The Economic Impacts of the Canada-European Union Comprehensive Economic and Trade Agreement (CETA) on Nova Scotia Fisheries

by

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Table of Contents

List of Tables and Figures

Abstract

The current fish and seafood industry in Nova Scotia is subject to various free trade agreements (FTAs) that have significantly reduced tariffs for these exported goods to other countries. The Canada-European Union Comprehensive Economic and Trade Agreement (CETA) promises to reduce tariffs in a similar fashion for many products, including fish and seafood. As a top priority for Prime Minister Justin Trudeau when he came into office in 2015, CETA has been a popular topic of discussions on international trade and economic sustainability. As the EU is a major trade partner for Canada, its effects may be slightly different than other trade agreements, especially at the provincial level. In terms of value, Nova Scotia currently exports the most fish and seafood products internationally out of all Canadian provinces and territories. Furthermore, as the European Union is the second largest importer of fish and seafood in the world, it thus evidently presents itself as a valuable trading partner for Canada, and especially for Nova Scotia. However, despite the many benefits of a trade agreement with the EU, the depletion of stocks and the increasing difficulties faced by both wild and farmed fish and seafood industries pose a threat to the long-term sustainability of CETA. The delicate nature of the fish and seafood industry, as well as its unpredictable volatility makes it difficult to grasp the future effects of CETA on Nova Scotia.

This study examines current trade agreements and their effectiveness on the province, as well as past stock records to determine whether CETA will in fact

be beneficial or will cause further depletion and environmental damage. CETA's impacts will be approximated using estimates for current landings, as well as existing quotas for Nova Scotia's top export species affected by this trade agreement's tariff reductions. Overall, CETA's implementation will have some benefits for both provincial Gross Domestic Product (GDP) and provincial employment, however relatively small in comparison to the existing 1.6 billion dollars in export revenue from fish and seafood in Nova Scotia in 2015.

1. Introduction

Fisheries in Nova Scotia are major contributors to the province's GDP, economic activity and employment. Both directly and indirectly, this province currently employs approximately 19,000 Nova Scotians in the fish and seafood industry (Government of Nova Scotia 2015). Not only are fisheries an important part of the local economy, but fish and seafood are essential to international trade as one of Canada's major exports. In 2014, Canada was a top ten exporter of fish and seafood, competing with much larger economies such as the United States. Nova Scotia currently provides the most exports, in terms of value, out of all provinces and territories across the country. In 2015 alone, it provided $1.6 billion to the national economy in exports (Fisheries and Oceans Canada 2015). The European Union (EU) is Canada's second top importer of fish and seafood products, ranked after the United States. Therefore, it presents itself as a valuable trading partner for Canada and for Nova Scotia.

The Canada-European Comprehensive Economic and Trade Agreement (CETA) proposes to eliminate tariffs on a variety of goods and services for imports from the EU. Fish and seafood form a large part of these tariff reductions, particularly for species such as lobster, scallops, shrimp, haddock, halibut, snow crab, herring and clams. These are Nova Scotia's top exports in terms of international sales (Fisheries and Oceans Canada 2015). Since its signing in 2016, CETA has been widely accepted and endorsed by both the previous national

Conservative government and the current national Liberal government. However, there has been speculation about CETA's effects on local fisheries in Nova Scotia and about the potential complications with stock availability and pricing.

This study seeks to determine whether the proposed enthusiasm in regards to this trade agreement is in fact justified by examining the existing fish and seafood industry, and the potential impacts of CETA on Nova Scotia fisheries. This study comprises of a qualitative overview of the existing industry and marketplace for fish and seafood in the province. Furthermore, it will conduct an analysis on existing price elasticities of demand and supply for Nova Scotia's top eight exporting fish and seafood species in order to determine whether the impact of CETA will result in price increases or expansion of the industry. In addition, it will analyze potential environmental impacts of CETA by examining existing Total Allowable Catch (TAC) quotas in place for each Nova Scotian fishery.

The demand for fish and seafood internationally rises by 3.6%, on average each year (Government of Nova Scotia 2015). Fish stocks, however, face a delicate balance as they are often at risk of depletion. This was proven true by the depletion of cod in Nova Scotia and Atlantic Canada a few decades ago. Therefore, the purpose of this study is to help provide a basis as to prevent such cases from occurring anew.

2. Characterizing the Current Nova Scotia Fishing Industry

In 2010, Canada placed seventh internationally as a top seafood exporter in terms of value (Library of Parliament 2014). In 2014, it placed sixth in the world for seafood exports (World Atlas 2014). Of these exports, approximately seventy percent originate from Eastern Canada (Library of Parliament 2014). The fish industry in Nova Scotia is an important one, as it is a major component of this province's Gross Domestic Product (GDP), as well as the Atlantic provinces' GDPs. As a $520-million industry, Nova Scotia's agriculture and agri-food sector is important for the survival of the province's economy (Government of Canada n.d., 3).

In 2011, the Canadian production of fish and seafood was about 162,000 tonnes or only 0.25% of the world's total tonnes produced (Nguyen and Williams 2016). Despite this small percentage, Canada, and in turn Nova Scotia, still presents itself as a valuable international exporter of seafood. In 2015, Nova Scotia fisheries contributed 1.68 billion dollars in revenue to the Canadian economy, accounting for over 27% of the country's national seafood exports (Nova Scotia 2016). Of these exports, 31% were from processed seafood (Nova Scotia 2016). This industry is an important part of the province's employment, with 19,231 employees linked to the fishing industry in 2014 (Fisheries and Oceans Canada 2017).

2.1. History and Overview

With 7,579 kilometers of coastline, Nova Scotia presents itself as a valuable resource for both wild seafood and the aquaculture industry, and in turn valuable for Canadian exports (Sebert and Munro 1972). This optimal land availability, in addition to the abundance of various fish species in this geographical area, makes Nova Scotia's fish industry the largest one within all Atlantic provinces (ACOA). The Bay of Fundy alone is home to approximately ninety salmon farms, making it an important area for aquaculture research, development and trade. Furthermore, Nova Scotia generally harvests the most wild seafood catches in all of Atlantic Canada. In 2005, 250,721 tonnes were caught or produced, valued at $647,127,000. This constitutes approximately 33% of the Atlantic industry as whole, and 23% of total catches in Canada. In revenue form, this accounts for 44% of sales from the Nova Scotia aquaculture industry, or 34% of the industry revenue raised nationwide (ACOA). This is represented in the following table from the Government of Canada.

Table 2.1: 2005 Canadian Commercial Catches and Values

2005 Canadian Commercial Catches and Values		
	Catches (tonnes)	Values (in 000s)
Nova Scotia	250,721	$647,127
New Brunswick	115,867	$182,432
Prince Edward Island	40,725	$132,047
Newfoundland and Labrador	352,427	$494,040
Atlantic Provinces Total	***759,739***	***$1,455,646***
Quebec Total	57,306	$152,316
Pacific Total	228,159	$314,255
Canadian Total	***1,045,205***	***$1,922,217***

Source: Atlantic Canada Opportunities Agency, Government of Canada

Since 2005, Nova Scotia has continued to be an important part of Canada's fish and seafood industry. Not only has it increased its landings in the past years, but the Canadian industry as a whole has also seen steady increases in its seafood industry. The following graph, from Fisheries and Oceans Canada, demonstrates this mostly upwards trend in total quantity (Q), or landings, and their annual values (V).

Figure 2.1: Atlantic, Pacific and total Canadian fisheries landings and landed value, 1976-2006

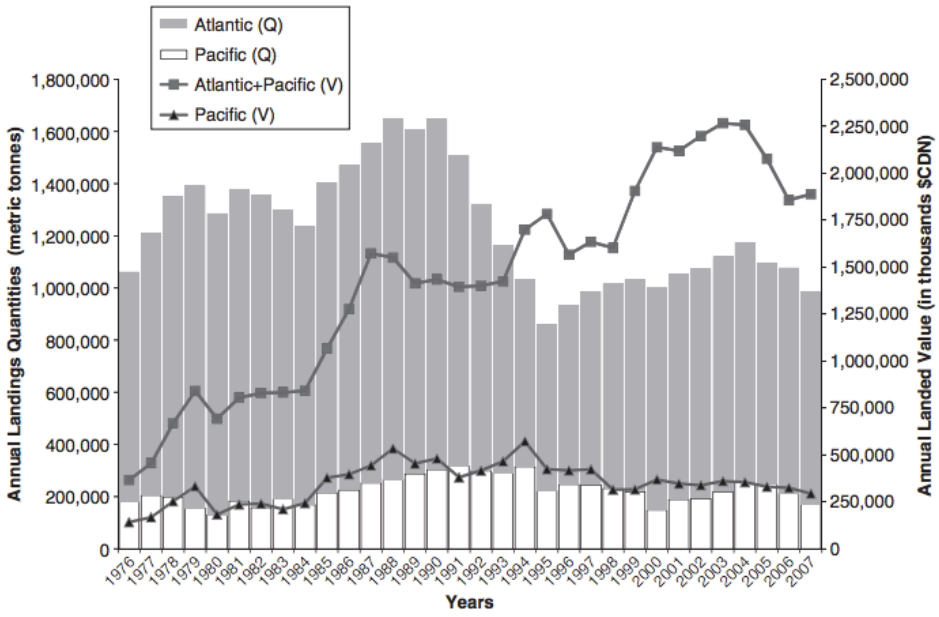
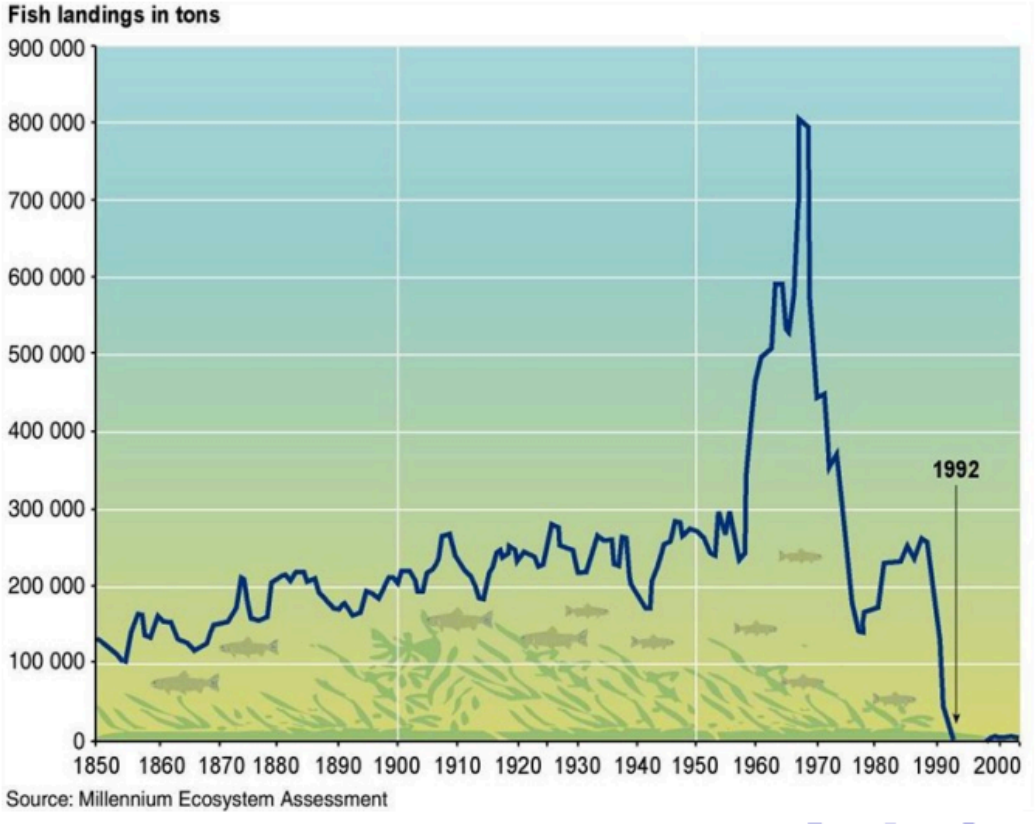


FIGURE 30.1 Atlantic, Pacific, and total Canadian fisheries landings and landed value, 1976–2006. (Data from Fisheries and Oceans, Statistics Division, Ottawa, Ontario)

Atlantic fisheries landings have demonstrated a fluctuation in landings and their respective values. Atlantic Canada, especially Newfoundland and Labrador, placed significant landing value on its cod fishery. Furthermore, the 1980s were dominated by an upheaval of shellfish landings, especially shrimp, lobster and crab. In 1992, however, the Canadian government placed a moratorium on Northern cod fisheries. After decades of overfishing, the government instilled this policy as to help stocks rebuild (Higgins 2008). This greatly impacted Atlantic fishing, as some thirty thousand people became unemployed in Newfoundland. In turn, the province saw a heavy reliance on government welfare, and a significant 10 per cent drop in population (Higgins 2008). Nowadays, fishermen in the

province have turned to shellfish fishing, as it has become a similarly profitable industry. The following graph depicts the massive increase in Atlantic cod fishing in the 1960s, followed by the decline in fish stocks later on in that decade. Finally, the 1992 moratorium depicts the cessation of cod fishing in Atlantic Canada.

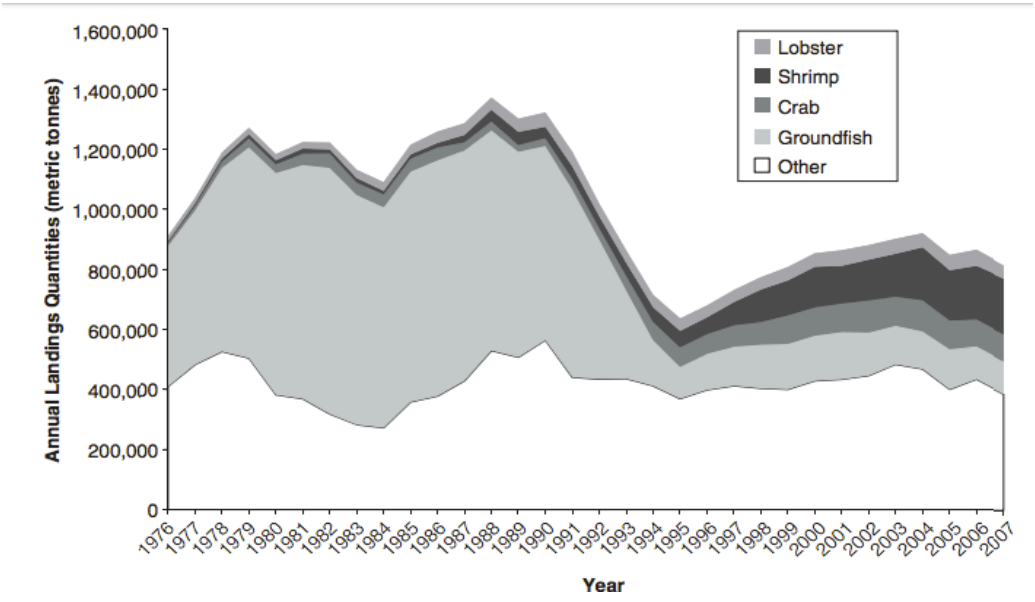
Figure 2.2: Cod landings in tons, 1850-2000



The moratorium was originally supposed to last two years. Stocks were only starting to replenish in 2012, however stock levels continue to be below ninety per cent of what they were in the 1980s (MacDonald 2012). As Parsons (n.d.) argues, the species composition of the Atlantic fisheries had “completely transformed” (394). Groundfish landings plunged significantly in Atlantic

provinces, decreasing their importance for local economies. In fact, groundfish dropped to fourteen percent in landings, but shellfish dominated at fifty-four percent of landings (Parsons n.d., 394). The value of landings for Atlantic Canada in Figure 1.2 is combined with Pacific values, but it is noticeable that there has been an increasing gap between values of fish and seafood in the Pacific and values in the Atlantic since the 1970s. This continuously expresses the importance of the Atlantic for the Canadian fish and seafood industry. Similar time trends are noticed when observing Atlantic landings by specific fishery, as illustrated in the following graph.

Figure 2.3: Annual Landings Quantities per Year in Atlantic Canada



Source: Parsons, n.d.

Again, the collapse of groundfish in the nineties is noticeable. Lobster landings continue to be the largest quantity of landings in Atlantic Canada. There has been an increase in the landings of other species that have proven to expand the market, such as shrimp and crab. The value, however, of various fish species has faced a different trend since the seventies. The following graph demonstrates a steady increase, with minor setbacks, of the landed value of seafood, per species, in Atlantic Canada in the last few years.

Figure 2.4: Canadian Atlantic landed value by fishery, 1976-2006

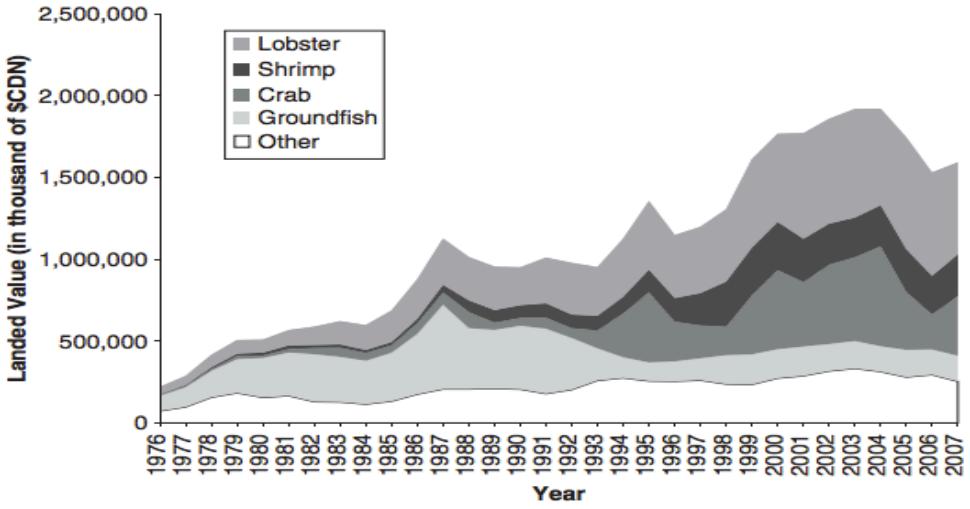


FIGURE 30.3 Canadian Atlantic landed value by fishery (nominal CA$), 1976–2006. (Data from Fisheries and Oceans, Statistics Division, Ottawa, Ontario)

Despite fluctuations in landings, prices of seafood species have steadily increased since the seventies, with a few slight drops. Groundfish, however, have experienced a decline in landed value, due to a drop in available fishing stock. Again, lobster proves to be the highest landed quantity and landed value. The

above graphs demonstrate that prices are inversely related with quantity, demonstrating the scarcity of seafood, and its quality as a luxury good for many consumers internationally.

Overall, the history of fisheries in Nova Scotia is fairly steady. Apart from cod, the general landings and values in this province and in Atlantic Canada have remained somewhat steady. Values of fish and seafood continue to increase, due to increased demand and increased scarcity of certain species. This steadiness makes Nova Scotia a promising exporter of seafood and a consistent one.

2.2. Species and Landings

Cooper and Clift (2012) explain that the sheer demand for seafood in recent years has greatly increased. People all over the world are recognizing seafood for its health benefits, and have shown that they are willing to pay high prices for fish and seafood. There currently exist over 70 aquatic species that can be fished and/or fish farmed in Canada. As a whole, the Atlantic fisheries sector accounted for approximately 73% of total landings in the country in 2008. In the same year, its landings from marine commercial fishing were valued at $1.89 billion. Of these, 27%, or 225 thousand tonnes of seafood, was landed in Nova Scotia. This accounts for a total of $677 million, or 36% of the total Canadian landed value (Canadian Fisheries Statistics 2008).

Popular export species in 2008 and in recent years included Nova Scotia lobster, scallops, Queen crab, and several others such as crab, cod, hake, herring and halibut, collectively contributing to the rest of the landing value. In 2008, total landings in Nova Scotia increased to 262,611 tonnes, valued at $658 million or 34% of total value in Canada for the industry (Canadian Fisheries Statistics 2008). In 2015, the species with the most commercial landings, calculated in ascending order of live weight metric tonnes, are depicted in the following table from Fisheries and Oceans Canada.

Table 2.2: Nova Scotia's Top Export Species by Landings (2015)

Species	Landings (metric tonnes)
Halibut (Atlantic)	2,718
Queen Crab	12,031
Clams	16,433
Haddock	17,460
Shrimp	25,711
Herring	46,576
Lobster	49,255
Scallops	55,297

Source: Fisheries & Oceans Canada, 2015

Furthermore, the following table depicts the same species, but in ascending order of value of species landings.

Table 2.3: Nova Scotia's Top Exports by Value (2015)

Species	Value (000s $)
Herring	16,221
Haddock	26,053
Clams	30,220
Halibut (Atlantic)	37,967
Queen Crab	73,268
Shrimp	92,846
Scallops	167,496
Lobster	695,759

Source: Fisheries & Oceans Canada, 2015

Both lobster and scallops are interchangeably important in terms of both landings and values. Certain species have very low landings, but are scarce and in turn provide high value, such as halibut and queen crab. The opposite is true, as some species have high landings but low value, such as herring. These eight species will be mainly used for analysis in this study.

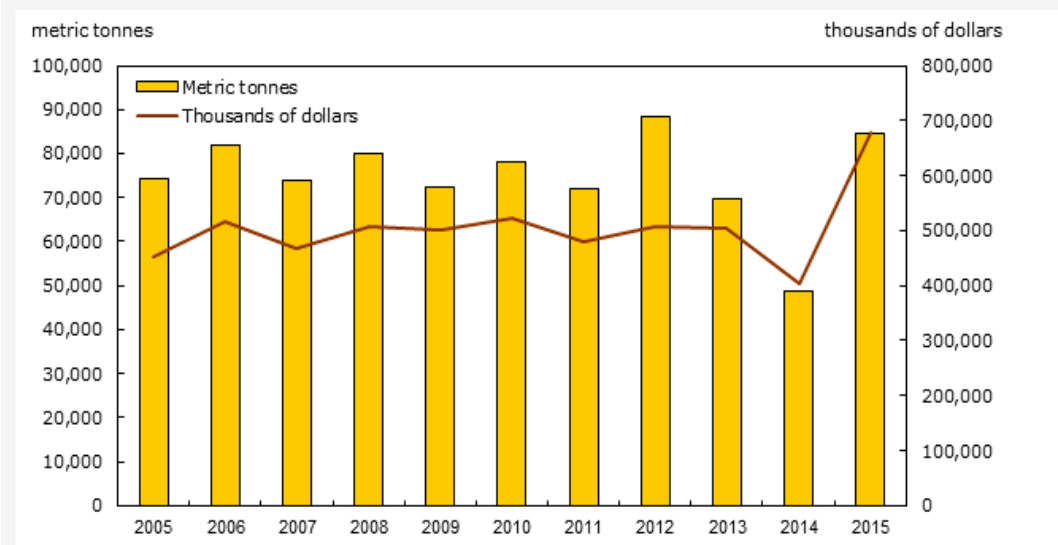
The optimal time of the year to catch seafood in Nova Scotia is between the months of May and October, for most species. Therefore, the industry and province can expect to yield higher revenues during this time period each year. However, prices are increased from November to January due to scarcity and a consistent demand (Canadian Fisheries Statistics 2008). L. Scott Parsons discusses the major trends in Canada's marine fisheries and their management in recent years in his text "Canadian Marine Fisheries Management: A Case Study". Since

the nineties, shellfish stocks have become increasingly abundant in the Maritimes. Particularly, lobster landings, queen crab and shrimp have increased in supply, creating an area of opportunity for the eastern provinces to trade overseas (Parsons n.d., 393). However, certain species have decreased in landings, mostly due to warmer water temperatures, which have shifted their habitats (Parsons n.d., 396). This can be especially problematic for certain areas in Nova Scotia where fishing enterprises largely depend on specific species for the majority of their incomes.

2.3. Aquaculture

By value, Atlantic salmon actually constitutes about seventy percent of aquaculture in Canada (Nguyen and Williams 2016). The following chart from Statistics Canada depicts the amount of Atlantic salmon and salmon fillets exports from 2005 to 2015, in combination with their export values, in thousands of dollars.

Figure 2.5: Atlantic salmon and salmon fillet exports, 2005-2015



Source: Statistics Canada, 2015

Export sales, both in terms of weight and revenue, were steady until 2014, when the Atlantic Provinces were faced with lower output in salmon. Similarly, export values declined in 2014. However, this recovered in 2015, as aquaculture products and services sales in Canada, including salmon, amounted to $907.4 million (Statistics Canada 2016). In Nova Scotia specifically, the value of its total aquaculture products in 2015 was valued at $55,975 million (Statistics Canada 2016). The Maritimes account for over one third of Canada's farmed salmon output internationally (Nova Scotia Salmon Association n.d.). Other important aquaculture species in Nova Scotia and the Atlantic Provinces include rainbow trout, Arctic char and coho salmon. In 2011, the province ranked third in Canada in quantities for farmed shellfish, and fourth in Canada for of farmed finfish (Nguyen and Williams 2016). Despite the strong presence of farmed salmon and these other species, the aquaculture production has not experienced much growth

in exports in recent years. This is due to a declining price for Atlantic salmon in global markets in combination with an increasing Canadian dollar. Furthermore, as salmon is a global commodity whose price is set by supply and demand, it thus has to compete with other countries' prices such as Chile. The latter has a competitive advantage in farmed salmon, due to minimal labour costs and low material costs (Nguyen and Williams 2016). Canadian farmed salmon is also dependent on the United States, as ninety-seven percent of Canadian exports in this industry are destined for the USA (Nguyen and Williams 2016). Fluctuations in U.S. markets and demand thus create volatility in the Canadian aquaculture industry.

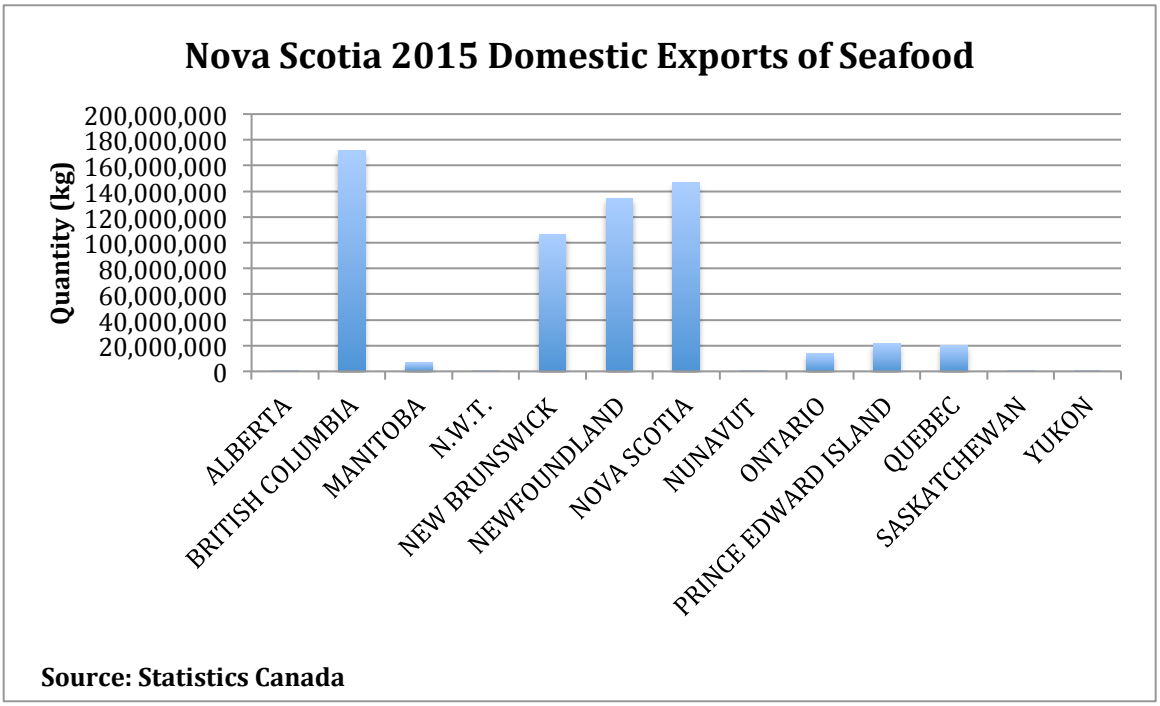
Furthermore, the aquaculture industry is often associated with controversy, as wild species are grown in captivity. There has been evidence of a correlation between aquaculture and a decline in wild stocks (Nova Scotia Salmon Association n.d.). Additionally, aquaculture can result in a loss of coastal habitat for wild species, pesticide pollution, residues on beaches, and increased algae in the water, which can endanger other species and natural ecosystems (Nova Scotia Salmon Association n.d.). Due to the majority of aquaculture coming from New Brunswick, the controversial effects and importance of aquaculture, and the complex provincial regulations that surround the industry, it will not be included in this study. Furthermore, there is little room for expansion in the aquaculture

industry (Nguyen and Williams 2016). Therefore, the industry's annual export numbers would remain consistent, deeming it somewhat irrelevant to this study.

2.4. Exports

Nova Scotia fisheries export to over 75 countries (Government of Nova Scotia 2016). The province's fisheries exported over $843 million worth of seafood overseas in 2008. This is the second highest ranking export value in Canada, with British Colombia at $911 million (Government of Nova Scotia 2016). Together, these two provinces accounted for 45% of all Canadian fish and seafood exports during this year. In 2014, Nova Scotia increased its exports to 125,157 tonnes, worth over $1.3 billion (Government of Nova Scotia 2016). This made it the largest exporter of fish and seafood in the country. In 2015, Nova Scotia fell back to the second highest number of domestic export quantities of seafood, with over 146 thousand tonnes (Government of Canada 2015). The following graph compares Nova Scotia's export quantities with other Canadian provinces and territories.

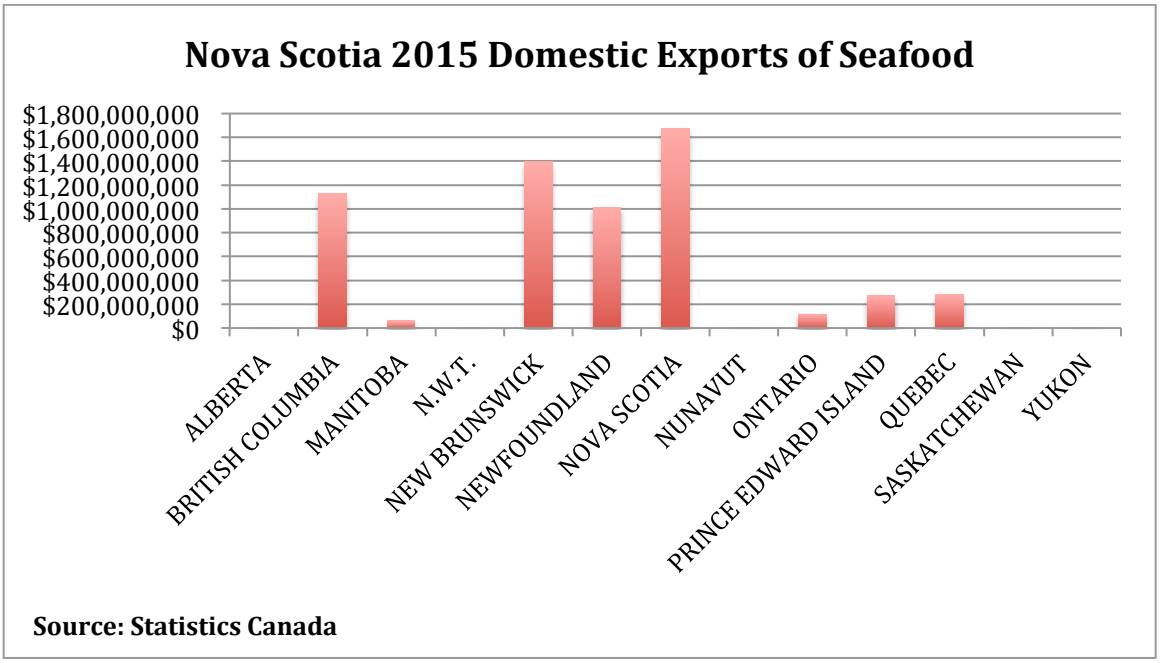
Figure 2.6: Nova Scotia Exports of Fish and Seafood, in Landings (kg), 2015



Source: Statistics Canada

This province is therefore an important contributor to Canadian seafood exports, and ranks first among Maritime provinces for export quantities. Furthermore, Nova Scotia has increased its exports, by approximately twenty million kilograms, from the previous year (Fisheries and Oceans Canada 2015). The following graph depicts Canada's value of seafood exports, in dollars, for each province and territory in 2015.

Figure 2.7: Nova Scotia Exports of Seafood, in Value ($), 2015



Source: Statistics Canada

In comparison to the first graph, Nova Scotia was actually the top exporter in Canada in terms of value for seafood, with over $1.6 billion in exports. Although British Colombia has the highest volume of seafood exports, it actually ranks third in the country for value. New Brunswick is a close second to Nova Scotia, with almost $1.4 billion in exports. Overall, the Maritime provinces dominate seafood exports in terms of both quantity and value.

Not surprisingly, most of Canadian seafood exports are shipped to the United States. In 2015, $958 million worth of seafood was exported to the US (Government of Nova Scotia 2015). In recent years, new markets have evolved in Europe and the Pacific Rim – contributing to the constant growth in exportation from Canada of these products (ACOA n.d.). $249 million worth of Nova Scotian

seafood was exported to the European Union, and $407 million was exported to Asia in 2015 (Government of Nova Scotia 2015). Key countries in the European Union to which Canada exported seafood to included Denmark, France, Spain, Poland and the United Kingdom (Fisheries and Oceans Canada 2015). Canadian seafood export revenues have increased by 86%, exclusively from 2011 to 2015 (Government of Nova Scotia 2015).

In recent years, Nova Scotia has demonstrated exemplary leadership and transformation abilities in its fishing technology and strategy. According to the Atlantic Canada Opportunities Agency, a governmental agency that mainly seeks to create opportunities for economic growth in Atlantic Canada, the Maritimes have managed to rebuild and maintain fish stocks, all while developing and/or implementing improved harvesting and marketing strategies, which in turn respond to international demand at a competitive price. From 1996 to 2006, the sheer volume of production in Atlantic Canada of seafood exports increased from 32,000 tonnes to 69,000 tonnes, a representation of this efficiency.

In 2015, the Government of Nova Scotia declared that the international demand for seafood was steadily continuing to increase. Since 1961, consumption of seafood has grown 3.6%, annually. The province exported over $1.6 billion globally in 2015, accounting for over 27% of Canadian seafood exports and thus making it Canada's top seafood exporter (Government of Nova Scotia 2015).

Furthermore, the seafood industry in the province directly hires about 10,000 Nova Scotians, and another 9,000 in related sectors to fish and seafood, making it an important labour market for many living in Atlantic Canada (Government of Nova Scotia 2015).

2.5. Management, Legal Bindings and Policies

Many changes happened between the 1960s and the 1990s in order to revamp and modernize Canadian fisheries. Furthermore, concerns about overfishing and resource availability became more problematic, creating the need for additional policies, restrictions and interventions. The tragedy of the commons[1] is often a looming concern for this province, partially due to the Atlantic history with cod fisheries, but it has dedicated clear-cut rules and regulations since then to prevent such a scenario from occurring. As a result, a variety of management practices were put in place across the country to regulate the delicate and volatile seafood market.

The Nova Scotia Fisheries and Coastal Resources Act, the Oceans Act, the Species at Risk Act and the general Fishery Regulations legally bind the Nova Scotia seafood industry. These legislative documents consolidate and revise laws

[1] "The 'tragedy of the commons' arises when it is difficult and costly to exclude potential users from common-pool resources that yield finite flows of benefits, as a result of which those resources will be exhausted by rational, utility-maximizing individuals rather than conserved for the benefit

regarding fishing and fisheries while also promoting improvements to the industry. The current Canadian Minister of Fisheries, Oceans, and Canadian Coast Guard of Canada Dominic Leblanc and his provincial counterpart Minister Keith Colwell, oversee the operations and procedures of Nova Scotia fisheries, while continuously reviewing the Nova Scotia Fisheries and Coastal Resources Act and its effectiveness. The Cabinet Minister is accountable for the protection and sustainable use of fisheries resource and their habitat (Parsons n.d., 398). His main duties also include the discretionary power necessary to regulate access to aquatic resources, licensing, the power to impose conditions on harvesting and the general enforcement of regulations (Parsons n.d., 398).

The Aquaculture part of the Nova Scotia Fisheries and Coastal Resources Act declares the importance of aquaculture, especially with compliance of safe environmental practices, as to not risk losing species that are already in danger of becoming extinct (Nova Scotia Legislature 1996). The National Aquaculture Strategic Action Plan (NASAPI) was endorsed in 2010. This initiative was put in place in order to ensure good governance, social licensing and reporting, productivity and competitiveness of the aquaculture industry (Nguyen and Williams 2016).

In general, licences are required for fishing, processing fish products, and buying fish products (Nguyen and Williams 2016). Limited-entry licensing exists

in all major fisheries in Canada (Parsons n.d., 399). According to Parsons, this has proved successful in controlling overcapacity and overinvestment in Canadian fisheries. In the Atlantic industry, lobster controlling in the eighties and nineties was successful in constraining additional entry. Limited-entry licenses, therefore, are not only a privilege but also hold capital value.

In addition to licensing, additional policy has been implemented in Nova Scotia in order to control fishing. The Fleet Separation policy, initially implemented in 1979 in all Atlantic provinces, mainly prohibits the issuance of new licenses to corporations for fisheries where vessels are less than sixty-five feet in length (Cooper and Clift 2012, 45). This policy was largely adopted in order to reduce corporate concentrations of fishing licenses, distribute licenses and wealth accordingly, and to ensure the sustainability of coastal communities (Cooper and Clift 2012, 45). In turn, vertical integration, often the product of corporate concentration, is reduced[2]. Much like the oil industry, where companies often own upstream subsidiary companies, the seafood industry in Atlantic Canada has had several occasions where vertical integration had a strong presence. Advantageously, this strategy tends to diminish risks with supply and tends to increase the operating season. On the other hand, it does pose a threat to small and local fisheries.

[2] The concept of vertical integration is defined by the supply chain or production at different levels of a product, all owned by a single company or entity, in order to increase power and revenue in the marketplace (Cooper and Clift 2012, 46)

2.6. Quotas

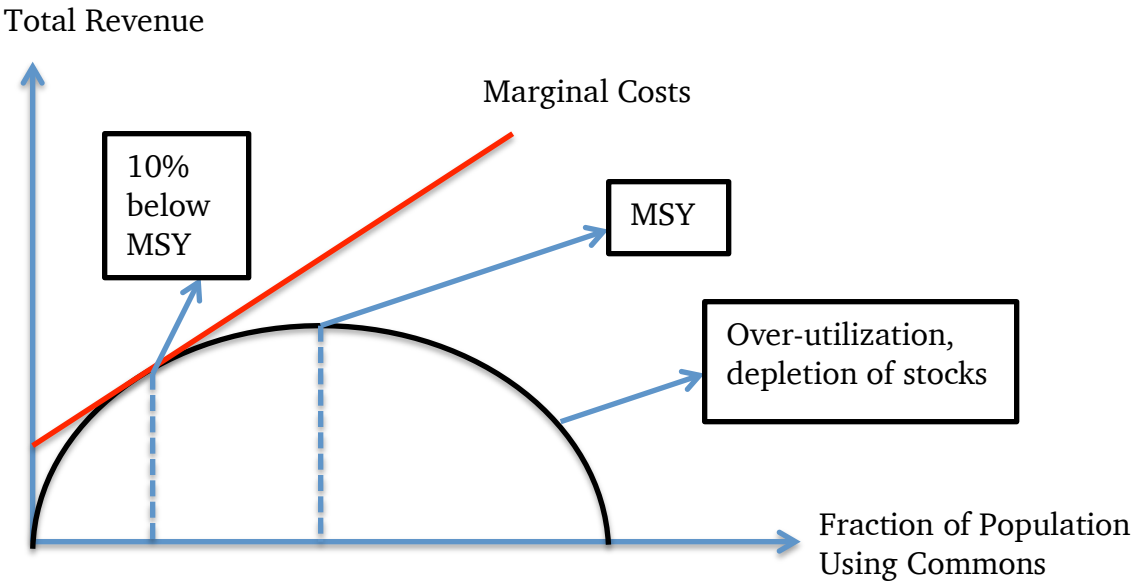
Catch quotas have been effective tools in place in Canada since the 1970s. The original objective of quotas was to rebuild fish stocks that had been reduced to dangerously low levels. However, studies have shown that these quotas have not been successful in rebuilding fish stocks (Parsons n.d., 399). An independent panel, established in 2001, was set up in order to review allocation criteria for Atlantic fisheries (Parsons n.d., 400). Individual quotas originated in the Bay of Fundy in the mid-seventies after massive depletion and tragedy of the commons. Company quotas were tested in the Maritimes in the 1980s in respect to groundfish, which were subsequently adopted for ongoing management, especially offshore (Parsons n.d., 400). Most individual quotas were in place within fisheries by mid-2000s.

Individual fishery quotas (IFQs) are now mandatory across Canada. In practice, a quota holder is generally prohibited from holding more than 2 percent of the total allowable catches (TACs) of any species for a specific area (Sanchirio et al. 2005, 10). The development of the IFQ program began in the late eighties, and has directed the repletion of cod, haddock, Pollock and various other groundfish species that suffered from overfishing. The TACs are set by the Minister of Fisheries and Oceans Canada, based on recommendations from the Department of Fisheries and Oceans and regional advisory panels (Sanchirio et al.

2005, 11). These TACs are carefully chosen as to represent a quota that is ten percent below the maximum sustainable yield (MSY) of a particular species, or the ecological yield that can be extracted without reducing the base of fish capital itself (Sanchirio et al. 2005, 11). This permits fishing, but at a quantity rate that will be below the maximum sustainable yield. This is beneficial for both the environment and for fisheries.

As commons goods, fish are subject to the tragedy of the commons. The following graph depicts the ten-percent-below-MSY approach. Without a quota, fish and seafood will continue to be exploited until the point of over-utilization. The MSY is the peak point of fishing, with no depletion. By setting the quota ten percent below optimal utilization, social optimization or first-best outcomes can occur, as this point will have the same slope as the industry's marginal costs. Therefore, it presents itself as a valuable maximum for both firms and for protecting the stock of fish in the environment and economy.

Figure 2.8: Tragedy of the Commons



In Nova Scotia, fleets can go over their TACs, but in turn must decrease their TACs the following year. They can only do this for one year at a time (Sanchirio et al. 2005, 11). These are called rollover allowances. Permit owners can either carry forward their unused quota for use in the following year, or carry back their overused quota from the following year (Sanchirio et al. 2005, 11). This cannot be carried over multiple years. For monitoring and regulation, the Canadian Dockside Monitoring Program was introduced in 1991 to verify landings, so that fisheries can be held accountable to the number of catches they are making. Few fisheries go over their quotas, however, due to other over-usage penalties.

In additional to TACs, Nova Scotia also implements a Catch-Quota Balancing Mechanism. This ultimately allows the sale of permanent rights, and the lease of annual quotas or sale of licenses under certain conditions (Sanchirio et al. 2005, 12). However, there are restrictions to this Mechanism, as quota owners have a "use-it-or-lose-it" policy restriction that prevents them from hoarding licenses and selling them at a later date. For example, Nova Scotia transfers in peak season are restricted to members of the same species sector, while transfers in the off-season are loosely restricted (Sanchirio et al. 2005, 13-4). There are approximately 1,100 temporary transfers between the 300 licensed vessel owners in the province each year (Sanchirio et al. 2005, 16).

Finally, Nova Scotia has an active prohibition program on discarding. This prohibits the discard of quota species and enforces serious punishments if such is the case. In the last thirty or so years, this province has made great improvements in its fishing technology and protection, making it increasingly difficult for poachers and illegal fishing activities (Sanchirio et al. 2005, 16).

2.7. Trade Agreements

Existing trade agreements and deals, such as the Canada-U.S. Free Trade Agreement (FTA), the North American Free Trade Agreement (NAFTA) and the

General Agreement on Tariffs and Trade (GATT) currently provide some structure to the seafood industry in Nova Scotia.

The Canada-U.S. FTA essentially lowers or eliminates tariffs on processed seafood and marine products (Fisheries and Oceans Canada 2015). This allows fisheries to increase their export potential, and provides them with a competitive advantage that other fisheries across the world might not have (ACOA n.d.). Canadian seafood exporters can also expect benefits from the dispute settlement mechanism. Countervail and antidumping defense legal cases take less time with the Canada-U.S. FTA due to the existence of the dispute settlement process (Fisheries and Oceans Canada 2015). Furthermore, the trade agreement limits impediments arising from trade in the U.S., and would keep the present Canadian Ministry of Fisheries and Oceans powers intact. This protects Nova Scotian fisheries and guarantees their oversight by Canadian sources. The Government of Canada can, in turn, maintain its regional, social, environmental and business goals for its fisheries (Fisheries and Oceans Canada 2015).

NAFTA, in comparison, characterizes the current seafood industry in Nova Scotia as it phases out tariffs on almost all exports from Canada to Mexico (ACOA n.d.). This trade agreement requires that a product originate in either one of these countries, with strict requirements on “Product of Canada” labels in order to qualify for reduced tariffs (Martin et al. 2000, 863). In fact, a 10 percent ad

valorem penalty is imposed on improperly marked shipments of seafood (865). Exporters sign and complete Certificates of Origins, and importers of seafood provide a written declaration stating the country of origin that the product came from (864). Furthermore, vessels must bear the flag of its country of origin in order to qualify as well. Separate, specific tariffs apply to processed seafood, as there is a value added to these products. Whichever country processed the seafood product then becomes the country of origin of the product (Martin et al. 2000, 864). Therefore, if countries other than Canada, the United States or Mexico process seafood that was originally caught or farmed in these countries, it will not qualify for NAFTA tariffs. The phase-out of tariffs with NAFTA may have been accelerated in certain cases through mutual agreements between countries (Martin et al. 2000, 863). Procedures like customs and liberalized investment policies are facilitated with NAFTA. The Council on Foreign Relations has declared that Canada has seen strong gains in cross-border investment since the implementation of NAFTA.

The GATT was implemented shortly after the Second World War, intended to boost economic recovery. On average, the GATT allows for one-third of a tariff reduction on processed fish products (ACOA n.d.). This incentivizes Nova Scotia seafood exporters to produce fish products such as canned and frozen seafood. In addition, the GATT reduces, if not eliminates, tariffs on a broad range of fish processing inputs and equipment. This allows Nova Scotia exporters to acquire a

competitive edge, especially for processed fish products exported to the Eurozone, Japan and South Korea (ACOA n.d.). The GATT especially benefits exporters of lobster, crab, herring, frozen fish and fillets, shrimp, halibut, salted fish, scallops and mackerel (ACOA n.d.).

Canada has many other important plurilateral trade agreements with other countries, such as the Trade in Services Agreement (TISA), the Canada-European Free Trade Association (EFTA) Free Trade Agreement, The World Trade Organization Agreement on Trade Facilitation (TFA) and the World Trade Organization Environmental Goods Agreement (EGA). In addition, Canada has many bilateral trade partners around the world. However, these agreements are not significantly relevant to Nova Scotia's exports of fish and seafood. They do not majorly impact the existing trade structure of fisheries, or do not have enough data provided to properly measure the effects of these FTAs on Nova Scotia fish and seafood exports. Therefore, they are excluded from this study.

2.8. Tariffs

Trade agreements in general have been beneficial for the promotion and sale of Nova Scotia fish and seafood internationally. These specific trade agreements determine their own tariff rules and regulations, but the World Trade Organization (WTO) also sets specific regulations in place worldwide with respect

to seafood trade. For the most part, the WTO seeks to reduce international tariffs for seafood between borders by tariff reduction. Arne Melchior describes this in his text “Tariffs in World Seafood Trade”. According to his research, seafood tariffs are higher than most tariffs for other goods, especially non-agricultural market goods (Melchior 2006, 9). More importantly, he describes the structure of tariffs internationally by using the phenomena known by economists as “water in the tariffs” (Melchior 2006, 11). This is defined as the classical approach to negotiating bound tariff rates, or the tariff rates set by the World Trade Organization, but simultaneously allowing countries to apply their own tariffs at their own discretion. Most often, there are large gaps between bound and applied tariff rates in the fish and seafood industry. Bound rates are set by the WTO and are often much higher than what is actually applied between countries in everyday trades. Applied rates, also called Most Favoured Nation (MFN) tariff rates, are rates set individually by each country (or, in the case of the EU, by the European Commission). So, by lowering WTO bound rates, the actual tariff rates between nations may not differ or change very much. There is no single measure for world tariff averages for fish and seafood, but bound rates or upper bound rates are normally around thirty percent or higher, whereas the actual burden of tariffs is usually around ten percent (Melchior 2015, 4). This is demonstrated in Melchior’s study, and in the following table.

Table 2.4: Tariff binding rates and average tariffs for seafood

Table 1. Tariff binding rates and average tariffs for seafood

	Share of six-digit items bound for seafood	Simple average of bound tariffs	Simple average of MFN applied tariffs
	(%)		
High income	79	12.4	5.2
Upper middle income	60.7	42.9	18.7
Lower middle income	71	31.6	16.3
Low income	43.1	51	17.8
All countries	60.5	34.2	15.6
Countries covered by data:	119 WTO members	70 WTO members	140 countries, WTO members and non-members

Source: Melchior (2006), Table 5.

Countries with high income see low tariffs in both bound and applied rates. Low-income countries see the highest averages for bound tariffs, whereas upper middle-income countries see the highest simple averages for MFN tariffs. Overall, applied rates are usually much lower than actual bound rates. This demonstrates that countries do not apply the world rates set by the WTO, but instead apply their own lower tariffs as to encourage trade. These lower rates are amplified with free trade agreements. For instance, the Republic of Korea – Chile agreement and the Japan – Mexico agreement reduced tariffs from 15.9 per cent to zero percent, and 5.9 per cent to 2.5 per cent, respectively (Melchior 2006, 17).

Tariffs for fresh and frozen fish and seafood tend to be negatively correlated (Melchior 2006, 20). As Nova Scotia tends to export fresh fish such as lobster, it often faces lower tariffs already. However, this is a disadvantage for processing firms in the province, as they face higher tariffs overseas when either freezing or processing the product. This is called tariff escalation. For example, the EU currently has a thirteen percent tariff on smoked salmon, while whole

salmon only faces a two percent tariff rate (Melchior 2006, 20). This can discourage processing firms in Canada that process smoked salmon. This can hinder some industrial development and specialization for both developing and developed countries. For Nova Scotia, this can prevent its processing industry from expanding.

More specifically related to the EU, Thai Nguyen presents specific data on fish and seafood export tariffs in his publication for the Library of Parliament entitled “Trade Agreements and Eastern Canada’s Fisheries”. 2013 average tariff rates for exports of Canadian lobster, crab, shrimp and Atlantic salmon are presented below:

Table 2.5: EU Export Market Tariff Rates and Share of Exports in 2013

Lobster (Fresh)		Lobster (Frozen)	
Tariff Rate	Share of Exports	Tariff Rate	Share of exports
8.7 %	8 %	11 %	8 %
Crab (Fresh)		Crab (Frozen)	
Tariff Rate	Share of Exports	Tariff Rate	Share of exports
7.5 %	Under 1 %	7.5 %	Under 1 %
Shrimp (Fresh)		Shrimp (Frozen)	
Tariff Rate	Share of Exports	Tariff Rate	Share of exports
12 %	3 %	12-20 %	10 %
Atlantic Salmon (Fresh)		Atlantic Salmon (Frozen)	
Tariff Rate	Share of Exports	Tariff Rate	Share of exports
2 %	Under 1%	2	13%

Source: Nguyen and Williams 2016

Export competitiveness of the Nova Scotia fish and seafood industry depends on several factors, including the removal of customs duties. As per the above table, unprocessed species face similar tariff rates for both fresh and frozen varieties. The average tariff rate for these major exporting fresh species is 7.5 percent, whereas for frozen 8.1 percent. These are somewhat high compared to tariff rates for other countries that have trade agreements with Canada. The U.S.A, for instance, has a zero percent tariff rate on most fresh and frozen unprocessed fish and seafood species, which in turn contributes to a greater portion of exports going to the U.S.A. Similar situations are occurring with other countries such as Hong Kong, Israel and the Republic of Korea.

3. Overview of CETA

The Canada-European Union Comprehensive Economic and Trade Agreement, according to the Government of Canada is a “progressive trade agreement”, which would greatly reduce tariffs on a widespread variety of goods and services for exports going to the EU. The negotiations regarding CETA began in 2008 with a Joint Study, which assessed the costs and benefits of a closer Canada-EU economic partnership (Viju n.d.). The document was finalized when Prime Minister Justin Trudeau signed it on October 30th, 2016, with then-Trade Minister Chrystia Freeland. The EU is Canada’s second largest trading partner, and is also the world’s second largest economy (Government of Canada 2016). The government claims that under CETA, ninety-eight percent of tariff lines will be duty-free, compared to the current twenty-five percent (Government of Canada 2016). Within seven years, CETA will expectedly remove ninety-nine percent of tariffs. As a result, Canada will be able to increase its competitiveness in global market access.

Furthermore, CETA will require strict regulations on what is deemed “made in Canada” as to ensure that only Canadian products are subject to preferential tariff treatment (Government of Canada 2016). The licensing and harvesting of fish and seafood and/or the processing of fish may require residency and citizenship proof for both Canadians and Europeans. Offshore processing

exceptions only exist if the fish or seafood species cannot be economically processed in existing national facilities, or if fishermen process their own catches overseas (CETA n.d., 798). In respect to the environment, CETA, Canada and the EU are committed to adhere to domestic environmental law (Government of Canada 2016). In its official document, CETA "recognizes the importance of the conservation and the sustainable and responsible management of fisheries and aquaculture and their contribution to providing environmental, economic and social opportunities for present and future generations" (CETA n.d., 195-6). In order to achieve this, both Canada and the EU have agreed to adopt or maintain effective monitoring, control and surveillance methods of fisheries as to preserve fish and seafood stocks, such as vessel monitoring schemes and transhipment control (CETA n.d., 196). To prevent illegal, unreported and unregulated (IUU) fishing, it proposes to adopt certain actions as to reduce these illegal activities and exclude such products from CETA's lower tariffs and preferential trade. Additionally, it aims to promote good governance of fisheries by advocating for science-based decisions, and to promote the development of an environmentally responsible and economically competitive aquaculture industry (CETA n.d., 196).

Quotas are likely to fluctuate with the implementation of CETA. This could lead to complications with stock depletion. Furthermore, imports in excess of volume quotas can be subject to higher tariff rates under CETA, usually the Most Favoured Nation (MFN) tariff rates. These rates may still be low, but would

generally be slightly higher than the zero percent CETA rates. The following represents CETA's proposed instant EU tariff elimination under this trade agreement, followed by their 2015 tariff rates:

- Live lobster – 8%
- Frozen and fresh scallops – 8%
- Frozen shrimp – 12%
- Cooked and peeled shrimp in retail packages – 20%
- Fresh or chilled hake – 15%
- Dried and salted cod – 13%
- Frozen herring – 15%
- Frozen mackerel – 20%
- Fresh or chilled halibut – 15%
- Fresh mussels – 8%-10%
- Salmon – 2%-15%
- Processed salmon – 5.5%
- Fresh crab – 7.5%
- Frozen snow crab – 7.5%
- Dogfish – 6%
- Oysters – 9%

(Government of Canada 2015).

These species will largely be affected by tariff reductions as they currently have relatively high tariff rates. Specifically, packaged frozen shrimp and frozen mackerel will see a huge reduction in tariffs, creating room for demand in the EU.

Specific to Nova Scotia, Reservation I-PT-91 of the CETA document allows the province to regulate and issue various authorizations relating to the production, processing or marketing of fish and aquaculture fish products. This includes the transfer, delivery or transmission of marine products by fish harvesters, aquaculturalists and subsequent purchasers (CETA n.d., 863). This allows for extra protection of Nova Scotia fisheries, and to better monitor the provincial industry. Furthermore, Reservation II-PT-35 of the document grants Nova Scotia the right to adopt or maintain a measure limiting market access in the sectors of fish and other fishing products, and prepared and preserved fish (CETA n.d., 1254). This excludes limitations on foreign capital and foreign shareholding.

For the EU, similar benefits arise from CETA. Besides lower tariffs, the opening up of the Canadian services market is appealing for European investors. The mutual recognition of professional qualifications and more transparent professional comparisons between both parties is also an asset (European Commission 2016). In turn, Europeans will be able to supply services without moving across the Atlantic Ocean. CETA will also aid to protect Europe's industry

of fine foods, and protect its innovators and artists through copyright rules that will be aligned with Canada's (European Commission 2016). All things considered, CETA is similar to other existing trade agreements including Canada and other foreign entities. Its main difference is that the EU includes twenty-eight countries. Overall, similarities between trade agreements can help decipher the future results and effects of CETA.

4. Literature Review

4.1. CETA in Canada and Nova Scotia

CETA itself has presented itself as a controversial and debatable trade agreement since the start of its negotiations. Several papers have been written and published against CETA's principles, mainly supported by activist groups. Scott Sinclair, director of the Canadian Centre for Policy Alternatives' Trade and Investment Research Project, argues strongly against CETA, mostly due to Canada's experience as the most-sued developed country in the world, in conjunction with the increasing list of corporate lawsuits against EU member state policy (Sinclair 2016). Giles, MacMillan and Saulnier (2012) also propose that CETA will renounce Nova Scotian control on domestic companies, as European companies will have easier access to the province's consumers and public spending, creating job loss. Barlow (2016) furthers this argument, by arguing that much like NAFTA and the Canada-USA Free Trade Agreement, CETA will cause Canada to lose further manufacturing jobs due to offshoring. This may affect fisheries, as their processing plants will likely see continued inability to compete internationally.

The investor state dispute settlement (ISDS) system is also a cause for concern. As mentioned above, Sinclair argues against CETA due to this process,

where corporations from the countries part of the trade agreement can sue one another's governments for changes to laws, policies or practices that hurt the corporation's bottom lines (Barlow 2016, 5). In other words, ISDS grants the right for corporations or private investors to use dispute settlement proceedings against a foreign government (Barlow 2016, 7). This system was first introduced with NAFTA. CETA does contain ISDS provisions, but are mostly controversial in Europe, and are likely not going to affect fisheries in Nova Scotia. Furthermore, countries of the Global South, not ones from the EU, originate the majority of ISDS cases. (Barlow 2016, 10).

Hübner et al. (2016) depict the difficulties that were faced in CETA's ratification process, as Canada requires provincial discussions throughout the negotiation process. In such, provinces have been fully included in negotiations and are aware and accepting of the implementation of CETA. Newfoundland and Labrador originally expressed concern over CETA, as it altered the minimum processing requirements for fish and seafood, to allow for a broader range of products to be subject to CETA's lower tariffs (Newfoundland and Labrador n.d., 2). In other words, the processing of a species into a value-added product does not have to be fully Canadian, as CETA will give more leeway for external processing tiers. In such, job loss may occur in the processing sectors not only for fisheries but for other industries as well. Nova Scotia does not have minimum

processing requirements, therefore would not see as great of a change as Newfoundland and Labrador would (McGuinness 2014).

The Government of Canada promotes that CETA will benefit every region of the country (Government of Canada n.d., 1). The opening of new markets for Canadian businesses as well as the creation of jobs for Canadians is the main reason as to why the government advocated heavily for this trade agreement. A joint Canada-EU study supported that CETA could boost Canada's income by twelve billion dollars annually, and boost bilateral trade by twenty percent (Government of Canada n.d., 1). As Nova Scotia's agricultural exports to the EU faced average tariff rates of 13.9 percent, a general tariff reduction would boost exports (Government of Canada n.d., 3). Penny (2016) justifies CETA's benefits as well, dependent on the fact that Nova Scotia strengthens its trade capacity, through efficiency and availability of exports, in order to fully benefit from CETA's low tariffs. He proposes increased coordination between public and private sectors, and the expansion of trade-related infrastructure such as bridges, ports and telecommunication developments (Penny 2016). Furthermore, although CETA has its downfalls, it is widely known that the sectors that will mostly benefit from this trade agreement are metals and mineral production, as well as fish and the fish products sector (Penny 2016).

Another benefit that has arisen from CETA negotiations and discussions is the increased usage of geographical indicators (GIs). Viju et al. (2012) discuss the importance of GIs, or the sign on products that have specific geographical origins and possess qualities respective to that origin (1). Popular examples include champagne, Scotch Whiskey, and Feta cheese. These items can only be labeled and marketed if they are actually produced in Champagne, France, in Scotland, or in Greece, respectively. This prevents competition from using the same marketing tools and proves authenticity. CETA will require Canada to provide protection for approximately 180 new GIs originating from Europe, including Gouda cheese and Roquefort cheese (Penny 2016). This does give an initial advantage for the EU, but would also allow Canada to promote regional products, such as Nova Scotia smoked salmon and lobster. Other products include Screech, Halifax donairs, and further Canadian products such as Oka cheese and Nanaimo bars. This would provide a new layer of protection for Canadian products, and provide a benefit for Canadian companies when marketed and/or sold in Europe. As of now, however, there are no GIs that the EU must respect from Canada under CETA. This is a potential problem with CETA that could require revision post-implementation.

4.2. CETA and Nova Scotia Fisheries

Sinclair argues that Canadian fisheries and farms will relinquish control of their operations, as CETA will expand intellectual property rights of European

companies (Sinclair et al. 2014, 86). The strict regulations that are already in place through Fisheries and Oceans Canada will most likely prevent such overtaking, and there are very few intellectual property rights for European fish and fish products. Giles et al. propose that CETA will likely create between 510 and 2587 net job losses in the agriculture and fisheries sectors (2012, 6). Although these assumptions may hold true for farmers, especially in the dairy industry, fish farms and fisheries will not likely be exposed to these modifications. Jobs in the fishing sector are more likely to see a small boost due to the elimination of tariffs. Where there may be job losses is within the wider economy, such as processing and manufacturing sectors for fish and seafood, as lower tariffs may not necessarily apply to some processed seafood not entirely made in Canada.

Sinclair continues by arguing that Canadian fisheries have a difficult time exporting to the EU, due to EU quotas, weak demand in Europe due to the economic crises faced by several countries such as Greece, and due to the high Canadian dollar. Furthermore, he argues that the large processing sector in Nova Scotia has in fact declined over the last decade, reflecting fluctuations in fish and seafood stocks, technological change and offshoring (Sinclair et al. 2014, 90). However, most fisheries in Nova Scotia export to the EU and the United States more than any other sovereignty in the world. The demand, therefore, is not low, even if certain countries within the EU are not importing very much Canadian fish

and seafood. Furthermore, despite lulls in the processing sector, wild fish and seafood combined with aquaculture fish and seafood make up most of the demand overseas. Finally, the real exchange rate of the Euro continuously surpasses the value of the Canadian dollar, causing a continuance of the bilateral trade surplus for Canada in terms of the fish and seafood industry.

The obvious benefit of CETA is its elimination or drastic decrease in tariffs. In order to maintain the increased demand for fish and seafood, Nova Scotia will therefore have to expand its knowledge base on species. Certain recommendations in order to accommodate a smooth implementation of CETA are mentioned by Pisces Consulting Limited, in a report for the Department of Fisheries and Aquaculture of Newfoundland and Labrador. These include more detailed and frequent assessments of both specific species and EU markets, the increase in value-added products as to land the highest intrinsic quality product for all key species, and a better infrastructure plan to encourage food safety and transportation across the Atlantic provinces (Pisces Consulting Limited 2015, viii). The tariff reduction with CETA for most fish and seafood products will be phased out either immediately, or within eight years, depending on the species (Sinclair et al. 2004, 91). Sinclair argues that the impact of tariff elimination will be small, as Canada's fish imports from the EU are small. Although this is true, it is generally beneficial for exports, as long as stocks and trade capacity will allow it. Sinclair demonstrates that the duty-free trade of frozen cod will allow for an extra

sale of one thousand metric tonnes of this species to the EU (Sinclair et al. 2004, 92). To compare, a normal quota for cod is below 1,000 tonnes per year (Fisheries and Oceans Canada 2015). Without any measurements of capacity, demand elasticity and supply elasticity, it is unclear as to whether Nova Scotia can sustain an extra thousand tonnes of cod strictly dedicated to the European Union.

Canada has, however, eliminated tariffs on all of its fish and seafood tariff lines in all of its past free trade agreements, except the Canada-Israel FTA (Action Plan Canada 2013, 6). Chomo and Ferrantino (2000) argue that trade flows post-NAFTA were actually similar to those prior to the enforcement of this trade agreement (i). Most tariffs for seafood were near zero prior to NAFTA, so trade did not drastically change. In their study, Chomo and Ferrantino assess the impact of removing an average of six percent tariffs on Canadian and U.S. imports of fish and seafood after NAFTA was implemented. They assume that each NAFTA exporter supplies imports perfectly elastically, so that the percentage change in imports is equal to the tariff cut multiplied by an elasticity (Chomo and Ferrantino 2000, 15). Elasticity is further discussed in Section 4.4.

The effects of NAFTA in Chomo and Ferrantino's study increased production and thus exports by 1.2 percent, as a percentage of pre-NAFTA production and supply (Chomo and Ferrantino 2000, 17). In comparison, imports in Canada increased by 1.7 percent (18). They also declare that North American

fisheries trade is primarily extra-NAFTA rather than intra-NAFTA, meaning that exports coming from Canada, Mexico and the United States after the implementation of NAFTA are mostly leaving North America and going to countries such as Japan (Chomo and Ferrantino 2000, 26-7).

Support for CETA and its impact on Nova Scotia fisheries comes from a variety of sources. While Giles et al. are generally against this trade agreement; they do argue that fisheries will generally benefit from this deal. As over sixty percent of exports from Nova Scotia to the EU are fish, wood, pulp, and paper, the fishing industry in the province is an impactful one for this agreement (Giles et al. 2012, 15). Furthermore, traffic is expected to increase in the Port of Halifax with CETA, either through the harbour or airport, creating potential job growth (Giles et al. 2012, 15). In contrast, however, this could cause increased environmental damage and infrastructure maintenance. The government of Canada boasts that Nova Scotia's fish and seafood industry will continue to remain sustainable, as nothing in CETA affects the sovereignty of Canada and control that it has over its territorial waters and commercial fishing licenses (Government of Canada n.d., 2).

4.3. Environmental Damage

Srinivasan et al. (2012) conclude that up to one-third of current commercial fishery stocks may be overfished in the world. The careful balance of trade and potential stock depletion requires intensive management and consistent knowledge about the world's fish and seafood industry. Barlow (2016) indicates that NAFTA facilitated the expansion of large-scale, export-oriented farming that relies on pesticides and GMOs. Furthermore, it facilitated an economic expansion in Mexico's mining industry, and undermined Canada's capability of regulating its own energy industry. Canada was also encouraged to export larger amounts of fossil fuels to the United States (Barlow 2016, 6). Commercial fisheries alone are heavily dependent on fossil fuel combustion. The potential increase in both fisheries and processing plants with CETA could be problematic. Driscoll and Tyedmers (2010) argue that stricter fisheries management, particularly in their study on Atlantic herring, can have a large impact on greenhouse gas emissions. The exclusion of mid-water trawlers, for instance, almost certainly reduces fuel use and greenhouse gas emissions. It is therefore important to take into account fisheries management and for the government of Nova Scotia to be extremely careful with its expansion of its fisheries. In addition to the pollution caused by boats and fisheries in general, some are worried about the effects of CETA and increased pollution due to transportation. Trew (2013) argues that CETA will ban "buy local" policies, as cities such as Toronto, Victoria and Hamilton originally

asked to be exempted from CETA's rules. These cities were questioning whether CETA would simply increase cheap imports from Europe, and encourage spending overseas rather than at home. Furthermore, the increased demand for fish and seafood would perhaps increase the price of it, deeming it too expensive for local purchases and reducing the domestic demand substantially. The environmental impacts that CETA may encourage are unclear, and it is difficult to compare these to the export benefits and access to markets that it will create.

In regards to fish and seafood species, Parsons argues that several species of groundfish have failed to recover after periods of overfishing, even after moratoriums were imposed. The Atlantic Coast's supplies of shellfish are worrisome, especially crab and shrimp. This is a bulk of the Atlantic seafood industry, and so without these species, supply chains will need to readjust. The resource itself is crucial to employment and economy in Nova Scotia. Parsons is shocked that lobster landings haven't declined as much as they were predicted to (410). This important species must be carefully monitored, as depletion would be catastrophic for Nova Scotia's GDP and employment.

Sumaila et al. (2014) explain fisheries governance as short-term based, and not focused enough on ecosystem management. Furthermore, they describe a lack in enforcement mechanisms for progress in sustainable fisheries, and a continued erosion of resources that undermines environmental long-term interests, including

food security and employment (Sumaila et al. 2014, V). In fact, the World Bank and FAO estimated that the net economic loss to the global economy due to overcapacity in the global fleet and depletion of fish stocks is $67 billion per year (Sumaila et al. 2014, 8). Even when certain sustainable fishing practices are implemented, negative impacts on fisheries can still occur. Modern technology and science, paired with high market demand yields negative impacts (Sumaila et al. 2014, 8). Marine habitats are often destroyed through bottom trawling techniques, water temperature changes, and certain types of fishing gear like dredges and trawls (Sumaila et al. 2014, 8). Loucks (2007) further explains potential failures in fisheries by analyzing the snow crab fishery in the Southern Gulf of St. Lawrence. The failures of this fishery can be blamed on the management system, which did not provide long-term sustainability goals for continued growth of the snow crab fishery (Loucks 2007). In addition to a heightened demand, especially from Japan, for this species in the 1990s, the government of Nova Scotia did not accept the scientific advice of a reduction in TAC, and only implemented a minimal reduction for this species (Loucks 2007). Although such lobbying efforts today may not persuade the government to change its TACs for various species, the increased demand for fish and seafood that CETA will incur may cause additional environmental and ecosystem damage.

For prevention of such cases, therefore, Parsons suggests incentive-based approaches. The Canadian Maritime provinces are constrained in terms of quotas

and new policymaking regarding environmentally friendly approaches to maintaining fisheries. Hundreds of coastal communities in the Maritimes, most in Nova Scotia, are dependent upon the fishing industry. In fact, Mazany et al. (1987) depict the importance of the industry as 765 communities in Nova Scotia are dependent on the fishing industry, and 87 of these completely dependent on the industry. Therefore, the province should be extremely careful with the implementation of new trade agreements such as CETA. Sinclair argues that federal forces have attempted to limit the market sale of commercial fishing licenses, and requiring the owners of licenses to also operate those licenses (Sinclair et al. 2004, 91). It is difficult to justify the expansion of the industry in Nova Scotia under CETA, due to these limitations and forward-thinking movements. However, another benefit of CETA would be the expanded markets for non-traditional fish and seafood species, such as sea cucumber, kelp and sea urchins (Government of Canada n.d., 2). Increased demand and investments from the EU would provide a greater market for these species, and diversify Nova Scotia's industry while improving research and technology.

Furthermore, an increased attention on species at risk of endangerment or extinction, as mentioned by Dawe and Neis (2012), would help provide benchmarks as to which species should be incorporated for lower tariff trade agreements and for potential expansion of TACs. Research by Fisheries and Oceans Canada and other governmental agencies could be amplified in order to

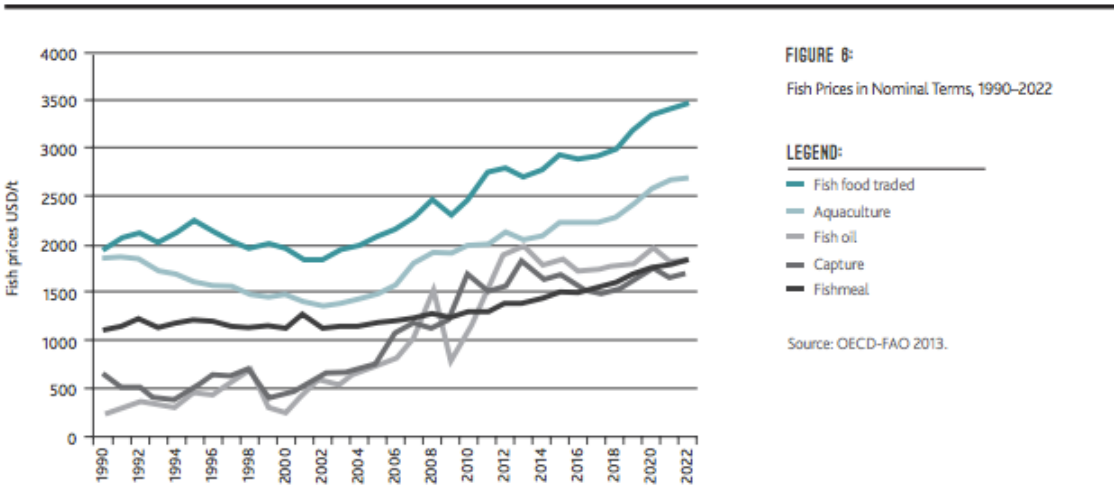
gain additional valuable data on species in danger of extinction. The determination of species at risk in Canada was deemed poor for species in the oceans or in Northern Canada. Certain institutions have deemed the assessment process too lenient in order to avoid potential decreases in trade and labour markets (Dawe and Neis 2012). VanderZwaag et al. (2012) further this point by demonstrating that Canada needs to complete its network of marine protected areas, and these areas are lacking for ocean species (332). The UN and FAO should be intensely involved in CETA's implementation, as they help determine and regulate sustainability in marine policy. Several regulations and legislative documents have been established by the Government of Canada and of Nova Scotia in the last fifty years, but VanderZwaag et al. depict that the coordination between these acts or agreements are questionable. Therefore, both the federal government and provincial governments may be unprepared for the potential drops in fish and seafood stocks with the upcoming increase in trade with CETA.

Finally, fish and seafood management in Nova Scotia should be carefully monitored as to avoid and combat illegal, unreported and unregulated (IUU) fishing. Young (2016) studies the potential impacts that IUU fishing would have had the Trans-Pacific Partnership (TPP) been implemented. She asserts that regulations against IUU fishing should be in accordance with international law, including the GATT. Extra protection and dockside monitoring could be beneficial

in order to ensure that increased demand from CETA does not deplete stocks in conjunction with illegal fishing activities.

In terms of fish prices with CETA, it is expected that they will most likely increase due to a higher demand. Fish prices are expected to increase in the next decade, regardless of trade agreements. Sumaila et al. depict this prediction in the following graph.

Figure 4.1: Fish Prices in Nominal Terms, 1990-2022



Higher prices remain consistent with Nikoloyuk and Adler (2013) who suggest that Nova Scotia fish and seafood prices actually need to be increased in order to sustain labour and capital expenses in the province itself (2). An increase in prices can be caused due to a combination of sustained increased demand, or a dwindling supply creating potential scarcity.

It is thus necessary to observe elasticities of specific species, as to determine whether capacity will simply increase prices, or expand the production of each fishery.

4.4. Elasticities

Elasticity itself is a measure of responsiveness of either demand or supply to price or income in economics. In this study, the elasticity of demand and supply of price is used to analyze research data. The price elasticity of demand refers to the responsiveness of the quantity demanded, in this case the demand from the EU for Nova Scotia fish and seafood, to the price of these goods. Elasticity is a simple measure of the percentage change in quantity demanded, divided by the percentage change in price. An inelastic demand, or an absolute value between zero and one, states that the percentage change in quantity demanded is smaller than the percentage change in price. An inelastic demand confirms that consumers in the EU are weakly responsive to changes in fish and seafood price, in other words demand remains somewhat steady despite fluctuations in prices. An elastic demand, in contrast, is a value above one. It represents a larger percentage change in quantity demanded compared to the percentage change in price. An elastic demand confirms that consumers in the EU are highly responsive to changes in fish and seafood prices. A higher price will yield a bigger drop in

quantity demanded. Elasticity of demand for fish and seafood is always a negative value, as a price increase will decrease the quantity demanded.

The elasticity of supply, similarly, is defined as the percentage change in the quantity supplied divided by the percentage change in price. Both types of elasticity are important in this study, as they help determine how consumers in the EU will change their consumption behaviour for Nova Scotian fish and seafood, should the price of these goods increase or decrease. The following references provide data on approximate elasticities for fish and seafood around the world. The elasticity of supply for fish and seafood will always be a positive value, as a price increase will increase the quantity supplied.

The long-run price elasticity of import demand for fish and seafood within NAFTA countries ranges between -0.5 to -2.0, meaning that a one-percent drop in the import price, generated from a one-percent tariff reduction, results in a 0.5 to a 2 percent increase in imports (Chomo and Ferrantino 2000, 17).

Lodhi (2015) studies the import demand elasticities for the EU and United States for farmed salmon specifically. Although this study does not include aquaculture species, his study can be interchanged with wild species. He refers to Bjørndal and Salvanes (1994) to help determine specific elasticities in his study. Bjørndal and Salvanes determine that price elasticities of demand for farmed

salmon in Italy and Spain are unitary in the short run, but showed significant price elasticity in the long run (Lodhi 2015, 10). They also found that farmed salmon was a luxury good, both in the long run and short run (Lodhi 2015, 10). As wild salmon is generally more expensive worldwide than farmed salmon, these findings can be applied to wild species of salmon as well coming from Atlantic Canada. Asche et al. (1998) used quarterly data on import value and quantity of fresh and frozen Atlantic salmon, and frozen Pacific salmon from 1984-1992. Their findings indicate that all three salmon types are substitutes for one another. The Atlantic kinds were found to be elastic and luxury goods (Lodhi 2015, 10). Fofana and Clayton (2003) determine that there is a substitute relationship in salmon markets and other white fish species such as cod and monkfish, and that shellfish are strong substitutes for salmon (Lodhi 2015, 11). Lodhi's results for elasticity estimations, using an LA/AIDS model, were consistent with other studies. He determines that for the EU market, fresh salmon from the Rest of the World (ROW) was very sensitive to changes in price. Frozen salmon had an inelastic demand elasticity with respect to prices (Lodhi 2015, 43). EU demand for fresh, farmed salmon had a price elasticity of -1.28, and frozen, farmed salmon had a price elasticity of -0.77 (Lodhi 2015, 43). This demonstrates that fresh farmed salmon was elastic, and easily substituted for other types of fish such as shellfish. Frozen farmed salmon tends to be cheaper internationally, therefore has an inelastic demand as demand is somewhat insensitive to price changes.

Cheng and Capps (1988) use household expenditures for at-home consumption for three kinds of shellfish and five kinds of finfish in the United States to determine elasticity of demand. They use factors explaining the variation of expenditures on fish and seafood such as price, household income, coupon value, household size, geographic region, urbanization, race and seasonality. Flounder and sole, or finfish, were found to have a -0.45 elasticity, and oysters, or shellfish, an elasticity of -1.13. This is consistent with Lodhi's results, as although they are different species their elasticities range from similar values. Cheng and Capps also found that expenditures on fish and seafood products were more sensitive to changes in household size rather than household income, meaning that a percentage unit decrease in household size would decrease expenditure on fish and seafood more than it would with a percentage unit decrease in household income. Their results determine that the demand for finfish is inelastic, as a price increase yields a smaller drop in quantity demanded of finfish. This is most likely due to the unavailability of close substitutes and the cheaper prices of finfish. In contrast, shellfish tend to have an elastic demand, as species such as oysters are considered expensive luxury goods.

Asche et al. (2005) determine that for most species, demand is elastic (21). From past studies, they conclude that demand elasticities for fish and seafood vary around -1, which is also the approximate average. More valuable fish have a more elastic demand, which is evident, as they tend to be luxury foodstuff (Asche

et al. 2005, 23). Furthermore, they confirm Cheng and Capps' study results for finfish as elastic, as this group of species is important for a vast majority of the world for consumption purposes. Salmon, however, they argue to be highly elastic, which is inconsistent with Lodhi's results (Asche et al. 2005, 24). Lodhi pegged frozen farmed salmon at an elasticity of -0.77, and Asche et al. argue that demand for frozen salmon hovers around inelasticity (24). Canned fish tends to be more inelastic, as a necessary good, whereas fresh products tend to be elastic (Asche et al. 2005, 25).

Asche et al. declare that species important to the Nova Scotia industry such as scallops, shrimp, tuna, halibut, lobster and crab have received little attention academically for demand and supply elasticities. They do, however, continue to argue that high-valued species tend to have an elastic demand, making it important for these species to have the right equilibrium international pricing (Asche et al. 2005, 25).

Gallet (2009) conducts a meta-analysis of various products such as fish, gasoline, cigarettes and alcohol in order to study the characteristics of the own-price elasticity of fish in the United States. His results conclude that the demand for salmon is significantly different from the demand for other fish. Furthermore, the demand for fish in the USA is more sensitive to price (i.e. elastic) compared to other countries such as the EU (Gallet 2009, 243). The EU's demand is thus

steadier and less elastic compared to the United States. Babović et al. (2011) study the factors that determine the supply, demand and elasticity of consumption of fish in the world, EU and Serbia. Their findings determine that the income elasticity of consumption of fish in the EU is inelastic at 0.42, and the price elasticity of consumption at -0.402 (Babović et al. 2011, 608). This means that demand of the EU for fish and seafood is relatively inelastic, so its imports are somewhat insensitive to prices.

Lysenko (2015) uses a GSIM model to study the impacts of the Trans-Pacific Partnership (TPP) and CETA on Nova Scotia as a whole. However, for specific fish and seafood sectors he uses a baseline elasticity of demand of -0.5, signifying an inelastic demand for the EU on most fish and seafood products. This is consistent with most data such as Lodhi's elasticity of demand for finfish. His elasticity of supply is 1, however for purposes of this study supply will be fixed at quota levels where applicable, and where current landings are approximate to quota levels.

Most fish and seafood species tend to have substitutes. This is why the price elasticity of demand for most species is elastic. This can generally be a good thing for the industry, as total revenues are likely to increase if production continues to increase (Asche et al. 2005, 29). Furthermore, substitutes for fish are

generally other fish and seafood species. Meat and alternatives are generally not close substitutes for fish (Asche et al. 2005, 29).

The following table tabulates the data on elasticities of demand as discussed in previous studies and literature.

Table 4.1: Elasticities of Demand for Fish and Seafood

Author	Elasticity of Demand/Findings
Chomo and Ferrantino (2000)	All species: between -0.5 and -2.0 for NAFTA countries
Bjørndal and Salvanes (1994)	Salmon: unitary in short run, elastic in long run
Asche et al. (1998)	Salmon: elastic, luxury good
Xie et al. (2009)	Salmon: elastic
Lodhi (2015)	Fresh, Farmed Salmon: -1.28 (elastic) Frozen, Farmed Salmon: -0.77 (inelastic)
Cheng and Capps (1988)	Finfish: -0.45 (inelastic) Shellfish: -1.13 (elastic)
Asche et al. (2005)	Most species: approx. -1.0 (elastic)
Gallet (2009)	Most species: less elastic in EU than USA
Babović et al. (2011)	Most species: -0.402
Lysenko (2015)	Most species: -0.5

5. Methodology

Drawing on previous literature for international price elasticity of demand for fish and seafood, paired with the top seafood exports originating from Nova Scotia, potential growth in this province's fisheries will be examined. This is studied in conjunction with the environmental sustainability and impact of a potential increase in exports. Data for Nova Scotia's top exports from Fisheries and Oceans Canada and Statistics Nova Scotia in 2015 was used for analysis. They include the following:

- Herring
- Haddock
- Clams
- Halibut (Atlantic)
- Queen Crab
- Shrimp
- Scallops
- Lobster

In the following, data will be used from CETA's official documentation as to determine how these species will be affected by the reduction in tariffs. This will allow for the determination of which kinds of species will face an increased global demand due to a drop in tariff rates in the EU. 2015 data is used as it is the most recent and complete information offered by Fisheries and Oceans Canada. Where 2015 data is unavailable, the most recent reports are used. Furthermore, existing Total Allowable Catches (TACs) quotas are presented for each species.

Next, the current landings of the species will be presented. Specific elasticities of demand relative to each top seafood export from Nova Scotia will be used to justify whether the increased demand from the EU will yield a larger percentage change in price, or if it will yield a smaller percentage change in price. Additionally, cross-price elasticities justified by past literature and studies will help determine whether an increased demand will truly be sustained or simply replaced with another fish or seafood species. Elasticity of supply will equal to one where the supply is fixed, or when quotas are almost met or met on an annual basis. If not, the elasticity of supply is assumed to be 0.5, as established by Lysenko (2015). Elasticities of demand will be fixed at the base elasticities of -0.5 for finfish, as per Lysenko (2015) and Lodhi (2015) and -1.13 for shellfish based on Lodhi (2015) as well will be used in this study. Shellfish assumes a higher elasticity due to their properties as a luxury good and easily substituted for other shellfish. Using export percentage data for certain species that will see a tariff reduction when exported to the EU, this study estimates the percentage changes in quantity demanded for the EU.

Finally, the existing quota measurements and fishing capacity for each species shall be used to determine whether an increase in demand can truly be sustained by an expansion in the industry and in turn in exports, whereas with other species the fixed supply will cause an increase in prices and a decrease in demand. This will also require a reference to the availability of substitutes to

determine whether the demand for certain species will simply be substituted for another due to an increased price.

6. Results

The following tables list Nova Scotia's top eight fish and seafood exports, divided by species not facing tariff changes, species that are facing tariff reductions but are binded by existing quotas, and species that are facing tariff reductions and are also able to meet increased demand due to availability for expansion within current quotas. Data used is from 2015 Fisheries and Oceans Canada, and from CETA documents. The current Total Allowable Catch (TAC) quota in place for each species is taken as of 2010 or from the most up-to-date information available from Fisheries and Oceans Canada.

Table 6.1: No Tariff Changes under CETA

Species	2015 Value of Exports (000s)	Immediate Tariff Reduction under CETA	2015 Landings (metric tonnes)	Current TACs (metric tonnes)
Haddock	$26,053	No change	17,460	Approx. 30,000
Surf Clams	$30,220	No change	16,433	38,756
Halibut	$37,967	No change	2,718	1,036.8

Table 6.2: Tariff Changes under CETA with No Room for Expansion in Industry

Species	2015 Value of Exports (000s)	Immediate Tariff Reduction under CETA	2015 Landings (metric tonnes)	Current TACs (metric tonnes)
Herring	$16,221	15%	46,576	Approx. 50,000
Queen Crab	$73,268	7.5%	12,031	Approx. 13,000
Shrimp	$92,846	12% (fresh) 20% (frozen)	25,711	Approx. 27,000

Table 6.3: Tariff Changes under CETA with Room for Expansion in Industry

Species	2015 Value of Exports (000s)	Immediate Tariff Reduction under CETA	2015 Landings (metric tonnes)	Current TACs (metric tonnes)
Scallops	$167,496	8%	55,297	Approx. 100,000
Lobster	$695,759	8%	49,255	No quotas

The following subsections will provide a breakdown of each species and the changes in quantity demanded and supplied, if any, with the implementation of CETA. Furthermore, a market analysis for lobster, scallops and shrimp is presented as to determine how much revenue will be generated with CETA's implementation and tariff reductions for these three top export species.

6.1. Atlantic Herring

Under CETA, Atlantic herring is expected to see a decrease in 15% in tariffs, as this is the current average tariff for Nova Scotia herring exports to the EU. Since 2001, herring population among the four southwest stocks in Nova

Scotia has declined, with no stock rebuild despite reduced catch levels (Fisheries and Oceans Canada, 2015). From 2009 to 2010, the biomass decline in herring was 36% in the southwest Nova Scotia Bay of Fundy area (Fisheries and Oceans Canada 2011). Despite the room for landings in the quota presented in the table above, this was due to a last minute reduction in TAC by fisheries themselves in order to maintain stock for the following year (Fisheries and Oceans Canada 2011). Landings are thus almost at quota level, which means that there is very little room for increased exports of Atlantic herring. Therefore, supply for Atlantic herring is ultimately fixed at the approximate 55,000 metric tonnes per year of landings. Herring is assumed to have an elasticity of demand of -0.5, therefore is inelastic with changes in price. As long as quotas are not expanded, due to depleting stocks of herring and the previously mentioned self-imposed catch limitations, the landings of this species will remain unchanged. As such, price will increase in the world market, and as demand is inelastic the EU will continue to purchase herring from Atlantic Canada at its higher price, with a smaller percentage change in demand than in price.

6.2. Haddock

Under CETA, Atlantic haddock is expected to see no change in tariffs, as haddock is not a part of CETA's tariff reduction program. Nova Scotia haddock exports to the EU are thus expected to remain constant, or decrease due to the

availability of substitutes that will see a tariff reduction. The stock biomass of haddock in Nova Scotia has increased in the past decade, especially in the southern Scotian Shelf and Bay of Fundy areas. From 1993 to 2009, population biomass increased by approximately 162,000 tonnes (Fisheries and Oceans Canada 2015). Annual TACs range around 30,000 tonnes, and landings ranged between 8,000 tonnes and 25,000 tonnes from 2009 to 2012. Stock biomass for haddock is considered to be in the Cautious zone based on Canada's Fishery Decision-Making Framework Incorporating the Precautionary Approach (Fisheries and Oceans Canada 2015). As landings are generally lower than the annual quotas, there is room for expansion for haddock fisheries. Furthermore, its price elasticity of demand is inelastic at -0.5, meaning that a percentage change in demand will not change as much as its percentage change in price. The price elasticity of supply is assumed to be one, meaning there is room for expansion in the haddock market. However, this species will not see a tariff reduction for exports to the EU. Therefore, it can be determined to remain at the same demanded quantity with same existing market price. It can thus be included as a potential, although poor, substitute for other finfish such as herring, which will face a higher international market price under CETA.

6.3. Surf Clams

Under CETA, Atlantic clams are expected to see no change in tariffs, as clams are not a part of CETA's tariff reduction program. Nova Scotia exports of clams to the EU shall expect to remain constant, or decrease due to the availability of substitutes that will see a tariff reduction. The demand for surf clams from the EU is not relatively strong compared to its demand from Japan, China and South Korea, as it is a popular ingredient for Asian cuisine (Fisheries and Oceans Canada 2015). Landings for clams in Nova Scotia have consistently been well below the TAC. There is thus room for expansion in the clam market, however this species is not a close substitute to many other species, deeming it somewhat irrelevant to the new implementation of CETA. If it does present itself as a substitute, it would be to other mollusks such as mussels, oysters and scallops. Therefore, there may be a small increase in demand for clams due to the reduction in tariffs of Nova Scotia scallops. The price elasticity of demand for shellfish is assumed to be -1.13, meaning a percentage change in price will yield a greater percentage change in demand. The elasticity of supply is assumed to follow 1.0. The industry for clams in Nova Scotia, therefore, shall expect to see a small boost. Should the price increase slightly, demand will decrease considerably due to elastic demand.

6.4. Halibut

Under CETA, Atlantic halibut is expected to see no change in tariffs, as halibut is not a part of CETA's tariff reduction program. Nova Scotia halibut exports to the EU expect to remain constant, or decrease due to the availability of substitutes that will see a tariff reduction. Halibut landings in 2015 almost doubled the TAC, due to increased profitability of this species and a lack of regulation enforcement and monitoring. In June of 2015, the federal government conducted a crackdown on illegal halibut fishing and caught several fishermen such as Bernie Selig, who was fined $50,000 for not reporting 22,000 pounds of halibut caught in Nova Scotia (Withers 2015). The demand for this species is clearly over its quota allocation, and halibut is not endangered but could face severe depletion if overfishing continues to occur. As a finfish, the elasticity of demand for halibut is assumed to be -0.5, and as quotas are maximized supply is fixed at the quota of 1,036.8 tonnes. No changes in tariffs under CETA are beneficial for halibut stocks, as demand will not be directly increased through this trade agreement. Halibut should not be used as a substitute for other finfish, but may see a slight increase in demand as a substitute for herring, for instance. In turn, prices for halibut will increase in the international market should such a case occur.

6.5. Queen Crab

Under CETA, fresh Atlantic queen crab is expected to see a decrease of 7.5% in tariffs, as this is the current average tariff for Nova Scotia queen crab exports to the EU. Queen crab stocks have periods of high and low abundance regularly, regardless of fishing activity, due to variability in climate (Fisheries and Oceans Canada 2015). In the Bay of Fundy area, fishable biomass has increased in most areas since 2012. The Southern Gulf of St. Lawrence, however, has seen decreasing exploitable biomass since 2004. Quotas are regularly met, and the Government of Nova Scotia recently increased the TAC for queen crab. As shellfish, crab assumes a price elasticity of demand of -1.13, and sees substitutes with other species such as shrimp and lobster. There is very little room for an expanded demand for crab stock with CETA's tariff reduction of 7.5%. Queen crab assumes a fixed quota supply of approximately 13,000 metric tonnes, as quotas are generally met on an annual basis. A price hike is thus most likely, paired with an increased demand for other species due to its elasticity.

6.6. Shrimp

Under CETA, fresh Atlantic shrimp is expected to see a decrease of 12% in tariffs, as this is the current average tariff for Nova Scotia shrimp exports to the EU. Frozen, packaged shrimp shall expect to see a tariff reduction of up to 20%

under CETA. Shrimp is considered to be in a period of sustained high productivity; due to optimal water temperatures and stable catch rates (Fisheries and Oceans Canada 2013). Landings are very competitive with the quota for shrimp in Nova Scotia; therefore it can be assumed that supply is fixed at the approximate quota of 27,000 metric tonnes. Shrimp is a shellfish, therefore assumes a price elasticity of demand of -1.13. This elasticity represents that shrimp can be substituted for other shellfish such as lobster. A percentage change in price yields a greater percentage change in quantity demanded. The reduced tariffs will decrease the price for the EU, and demand for shrimp will thus increase due to a lower price. With a fixed supply, shrimp is assumed to incur a higher price due to a raised demand.

6.7. Scallops

Under CETA, fresh Atlantic scallops are expected to see a decrease of 8% in tariffs, as this is the current average tariff for Nova Scotia scallops exports to the EU. The commercial rate catch for scallops remains above the long-term average catch rate, which allows for expansion in the scallops market overseas. There are measures in place in Nova Scotia, however, that prevent entry into the sea scallop fishery, and enhanced dockside-monitoring programs (Fisheries and Oceans Canada 2015). The industry is therefore relatively healthy, and scallop stocks can sustain an eight percent decrease in tariffs resulting from CETA. As a shellfish,

scallops can assume a price elasticity of demand of -1.13. Its elasticity of supply can be assumed to be one, as there is room for expansion in the scallop industry. However, as entry is limited, it is expected that the increased demand for scallops will simply be expanded within existing license-holders. In other words, new fleets will have difficulty entering the market, but existing ones will profit from the added demand. Price is thus expected to remain relatively stable, with a small hike. As demand is elastic, the increase in price will yield a greater decrease in quantity demanded of scallops under CETA. The availability of substitutes is thus somewhat important, and CETA's implementation can expect to cause an increase in demand for substitute shellfish.

6.8. Lobster

The most important fishery in Nova Scotia, lobster, shall expect to see an 8% reduction in tariffs under CETA. Only one Nova Scotia lobster fishery sees a quota of 750 tonnes. Other fisheries are regulated through the implementation of illegal fishing of berried female lobsters, closed fishing seasons, trap limits, and minimum landing size provisions (Fisheries and Oceans Canada 2015). Therefore, supply is somewhat fixed by regulations and restrictions. Price elasticity of demand remains at -1.13, as lobsters are shellfish. Overall, lobster populations in Canada are deemed healthy and sustainably managed. The price elasticity of supply, therefore, is assumed to be approximately one. There has been a general,

upwards trend in landings in recent decades, representing the availability to expand the market, if not slightly (Fisheries and Oceans Canada 2015). It is an elastic species in terms of EU demand, so a reduction in tariffs under CETA would cause an increase in the quantity demanded. Lobster's price is expected to increase with CETA's implementation. There is room for expansion in the lobster market, but with the limited entry and strict regulations as one of Nova Scotia's most valuable exports, the industry is not well suited for additional fleets. Rather, the existing lobster fisheries will see a combination of an increase in demand due to lower tariffs, and a corresponding price difference, as well as a slight expansion in the lobster market.

6.9. Market Analysis for Lobster, Scallops and Shrimp

Using the elasticities of demand and supply from past literature and data from the Government of Nova Scotia and Library of Parliament, a numerical exercise can be conducted in order to estimate how much revenue will be generated with CETA's implementation for three of Nova Scotia's top exports in their respective quota allowances if applicable: lobster, scallops and shrimp. The elasticity of demand is of -1.13 for these shellfish, and the elasticity of supply 0.5. See the Methodology in Section 5 for further discussion on these elasticity estimates. These are represented by the following equations:

$$Elasticity\ of\ Supply = \%\Delta\ in\ Quantity\ Supplied / \%\Delta\ in\ Price$$

$$0.5 = \frac{(Q_1 - Q_0)/Q_0}{(P_1 - P_0)/P_0}$$

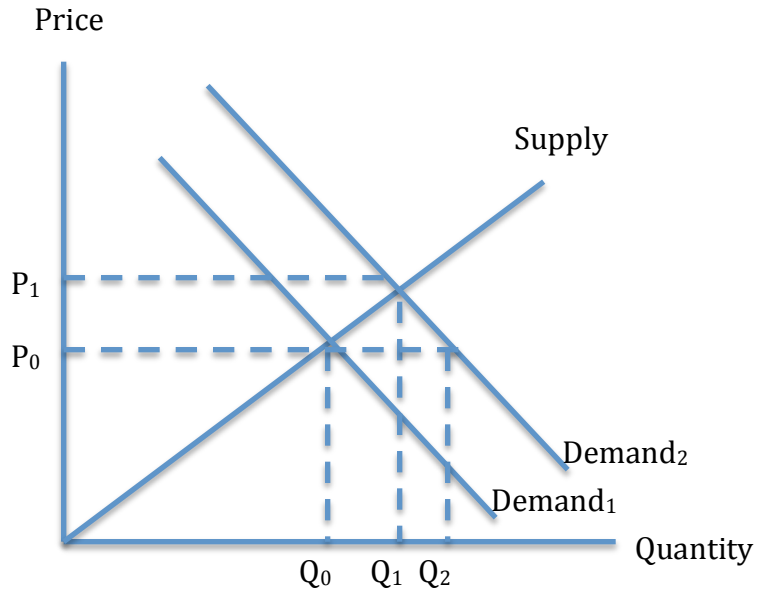
Similarly, the elasticity of demand is calculated in a similar fashion:

$$Elasticity\ of\ Demand = \%\Delta\ in\ Quantity\ Demanded / \%\Delta\ in\ Price$$

$$-1.13 = \frac{(Q_1 - Q_2)/Q_2}{(P_1 - P_0)/P_0}$$

Lobster is expected to see an 8% tariff reduction with CETA, therefore creating an 8% reduction in lobster price for EU customers of Nova Scotia lobster. As determined by the Library of Parliament in 2014, the percentage of Nova Scotia lobster being exported to the EU is also 8% of all total catches. This represents a quantity of 3,940,400, or 8% of the total Nova Scotia landings of 49,255,000. The following graph depicts the change in demand from the EU, as well as the new equilibrium quantity and price (Q_1 and P_1) following CETA's implementation.

Figure 6.1: Supply and Demand Market for Lobster with CETA



CETA's reduction in tariffs for lobster and scallops will cause an increase in demand. This shifts the original demand curve to $Demand_2$. The new quantity demanded, therefore, is Q_2. This does not account for a change in price, and the quantity must move along the new demand curve in order to create an equilibrium with the supply curve. Q_1 is therefore the quantity increase that Nova Scotia fisheries can expect for lobster and scallops, along with its corresponding price of P_1. The percentage change in demand can be calculated as follows:

$$\%\Delta\ in\ Demand$$

$$= EU\ Share\ of\ Lobster * EU\ Tariff\ Reduction$$

$$* Elasticity\ of\ Demand$$

$$= 8\% * (-8\%) * (-1.13) = 0.72\%$$

Therefore, Nova Scotia lobster fisheries should expect to see a 0.72% increase in demand from the EU with CETA's implementation. In order to calculate the exact percentage change in price for lobster, the change in landings exported to the EU, or the percentage change in quantity supplied, must first be calculated. As such, the two equations for elasticity of demand and supply must be set equal to each other. In following, inputting the relevant data from the information gathered from lobster export landings and revenues from Fisheries and Oceans Canada 2015 will determine the new value for landings sold to the EU.

$$\{(Q_1 - Q_0)/Q_0\}/0.5 = \{(Q_1 - Q_2)/Q_2\}/-1.13$$

The values of Q_0 and Q_2 are as follows:

Q_0 = 49,255,000;

Q_2 = (1.0072) * Q_0 = 49,609,636

Using these values in the equation, it can be determined that CETA's implementation will increase lobster sales at a quantity of 49,363,000 metric tonnes to the EU. This is an increase of 108,000 metric tonnes, or 0.22% change in quantity from the current 49,255,000 metric tonnes of lobster going to the EU. Subsequently, the change in price can be estimated from the following equation:

$$0.5 = \%\Delta\ Quantity\ Supplied / \%\Delta\ in\ Price$$

$$\%\Delta\ in\ Price = 0.22\% / 0.5\ = 0.44\%$$

CETA's implementation of a tariff reduction for lobster exports from Nova Scotia to the European Union will thus generate a 0.22% change in quantity supplied to the EU, and a 0.44% increase in price. The new revenue generated from CETA is therefore:

$$Revenue = Price * Quantity = 0.44\% *\ 0.22\% = 0.66\%$$

A 0.66% increase in revenue, or the new revenue, takes an approximate value of $4,592,000 from the original $695,759,000 that lobster exports to the EU generated in 2015. In total, the expected revenue for lobster exports is expected to be $700,351,000.

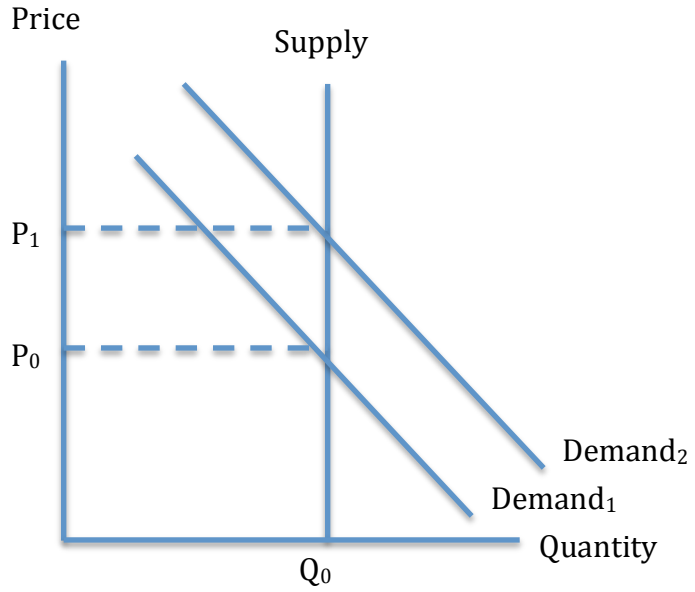
The same exercise can be conducted for Nova Scotia scallop exports. Although data is not available from the Library of Parliament for the share of scallop exports going to the EU, if it is also assumed to be 8%, the generated new revenue for this species can be estimated. In terms of value, scallops generate approximately 24%, in dollars, compared to what is generated by lobster. Therefore, 24% of the new revenue generated from lobster can determine the estimated new revenue for scallop exports under CETA.

$$0.24 * \$4\ 592\ 000 = \$1\ 102\ 080$$

The new revenue from scallops is an estimated $1,102,080. This would create the new total revenue of $168,598,080 for the scallop fishery in Nova Scotia with CETA's implementation, compared to the current revenue of $167,496,000.

For Nova Scotia's shrimp industry, the same exercise can also be conducted in order to estimate by how much CETA will increase revenues for fisheries in the province. However, shrimp is currently at quota level, meaning that quotas are regularly met on an annual basis. The following graph depicts the shrimp industry and its change in demand with CETA's reduction in tariffs for shrimp:

Figure 6.2: Supply and Demand Market for Shrimp with CETA



In this case, shrimp has a fixed supply, which is also the quota level. Therefore, the tariff reduction from CETA will simply cause a price increase for shrimp. The quantity change, therefore, will be zero.

The portion of shrimp landings going to the EU is 3% for fresh shrimp, and 10% for frozen shrimp. These will respectively be the "low case" and "high case" for revenue increase scenarios. The proposed tariff reduction for shrimp under CETA is 12%. Following the same exercise as lobster:

$$\%\Delta\ in\ Quantity\ Demanded = EU\ Share\ of\ Shrimp * EU\ Tariff\ Reduction * Elasticity\ of\ Demand$$

Low case (fresh): $3\% * (-12\%) * (-1.13) = 0.41\%$

High case (frozen): $10\% * (-12\%) * (-1.13) = 1.36\%$

In following, the percentage changes in prices can be estimated as follows:

Low case: $\%\Delta\ in\ Price = \frac{0.41\%}{-1.13} = 0.36\%$

High case: $\%\Delta\ in\ Price = \frac{1.36\%}{-1.13} = 1.2\%$

The change in revenue can thus be determined solely by the change in price.

Low case: $Revenue = Price * Quantity = 92\ 846\ 000 * 0.36\% = \$334\ 245$

High case: $Revenue = Price * Quantity = 92\ 846\ 000 * 1.2\% = \$1\ 114\ 152$

If all shrimp exports from Nova Scotia to the EU were frozen, this would generate new revenue of $1,114,152 for Nova Scotia with CETA's implementation. In contrast, if exports were only fresh shrimp, this would only generate new total revenue of $334,245.

The revenue increases for shrimp, scallops and lobster are somewhat significant for Nova Scotia. Lobster is evidently the major source of revenue that will arise with CETA's implementation. The other species are not as important for generating new revenue. The tariff changes with CETA will therefore be beneficial for Nova Scotia fisheries. These new revenues are simply estimates, but it can be determined that there is a slight impact on Nova Scotia fisheries with CETA.

Table 6.2: Changes in Revenue for Lobster, Scallops and Shrimp with CETA

Species	Current Value	New Revenue with CETA Tariff Reduction	Total New Revenue
Lobster	$695,759,000	$4,592,000	$700,351,000
Scallops	$167,496,000	$1,102,080	$168,598,080
Shrimp	$92,846,000	$334,245 - $1,114,152	$93,180,245 – 93,960,152

7. Summary and Conclusion

As a worldwide leader for fish and seafood exports, Canada presents itself as a valuable trading partner for countries such as those in the EU, who consistently present a high demand for these products. Nova Scotia is Canada's top fish and seafood exporter in terms of value at 1.6 billion dollars in exports. The province can account for approximately 19,000 workers either directly or indirectly related to the fish and seafood industry.

CETA promises to lower tariffs to zero percent, either immediately or within the first eight years of its implementation. This is expected to increase demand for fish, as seen in previous trade agreements such as NAFTA. Out of Nova Scotia's top export species for fish and seafood, the species that will see a reduction in tariffs include herring, Queen crab, shrimp, scallops and lobster. From these fisheries, those that are able to sustain an expansion in landings due to an increased demand are scallops and lobster, yet surf clams and haddock will also see an expansion due to their availability as substitutes. Therefore, scallops and lobster are expected to see a boost in existing fleets and a potential opening in the marketplace. The estimated new revenues that will be generated with CETA, based on a market analysis, are $4,592,000 for lobster, $1,102,080 for scallops, and between $334,245 and $1,114,152 for shrimp. In turn, this could generate increased labour and employment in the province, and create a boost in

Nova Scotia's GDP. Shellfish have a constant elasticity of -1.13 as estimated by previous literature and studies, therefore deeming these species as relatively elastic. Lobster, scallops and shrimp tend to be substitutes for one another, and CETA can expect to create an increase in demand for all three of these species due to lower tariffs, yet only the lobster and scallops fisheries will be able to withstand a higher demand as shrimp quotas are regularly met within the province. Popular finfish in Nova Scotia, in comparison, are almost all at capacity of fishing, where supply and demand meets the TAC quota, with the exception of haddock. This deems supply fixed for each species at quota level. Therefore, their elasticity of demand of -0.5 shall withhold increased demand, as a percentage decrease in price will yield a smaller percentage in increased quantity demanded. As stocks are almost always fished at quota level, there is little room for expansion in these markets besides haddock. Therefore, the expected result from CETA is an increase in price, and a sustained demand from the EU. Demand may shift to haddock, as it is a substitute for other finfish. Overall, CETA's implementation will yield increases in demand that are unachievable in stock. Therefore, Nova Scotia should expect to see a price hike in many of its fisheries, both directly affected by tariffs and indirectly for species that are substitutes for both finfish and shellfish.

Nova Scotia has seen a wide variety of stock availability in its popular fishing species, particularly with the depletion of cod a few decades ago. Therefore, the province should be extremely careful of its capacity within its

fisheries with the implementation of CETA. Certain regulation and policy recommendations are thus advised for the province as to ensure sustainability of stocks. The first includes a comprehensive study on limited entry licensing, and a current study of where each fishery stands on the availability of new licenses. Data for most species is unclear and difficult to decipher as to which fishery has room for expansion. Furthermore, strict catch quotas (TACs) should be continued in usage, with increased protection of species at risk that are currently being overfished, such as halibut. This can be monitored with increased authoritative presence in the dockside-monitoring program. Next, continuing to combat illegal, unregulated or unlicensed (IUU) fishing, potentially with increased fines and punishments, should be implemented in order to prevent such cases like halibut overfishing. Finally, CETA's monitoring, control and surveillance promises within its text should be more specifically defined in order to ensure that Nova Scotia fisheries will be sustained and not depleted due to the EU's demand.

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