while the volume of services has fallen is perhaps counterintuitive but can be explained, in part, by increases in either real wages or by the large growth in capital consumption that occurred, especially in recent years. Since we are measuring GDP by its value-added, this is captured in the addition to real wages and capital consumed and not directly related to the volume of output (the amount of traffic serviced).

Beyond contributing directly to GDP, Marine Atlantic's activities generate supply chain impacts on other industries. We relied on Statistics Canada's detailed information about the economy's industrial structure to gain some insights into the supply chain and other induced economic benefits of water transportation activity.⁴ For example, the economic multiplier associated with water transportation suggests that a \$1 increase in water transportation activity results in a gain of \$2.4 in Canada's GDP.

The direct and supply chain effects account for the increased activity in businesses that supply goods and services to Marine Atlantic and the positive economic effect attributable to the greater spending by workers who are employed by Marine Atlantic or its suppliers. When these workers spend more on goods and services, additional economic activity is generated in other sectors of the economy. Thus, we assume that each \$1 directly attributed to Marine Atlantic's GDP generates an additional \$1.4 in GDP nationwide. Likely, some of the additional economic activity is generated in the Atlantic region, but a more detailed analysis is required to isolate regional impacts. Similarly, the multipliers for labour suggest that for every full-time employee at Marine Atlantic, another one and a half full-time jobs are supported in other industries nationwide.

3. The Economic Impact of a Rise in Ferry Fees

Marine Atlantic's importance to Newfoundland and Labrador's economy cannot be emphasized enough. It is a vital transporter of people and goods and is key to the province's tourism industry.

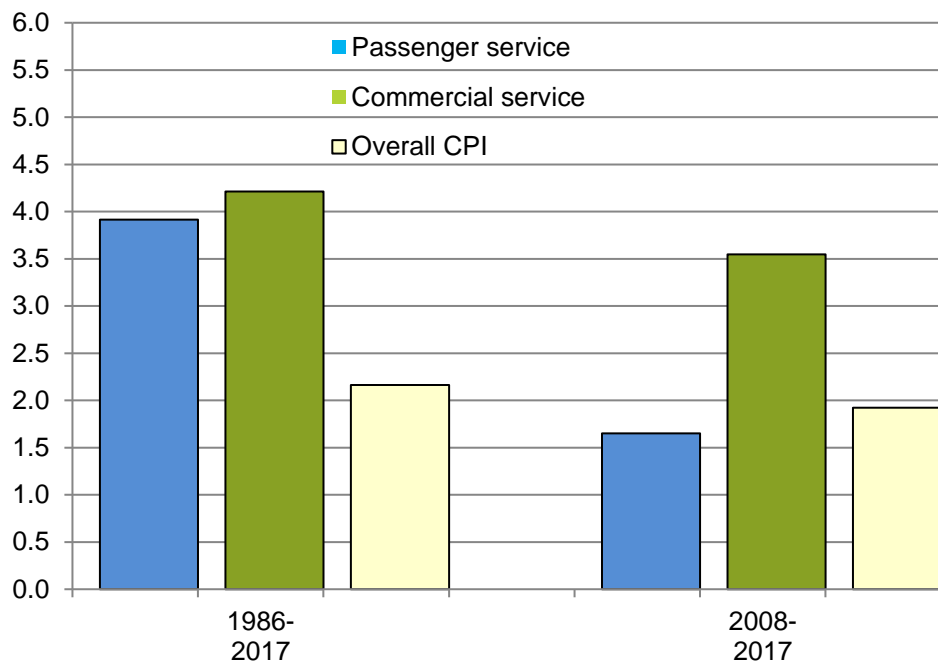
We have noted that despite the fact that the ferry service is heavily subsidized, it has been raising service fees considerably above the level of overall inflation since the corporation's establishment in 1986. Chart 3 displays the average annual increase in user fees for passengers and for commercial traffic in comparison to overall inflation.⁵ Data suggest that

⁴ Statistics Canada, Industry Account Division, Input-Output National Multipliers.

⁵ The user fee inflation calculation is based on a weighted average cost of service for a typical passenger vehicle, carrying an average number of passengers, and includes recently introduced fuel surcharges and security fees. We also take into account the proportion of passengers using the Port aux Basques versus Argentia service. Similarly, commercial fares take into consideration tractor trailer

over the 1986 to 2017 period, prices for the passenger and commercial service have grown at a similar pace of about 4.1 per cent per year—well above overall price inflation of below 2.2 per cent annually over the same period. The recent slide in demand from passengers has perhaps held back price increases for passenger services. From 2008 to 2017, overall passenger service fees have risen at a rate just below inflation, although commercial service fees have continued to significantly outpace inflation.

**Chart 3: Ferry Fees vs. Inflation in Newfoundland & Labrador
(Average annual compound growth, per cent)**



Sources: Marine Atlantic; The Conference Board of Canada.

A divergence of 2 per cent in annual inflation builds rapidly over time. For example, if passenger ferry fees had increased at the rate of inflation since 1986, the cost of a one-way crossing for a passenger car with occupants would have been about 41 per cent below the actual charge. Similarly, for commercial transport, if fees had increased at the rate of inflation, the cost of a one-way crossing for a drop trailer would have been roughly 46 per cent below current rates.

and drivers, drop trailers, fuel surcharges and other fees and also are much more heavily weighted to the Port aux Basque service, which accounts for over 99 per cent of commercial traffic. Weights are held to 2017-18 values.

Despite solid increases in fees charged, Marine Atlantic's own- source revenues fall well shy of the overall operating costs of the ferry service. Because the corporation relies so heavily on federal subsidies to maintain operations, we have assumed that private sector operators are unable to compete at current rates. Even if air travel may be an option for some travelers and commercial transporters, in producing our model-based analysis, we assume that rate increases must be fully absorbed by users.

3.1 Methodology

In addition to assessing the contribution of Marine Atlantic's direct operations to the economies of Nova Scotia and Newfoundland and Labrador, the goal of this study is to quantify the potential economic impact of a significant drop in ferry fees on the economy of Newfoundland and Labrador.

In order to estimate the full employment and economic impacts, we performed simulations using The Conference Board of Canada's detailed proprietary model of Newfoundland and Labrador's economy. The economic impact analysis is performed over a two-year period.

The economic impact analysis of the first scenario is carried out under the assumption that Marine Atlantic service fees are permanently lowered back to inflation-adjusted 1992 levels using the Confederation Bridge formula for toll increases. On average, this would represent a 56 per cent drop in Marine Atlantic revenues. By comparing the *lower fares* scenario to the *control* scenario, in which fares are not raised, we can determine the economic impact of lowering Marine Atlantic fares on a wide range of economic indicators tracked by the Conference Board's economic model.

Benefits to households and businesses

The bulk of the impact of price shocks on an economy are felt in the first year, when a drop in prices leads to increased household purchasing power and a boost to consumer spending. Businesses respond to surging demand by increasing their supply of goods and services to meet that demand—which requires them to hire more employees and invest in order to expand capacity. If demand is strong and sustained, business will also adjust prices up slowly—partially offsetting the initial drop in prices. Therefore, the impacts are larger in the first two years of the simulation but are less pronounced in later years when prices adjust up and the supply of goods and services eases to balance out the economy's new level of supply with demand.

Lower transportation costs will also have an impact on the Province's export competitiveness. We assume that the decreases will, in the short term, lower the cost of goods sold in the province, reduce the costs of exporting out of the province and directly lower the travel costs for tourists to the province.

Overall, transport price decreases would raise households' purchasing power as well as improve the competitiveness of both exports and the province's tourism industry.

In this scenario, we assume that ferry service fees for each service and route (commercial, passenger, to Argentia and to Port aux Basques) are brought back to 1992 inflation-adjusted rates. Based on current usage, which is heavily weighted to the Port aux Basques commercial service, this would result in a 56 per cent drop in revenues for Marine Atlantic. We assume that the decreases will, in the short term, lower the cost of goods sold in the province, reduce the costs of exporting out of the province and directly lower the travel costs for tourists to the province. In essence, transport price decreases would raise households' purchasing power as well as improve the competitiveness of both exports and the province's tourism industry.

We estimate the impact of price increases on the province using economic models that help us understand how changes in the activity of one industry can have wider repercussions on the economy. Changing Marine Atlantic's transportation fees could lead to widespread economic impacts because of the heavy dependence on Marine Atlantic ferry services for the transportation of goods and passengers and because of the interrelated nature of the economy. For example, a boost in household demand associated with increased purchasing power could lead to job gains in the retail sector—with its own follow-on effects on the economy. A drop in transport costs directly reduces the cost of exporting and could have beneficial indirect effects as well if the exporter's supply chain is dependent on imported goods. We used the Conference Board's provincial forecasting model to simulate the effects of transport price declines on Newfoundland and Labrador's economy in an effort to capture these various effects.⁶

It is important to note that most prices are determined within the model (endogenously) based generally on input costs or supply-demand factors. For the purpose of this analysis, we take away from prices exogenously, that is, from outside the system. We then let the model determine the resulting impact on prices. The impact of the price increases is greatest in the first year of the simulation. Thereafter, the impact on prices is eroded because of the boost to demand and capacity usage. Essentially, lower prices lead to stronger demand, but this, eventually, leads to stronger price gains. Simulation results are presented over a two-year time period, capturing peak impacts on the economy.

The first step in the analysis is to determine the direct impact to various prices included in the Conference Board's provincial model. To do this, we assume that the direct decrease in transportation costs is fully passed on to various agents in the economy, namely households, export and import businesses, and tourists. With own-source revenues of around \$113 million in 2017, the initial hit to prices was equivalent to \$63.3 million (56 per cent) spread among import, export and domestic prices. Even though transport margins represent a relatively small portion of the total cost of goods and travel, the initial hit to prices is noticeable at an aggregate level. For example, the initial impact is to lower the price of consumer goods by an estimated 0.53 per cent. Export and import prices are also reduced. Overall, the initial price impact of the reduced ferry service fees is large enough to

⁶ A more detailed description of the Conference Board's provincial econometric model is provided in Appendix C.

lower economy-wide prices by 0.59 per cent.⁷ As we shall see in the sections that follow, the initial drop to consumer, export and import prices will have multiplier effects on the province's prices; and the repercussions of these changes are not negligible on Newfoundland and Labrador's economy.

The 56 per cent reduction in ferry service fees is based on bringing fares back to their 1992 inflation-adjusted levels and applying the Confederation Bridge formula for toll increases, keeping in mind that (under not very strict assumptions) the results are relatively linear. That is, if the decrease in ferry service fees were 28 per cent instead of 56 per cent, simulation results would be roughly halved from those presented. Alternatively, an *increase* in ferry service fees would lead to similarly sized economic impacts, but in the opposite direction. The simulation results thus provide a useful rule of thumb to broadly assess the economic impacts of increased or decreased Marine Atlantic ferry service fees.

3.2 Results Using the Confederation Bridge Formula

Using the Confederation Bridge formula for toll increases, we estimate that Marine Atlantic's toll prices would be about 56 per cent lower today than their current fees.

The Conference Board estimates that the total economic impact of a broad-based reduction in Marine Atlantic ferry fees of 56 per cent would lift real GDP by \$145.6 million in the first year of the shock. (See Table 3). The reduced transportation costs would lower prices across many sectors of the economy, decreasing consumer prices by about 0.53 per cent and lowering the overall GDP deflator by 0.59 per cent.

⁷ That is, the overall GDP deflator.

Table 3: Economic Impact of a 56 per cent Drop in Marine Atlantic Fares - Key Economic Indicators – Newfoundland & Labrador
(Level difference shock minus control except where otherwise indicated)

	Year 1	Year 2	Total over Period
Real GDP at market prices (2019 \$ millions)	145.6	104.2	249.8
GDP deflator (percentage difference)	-0.59	-0.34	
Consumer price index (percentage difference)	-0.53	-0.15	
Average weekly wages industrial composite (percentage difference)	0.16	0.12	
Household income (millions of current \$)	38.7	50.1	88.8
Employment	1,237	1,113	
Unemployment rate (level difference in rate)	-0.18	-0.16	
Retail sales (millions of current \$)	52.7	18.9	71.5
Net operating surplus of corporations (millions of current \$)	10.0	3.2	13.2

Source: The Conference Board of Canada

The boost to economic activity leads to a gain of 1,237 jobs in the province, in the first year of the simulation, and a slight decrease in the unemployment rate. Despite the lower consumer prices in the economy, a tighter labour market results in a slight increase in average wages. This leads to cumulative gains in household income of over \$89 million over two years. The aggregate net operating surplus of corporations is also bolstered because of lower transport costs and stronger demand.

Real consumer spending is up \$98.6 million above the *control* scenario in the first year of the simulation. (See Table 4.) Overall, the volume of goods and service sector exports is raised by \$54.8 million and \$41.8 million, for a cumulative gain of more than \$96.6 million over the two years of the simulation. The boost to competitiveness and increase in economic activity stimulates business investment, with real private capital investment rising by \$17.9 million in year one of the simulation. This expands to a gain of \$47.8 million in the second year of the simulation, as investment spending typically lags economic activity. The decrease in import prices and increase in aggregate demand within the province results in a boost to imports that mitigates the overall effect on real GDP.

Table 4: Economic Impact of a 56 per cent Drop in Marine Atlantic Fares – Components of Newfoundland & Labrador's Real GDP (Expenditure-Based) (Level difference shock minus control except where otherwise indicated) *

	Year 1	Year 2	Total over Period
Household consumption expenditures	98.6	65.2	163.8
Government consumption expenditures	5.6	4.9	10.6
Business fixed capital formation	17.9	47.8	65.7
Government fixed capital formation	-	0.8	0.8
Exports	54.8	41.8	96.6
Imports	31.4	56.4	87.8
Real gross domestic product	145.6	104.2	249.8

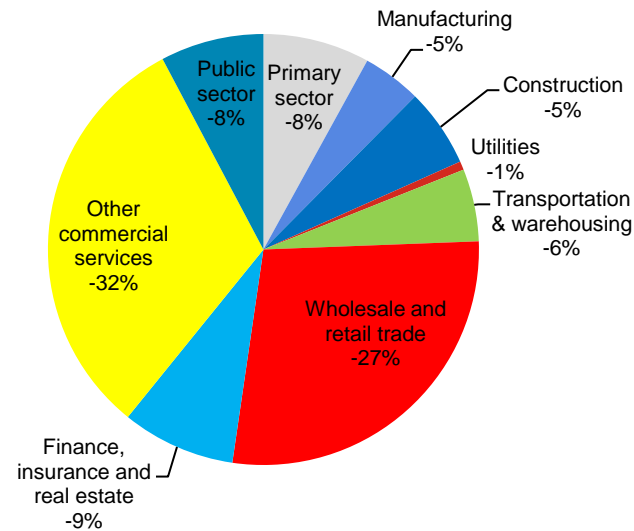
* Real GDP, 2019 \$ millions

Source: The Conference Board of Canada

As was the case in the first simulation, wholesale and retail trade sectors, along with other commercial services, account for the lion's share of industry impacts, in light of the boost to consumer and tourism spending. The increase in exports and investment will especially benefit goods production (manufacturing, primary sector, and construction) as well as services such as finance, insurance, real estate and transportation. (See Table 5.) Employment in the province is lifted by 1,237 in year one of the simulation, and job gains remain steady in year two of the simulation. The share of job gains by sector closely mirrors the industry impacts.

Table 5: Economic Impact of a 56 per cent Drop in Marine Atlantic Fares – Components of Newfoundland & Labrador's Real GDP (Industry-Based) (Level difference shock minus control except where otherwise indicated) *

Primary sector	12.4
Manufacturing	5.6
Construction	7.9
Utilities	4.3
Transportation & warehousing	4.9
Wholesale and retail trade	39.3
Finance, insurance and real estate	18.7
Other commercial services	38.2
Public sector	5.5
Total real GDP at basic prices	136.9



* Real GDP, 2019 \$ millions

Source: The Conference Board of Canada

Overall, lowering ferry service fees by 56 per cent leads to a reduction in Marine Atlantic's own source revenues that is equivalent to \$63.3 million in 2017. This amount, redistributed as cost savings to ferry users, substantially raises real GDP by \$145.6 million (0.4 per cent in 2017), generates 1,237 jobs, and significantly boosts household income and corporate profits.

3.3 Rule of Thumb Analysis

Following the same methodology as the first simulation, the Board's provincial model simulated a scenario in which ferry prices were lifted by 5 per cent, instead of being decreased by 56 per cent.

The 5 per cent increase in ferry service fees was arbitrarily chosen by the Conference Board for illustrative purposes, keeping in mind that (under not very strict assumptions) the results are relatively linear. That is, if the increase in ferry service fees were 10 per cent instead of 5 per cent, simulation results would be roughly twice as large in magnitude as those presented. Alternatively, a 5 per cent *decrease* in ferry service fees would lead to similarly sized economic impacts, but in the opposite direction. The simulation results thus provide a

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useful rule of thumb to broadly assess the economic impacts of increased or decreased Marine Atlantic ferry service fees.

Transport price increases can lead to widespread effects on the economy because of the heavy dependence on Marine Atlantic ferry services for a significant portion of transportation and the interrelated nature of the economy. For example, a reduction in household demand associated with reduced purchasing power can lead to job losses in the retail sector—with its own follow-on effects on the economy. Increased transport costs add directly to the cost of exporting, but indirectly as well if the exporter's supply chain is dependent on imported goods. This can result in a build-up in the erosion of competitiveness. The 'rule of thumb' analysis simulates the effects of transport price increases on Newfoundland and Labrador's economy in an effort to capture these various effects.

The Conference Board estimates that the total economic impact of a broad-based increase in Marine Atlantic ferry fees of 5 per cent would result in a reduction in real GDP of \$13.0 million in the first year of the shock. (See Table 6.) The increase in transportation costs will boost prices across many sectors of the economy, adding about 0.05 per cent to consumer prices and 0.05 per cent to the overall GDP deflator.

Table 6: Economic Impact of a 5 per cent Lift in Marine Atlantic Fares - Key Economic Indicators – Newfoundland & Labrador

(Level difference shock minus control except where otherwise indicated)

	Year 1	Year 2	Total over Period
Real GDP at market prices (2019 \$ millions)	-13.0	-9.3	-22.3
GDP deflator (percentage difference)	0.05	0.03	
Consumer price index (percentage difference)	0.05	0.01	
Average weekly wages industrial composite (percentage difference)	-0.01	-0.01	
Household income (millions of current \$)	-3.5	-4.5	-7.9
Employment	-110.4	-99.4	
Unemployment rate (level difference in rate)	0.02	0.01	
Retail sales (millions of current \$)	-4.7	-1.7	-6.4
Net operating surplus of corporations (millions of current \$)	-0.9	-0.3	-1.2

Source: The Conference Board of Canada

The reduction in economic activity leads to a loss of 110 jobs in the province and a slight increase in the unemployment rate. Despite the boost to consumer prices in the economy, a softer labour market results in a slight reduction in average wages and this leads to

cumulative losses in household income of \$7.9 million over two years. The aggregate net operating surplus of corporations is also eroded because of higher transport costs.

A reduction in household's purchasing power, associated with higher prices for goods, makes the largest contribution to the decline in real economic activity as real consumer spending is reduced by \$8.8 million in the first year of the simulation. (See Table 7.) Perhaps more concerning is the impact of higher transport fees on Newfoundland and Labrador's export competitiveness—both in terms of goods and service sector exports, with the latter largely associated with tourism. Overall, the volume of good and service sector exports is reduced by \$4.9 million and \$3.7 million, for a cumulative loss of nearly \$8.6 million over the two years of the simulation. The erosion in competitiveness and decline in economic activity leads to a reduction in real private capital investment of \$1.6 million in year one of the simulation. This expands to a loss of \$4.3 million in the second year of the simulation. The increase in import prices and decline in aggregate demand within the province results in a reduction in imports that mitigates the overall effect on real GDP.

Table 7: Economic Impact of a 5 per cent Lift in Marine Atlantic Fares – Components of Newfoundland & Labrador's Real GDP (Expenditure-Based)
(Level difference shock minus control except where otherwise indicated) *

	Year 1	Year 2	Total over Period
Household consumption expenditures	-8.8	-5.8	-14.6
Government consumption expenditures	-0.5	-0.4	-0.9
Business fixed capital formation	-1.6	-4.3	-5.9
Government fixed capital formation	0.0	-0.1	-0.1
Exports	-4.9	-3.7	-8.6
Imports	-2.8	-5.0	-7.8
Real gross domestic product	-13.0	-9.3	-22.3

* Real GDP, 2019 \$ millions

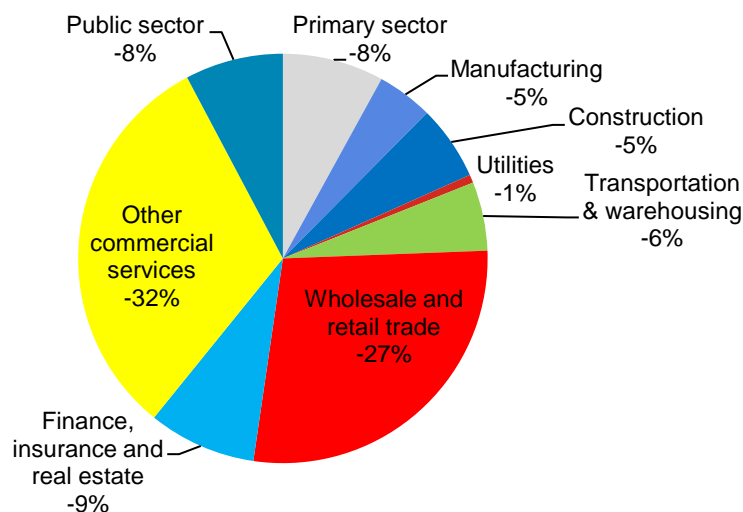
Source: The Conference Board of Canada

On an industry basis, production losses are felt across a wide range of both goods and service producing sectors, reflecting the broad range of transport services provided by Marine Atlantic. Together wholesale and retail trade sectors, along with other commercial services, account for the lion's share of industry impacts, reflecting the hit to consumer and tourism spending. The reduction to exports and investment will weigh more heavily on goods production (manufacturing, primary sector, and construction) as well as services such as finance, insurance and real estate and transportation. (See Table 8). Employment in the province is reduced by 110 in year one of the simulation and job losses do not recover in

year two of the simulation. The share of job losses by sector closely mirrors the industry impacts.

Table 8: Economic Impact of a 5 per cent Lift in Marine Atlantic Fares – Components of Newfoundland & Labrador's Real GDP (Industry-Based)
(Level difference shock minus control except where otherwise indicated) *

Primary sector	-1.1
Manufacturing	-0.5
Construction	-0.7
Utilities	-0.4
Transportation & warehousing	-0.4
Wholesale and retail trade	-3.5
Finance, insurance and real estate	-1.7
Other commercial services	-3.4
Public sector	-0.5
Total real GDP at basic prices	-12.2



* Real GDP, 2019 \$ millions

Source: The Conference Board of Canada

4. Conclusion

Marine Atlantic provides a vital service to Newfoundland and Labrador. Through its operations, it contributes directly and indirectly to economic output and employment in Newfoundland and Labrador, Nova Scotia and other regions in Canada. More importantly, the ferry transport service is key to bringing goods and people in and out of the province—helping to keep the province's export and tourism industry competitive.

Our economic impact analysis brings Marine Atlantic's ferry service fees back to their 1992 inflation-adjusted values—a 56 per cent drop from 2017 rates. The positive repercussions on the Newfoundland and Labrador economy are sizeable, especially considering that the effects are attributed to a single corporation simply lowering its service fees. Economy-wide prices are lowered by 0.53 per cent in the first year of the simulation, resulting in a boost to households' purchasing power, consumption, exports and tourism. The lift to economic activity represents boosts of roughly 0.4 and 0.6 per cent to GDP and employment respectively.

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Our economic impact analysis suggests that a *rise* in fares has negative impacts on the economy by eroding the competitiveness of local industry and reducing the purchasing power of households. A 5 per cent increase in commercial and passenger fees will take Newfoundland and Labrador's real GDP down by \$13.0 million and result in 110 job losses in the first year of the simulation.

The simulation results provide a useful rule of thumb to broadly assess the economic impacts of decreased or increased Marine Atlantic ferry service fees. Marine Atlantic has been raising its ferry service fees considerably above the level of overall inflation since 1986, when the corporation was established. This has been a significant contributing factor to lifting prices in Newfoundland and Labrador, thus eroding real household incomes and the competitiveness of the province's export and tourism sectors. For most imported and exported goods, and for many passengers, tourists, and businesses there are few or no alternatives to the ferry service. As such, any changes to Marine Atlantic fares will have important implications for the province's economy.

Appendix A: Economic Impact Tables

Table 3: Economic Impact of a 56 per cent Drop in Marine Atlantic Fares - Key Economic Indicators – Newfoundland & Labrador
(Level difference shock minus control except where otherwise indicated)

	Year 1	Year 2	Total over Period
Real GDP at market prices (2019 \$ millions)	145.6	104.2	249.8
GDP deflator (percentage difference)	-0.59	-0.34	
Consumer price index (percentage difference)	-0.53	-0.15	
Average weekly wages industrial composite (percentage difference)	0.16	0.12	
Household income (millions of current \$)	38.7	50.1	88.8
Employment	1,237	1,113	
Unemployment rate (level difference in rate)	-0.18	-0.16	
Retail sales (millions of current \$)	52.7	18.9	71.5
Net operating surplus of corporations (millions of current \$)	10.0	3.2	13.2

Source: The Conference Board of Canada

Table 4: Economic Impact of a 56 per cent Drop in Marine Atlantic Fares – Components of Newfoundland & Labrador's Real GDP (Expenditure-Based)
(Level difference shock minus control except where otherwise indicated) *

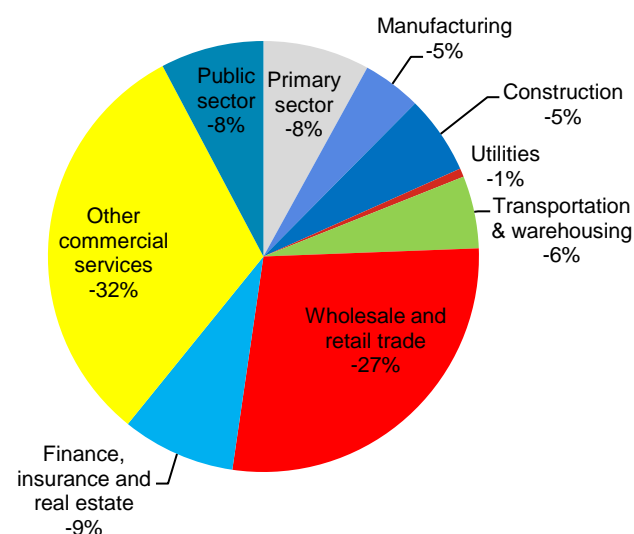
	Year 1	Year 2	Total over Period
Household consumption expenditures	98.6	65.2	163.8
Government consumption expenditures	5.6	4.9	10.6
Business fixed capital formation	17.9	47.8	65.7
Government fixed capital formation	-	0.8	0.8
Exports	54.8	41.8	96.6
Imports	31.4	56.4	87.8
Real gross domestic product	145.6	104.2	249.8

* Real GDP, 2019 \$ millions

Source: The Conference Board of Canada

Table 5: Economic Impact of a 56 per cent Drop in Marine Atlantic Fares – Components of Newfoundland & Labrador's Real GDP (Industry-Based) (Level difference shock minus control except where otherwise indicated) *

Primary sector	12.4
Manufacturing	5.6
Construction	7.9
Utilities	4.3
Transportation & warehousing	4.9
Wholesale and retail trade	39.3
Finance, insurance and real estate	18.7
Other commercial services	38.2
Public sector	5.5
Total real GDP at basic prices	136.9



* Real GDP, 2019 \$ millions

Source: The Conference Board of Canada

Table 6: Economic Impact of a 5 per cent Lift in Marine Atlantic Fares - Key Economic Indicators – Newfoundland & Labrador (Level difference shock minus control except where otherwise indicated)

	Year 1	Year 2	Total over Period
Real GDP at market prices (2019 \$ millions)	-13.0	-9.3	-22.3
GDP deflator (percentage difference)	0.05	0.03	
Consumer price index (percentage difference)	0.05	0.01	
Average weekly wages industrial composite (percentage difference)	-0.01	-0.01	
Household income (millions of current \$)	-3.5	-4.5	-7.9
Employment	-110.4	-99.4	
Unemployment rate (level difference in rate)	0.02	0.01	
Retail sales (millions of current \$)	-4.7	-1.7	-6.4
Net operating surplus of corporations (millions of current \$)	-0.9	-0.3	-1.2

Source: The Conference Board of Canada

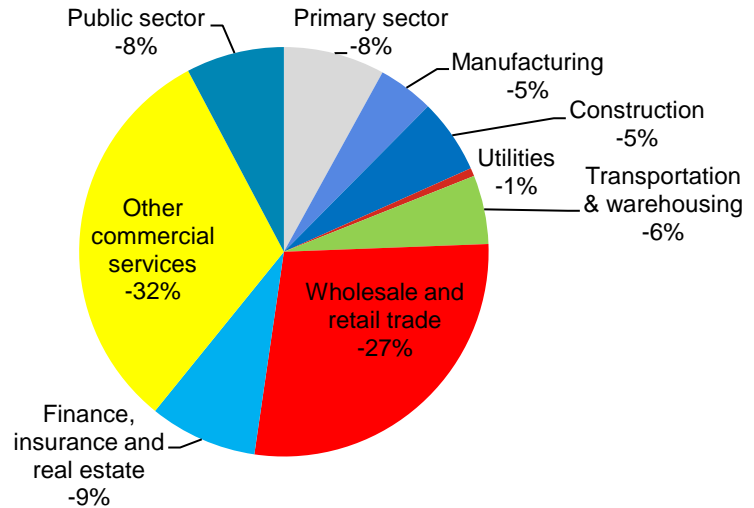
Table 7: Economic Impact of a 5 per cent Lift in Marine Atlantic Fares – Components of Newfoundland & Labrador's Real GDP (Expenditure-Based)
 (Level difference shock minus control except where otherwise indicated) *

	Year 1	Year 2	Total over Period
Household consumption expenditures	-8.8	-5.8	-14.6
Government consumption expenditures	-0.5	-0.4	-0.9
Business fixed capital formation	-1.6	-4.3	-5.9
Government fixed capital formation	0.0	-0.1	-0.1
Exports	-4.9	-3.7	-8.6
Imports	-2.8	-5.0	-7.8
Real gross domestic product	-13.0	-9.3	-22.3

* Real GDP, 2019 \$ millions
 Source: The Conference Board of Canada

Table 8: Economic Impact of a 5 per cent Lift in Marine Atlantic Fares – Components of Newfoundland & Labrador's Real GDP (Industry-Based)
 (Level difference shock minus control except where otherwise indicated) *

Primary sector	-1.1
Manufacturing	-0.5
Construction	-0.7
Utilities	-0.4
Transportation & warehousing	-0.4
Wholesale and retail trade	-3.5
Finance, insurance and real estate	-1.7
Other commercial services	-3.4
Public sector	-0.5
Total real GDP at basic prices	-12.2



* Real GDP, 2019 \$ millions
 Source: The Conference Board of Canada

Appendix B: 1986 Inflation-Adjusted Scenario

The economic impact analysis of the third scenario is carried out under the assumption that Marine Atlantic service fees are permanently lowered back to inflation-adjusted 1986 levels. On average, this would represent a 45 per cent drop in Marine Atlantic revenues.

Results

The Conference Board estimates that the total economic impact of a broad-based reduction in Marine Atlantic ferry fees of 45 per cent would lift real GDP by \$117.0 million in the first year of the shock. (See Table 9.) The reduced transportation costs would lower prices across many sectors of the economy, decreasing consumer prices by about 0.43 per cent and lowering the overall GDP deflator by 0.48 per cent. Simulation results suggest that the permanent drop in fares would significantly lower price levels in the near term, but not have a lasting impact on inflation. Moreover, other adjustments in the economy would help mitigate the impact on real GDP in year two of the simulation and thereafter. Still, the cumulative impact on real GDP and prices is not negligible, given that the effects are attributed to a single corporation lowering its service fees.

Table 9: Economic Impact of a 45 per cent Drop in Marine Atlantic Fares - Key Economic Indicators – Newfoundland & Labrador
(Level difference shock minus control except where otherwise indicated)

	Year 1	Year 2	Total over Period
Real GDP at market prices (2019 \$ millions)	117.0	83.7	200.7
GDP deflator (percentage difference)	-0.48	-0.27	
Consumer price index (percentage difference)	-0.43	-0.12	
Average weekly wages industrial composite (percentage difference)	0.13	0.09	
Household income (millions of current \$)	31.1	40.3	71.4
Employment	993.7	894.8	
Unemployment rate (level difference in rate)	-0.14	-0.13	
Retail sales (millions of current \$)	42.3	15.2	57.5
Net operating surplus of corporations (millions of current \$)	8.0	2.6	10.6

Source: The Conference Board of Canada

The boost to economic activity leads to a gain of 994 jobs in the province, in the first year of the simulation, and a slight decrease in the unemployment rate. Despite the lower consumer prices in the economy, a tighter labour market results in a slight increase in average wages.

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This leads to cumulative gains in household income of over \$71 million over two years. The aggregate net operating surplus of corporations is also bolstered because of lower transport costs and stronger demand.

An increase in households' purchasing power, associated with stronger employment and lower prices for goods, makes the largest contribution to the boost in real economic activity as real consumer spending is up \$79.2 million above the *control* scenario in the first year of the simulation. (See Table 10.) Perhaps more important is the positive impact of lower transportation fees on Newfoundland and Labrador's export competitiveness—both in terms of goods and service sector exports, with the latter largely associated with tourism. Overall, the volume of goods and service sector exports is raised by \$44.1 million and \$33.6 million, for a cumulative gain of more than \$77.6 million over the two years of the simulation. The boost to competitiveness and increase in economic activity stimulates business investment, with real private capital investment rising by \$14.4 million in year one of the simulation. This expands to a gain of \$38.4million in the second year of the simulation, as investment spending typically lags economic activity. The decrease in import prices and increase in aggregate demand within the province results in a boost to imports that mitigates the overall effect on real GDP.

Table 10: Economic Impact of a 45 per cent Drop in Marine Atlantic Fares – Components of Newfoundland & Labrador's Real GDP (Expenditure-Based) (Level difference shock minus control except where otherwise indicated) *

	Year 1	Year 2	Total over Period
Household consumption expenditures	79.2	52.4	131.7
Government consumption expenditures	4.5	3.9	8.5
Business fixed capital formation	14.4	38.4	52.8
Government fixed capital formation	-	0.7	0.7
Exports	44.1	33.6	77.6
Imports	25.2	45.3	70.5
Real gross domestic product	117.0	83.7	200.7

* Real GDP, 2019 \$ millions

Source: The Conference Board of Canada

On an industry basis, production gains are felt across a wide range of both goods- and service-producing sectors, reflecting the broad range of transport services provided by

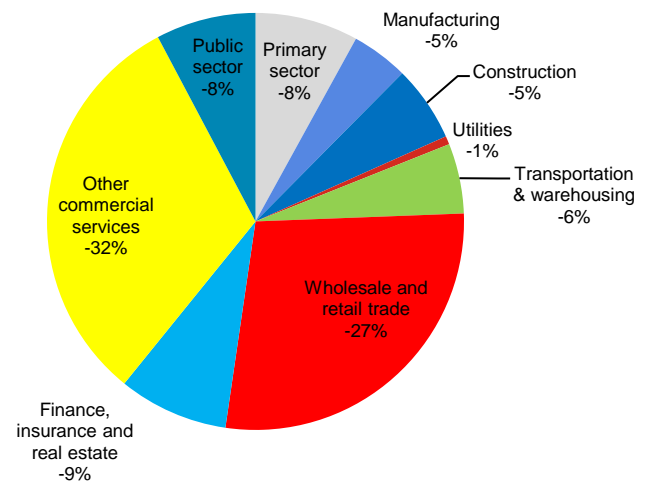
Marine Atlantic. Together, wholesale and retail trade sectors, along with other commercial services, account for the lion's share of industry impacts, in light of the boost to consumer and tourism spending. The increase in exports and investment will especially benefit goods production (manufacturing, primary sector, and construction) as well as services such as finance, insurance, real estate and transportation. (See Table 11.) Employment in the province is lifted by 994 in year one of the simulation, and job gains remain steady in year two of the simulation. The share of job gains by sector closely mirrors the industry impacts.

Table 11: Economic Impact of a 45 per cent Drop in Marine Atlantic Fares – Components of Newfoundland & Labrador's Real GDP (Industry-Based) (Level difference shock minus control except where otherwise indicated) *

Primary sector	10.0
Manufacturing	4.5
Construction	6.3
Utilities	3.5
Transportation & warehousing	4.0
Wholesale and retail trade	31.6
Finance, insurance and real estate	15.1
Other commercial services	30.7
Public sector	4.5
Total real GDP at basic prices	110.0

* Real GDP, 2019 \$ millions

Source: The Conference Board of Canada



Overall, lowering ferry service fees by 45 per cent leads to a reduction in Marine Atlantic's own source revenues that is equivalent to \$50.8 million in 2017. This amount, redistributed as cost savings to ferry users, substantially raises real GDP by \$117.0 million (0.3 per cent in 2017), generates 994 jobs, and significantly boosts household income and corporate profits.

Appendix C: The Conference Board's Provincial Forecasting Model

The Conference Board of Canada's Provincial Medium-Term Forecasting Model (PMTFM), is a quarterly, bottom-up econometric model of the 10 provincial economies and three territories combined. The model defines real GDP at basic prices and at market prices by province.

PMTFM includes over 1,200 equations, of which roughly half are behavioral or stochastic, while the others are accounting or definitional equations. Most of the exogenous variables in the model are national indicators. For each province, there are a number of simultaneous blocks of equations, including final domestic demand (personal consumption, government spending, residential and non-residential business investment), production by industry, income, prices, and labour market blocks. The provincial model also has an endogenous provincial population block in which net interprovincial migration plays a key role in determining overall population growth.

The Newfoundland and Labrador sub-model is used in this analysis. The model is freely estimated but is based on the neoclassical Keynesian synthesis. Prices respond to aggregate demand conditions as well as intermediate material costs, international and interprovincial import prices and changes in the indirect tax structure. Potential output and the output gap are fully integrated in the models; thus, the gap and speed of gap closure are explicitly introduced into most price equations to represent supply-side feedback. Potential output and total factor productivity are derived from a Cobb-Douglas production function modelled in terms of capital and labour.

In this model, provincial expenditures determine industrial output through the use of full input-output framework. Provincial real GDP by industry establishes labour market conditions that, in turn, influence population (through interprovincial migration), prices and income. The labour market block includes employment, labour force, unemployment and the unemployment rate. Employment is divided into 11 sector categories and is determined by labour productivity and the current level of output.

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