Journal of Economic Integration
Vol. 38, No. 1, March 2023, 93-114
https://doi.org/10.11130/jei.2023.38.1.93

pISSN: 1225-651X eISSN: 1976-5525

Market Integration through Smuggling: China's Sanction on Norwegian Salmon

Roberto J. Garcia+, and Thi Ngan Giang Nguyen

Norwegian University of Life Sciences, Norway

Abstract Popular press accounts and the political-economics literature link awarding the 2010 Nobel Peace Prize to a Chinese dissident to China's trade sanction on Norway's whole, fresh/chilled salmon exports. Norway lost its dominant supplier share of the Chinese market as its total salmon exports to China decreased. Then, in 2011, Vietnam dramatically increased its imports of Norwegian salmon. A structural break divides the data series into two sub-periods: July 1997 to February 2011, and March 2011 to December 2018 (the sanction period). This provides statistical evidence of China imposing an unannounced trade sanction. During the sanction period, Vietnam's current monthly imports are negatively affected by China's lagged monthly imports. A decrease in China's previous monthly salmon imports from Norway "Granger causes" an increase in Vietnam's current imports. No such relationship existed before the sanction, implying that China and Vietnam's salmon markets became integrated through smuggling.

Keywords: Vietnam, China, Norwegian salmon trade, sanction, Granger causality, and smuggling

JEL Classifications: F13, F14, F51, P33

Received 28 March 2022, Revised 24 November 2022, Accepted 19 December 2022

I. Introduction

The Norwegian Nobel Committee (NNC) awarded the 2010 Nobel Peace Prize (NPP) to Liu Xiaobo, a Chinese dissident, for his long and nonviolent struggle for basic human rights in China (NNC, 2010). China had already expressed its displeasure with the NNC for nominating him for the NPP, citing Norway's meddling in the official internal affairs of the Chinese state, which considered him a criminal. The Chinese government sentenced Xiaobo to 11 years in prison in 2008 for "inciting subversion of state power" for advocating sweeping changes to

+Corresponding Author: Roberto J. Garcia
Associate Professor, School of Economics and Business, Norwegian University of Life Sciences, NMBU, Aas, Norway.
E-mail: Roberto.garcia@nmbu.no
Co-Author: Thi Ngan Giang Nguyen
Research Assistant, School of Economics and Business, Norwegian University of Life Sciences, Aas, Norway.
E-mail: giangnguyen.ftu.94@gmail.com
The data that support the findings of this study are available online. These data were derived from the following resources available in the public domain: https://comtrade.un.org/data/. The authors thank the Norwegian Seafood Council for providing the monthly trade data used in the analysis, which conform to the online database. The views expressed in this work reflect those of the authors. Any judgements made or errors that remain in this study are solely the responsibility of the authors.

China's system of government in favor of putting democracy, human rights, and the rule of law at the core of the political system (McDonell, 2017).

Unsurprisingly, the announcement of the award was met with swift condemnation from Beijing, which had previously warned of strained relations. The Chinese government summoned Norway's ambassador to the foreign ministry to express the government's official dissatisfaction with and protestation of the decision (British Broadcasting Corporation [BBC], 2010). Thus, a six-year period of diplomatic tensions began, with a limited trade sanction on Norwegian salmon playing a role. Although China's government has never formally declared a trade sanction, much has been written about it in international popular press and industry newsletters (Berglund, 2010; Lewis, 2011; Godfrey, 2012; Milne, 2013; Wright, 2015; Tallaksen, 2015), and documented at the multilateral institutional level (World Trade Organization [WTO] and World Organization for Animal Health). It has also been studied in the political-economics academic literature, albeit to a lesser extent (Kolstad, 2016; Sverdrup-Thygeson, 2015; Chen and Garcia, 2016), establishing a link between the awarding of the NPP and the consequences for bilateral trade.

The salmon sector was an obvious target for China because of its iconic association with Norway and because Norwegian salmon dominated the Chinese market until 2010. The sanction would be relatively inexpensive for China because salmon accounts for a small portion of consumers' total seafood protein intake and other sources of salmon are readily available. Norway's salmon exports to China began to recover only after relations were normalized in December 2016.

For this study, the sanction period should include 2011, when Norwegian salmon exports to China began to be negatively impacted by stricter testing and longer quarantine times at the border, and when import license applications were approved for only small volumes of Norwegian salmon (Chen and Garcia, 2016), through 2018, when a partial ban and certification requirements on Norway's exports remained in effect (Ministry of Trade, Industry, and Fisheries [MTIF], 2019; *Undercurrent News*, 2019). Although China's sanction affected the Norway-China salmon trade, it also coincided with a noticeable change in the Norway-Vietnam salmon trade. Vietnam's salmon market, which had previously been neither substantial nor variable in volume, saw a 13-fold increase in Norwegian salmon imports from 2010 to 2011, from approximately 600 tons to 8,000 tons (United Nations [UN], 2022). More notably, salmon imports into Vietnam appear to vary inversely with Norwegian salmon import volumes to China. That is, the sanctions affecting China-Norway trade may have implications for the Norway-Vietnam salmon trade because as Norway's exports to China decreased (*increased*), exports to Vietnam increased (*decreased*).

This study analyzes Norway's monthly exports of whole, fresh/chilled salmon to China and Vietnam, but only from the perspective of Vietnam. Vietnam's monthly imports from Norway are analyzed from July 1997, when Vietnam first began importing salmon on a regular basis,

to December 2021. This study seeks to answer two questions. First, is there a structural break in the data series that corresponds with China's unannounced trade sanction on Norwegian salmon? Second, is there evidence of a link between Vietnamese and Chinese imports? The study hypothesizes that a shift in Vietnam's import pattern coincided with China's sanction, and that China's previous months' import volumes negatively affected Vietnam's current monthly import volume during the sanction period. This would provide statistical evidence of Norwegian salmon being transshipped via Vietnam, implying that the markets of China and Vietnam were integrated through smuggling. The alternative hypothesis is that there is no statistical evidence of a sanction or market integration. That is, the decision to import Norwegian salmon into Vietnam had no relation to the volume of Norwegian salmon imported into China.

To test the hypothesis, we estimated an econometric model to determine whether a structural break in the data series reflects a sanction period during which Norwegian salmon imports into Vietnam are affected. Second, Granger causality is used to establish whether the volume of Vietnamese imports of Norwegian salmon is related to China's import volume during the sanction period. If no Granger causality is found, there is no reason to suspect that markets were integrated during a sanction period. The analysis relies on monthly trade data on whole, fresh/chilled salmon, classified under Chapter 3 of the Harmonized Commodity Description and Coding System (HS) of the tariff nomenclature (HS030212, HS030213, HS030214, or Atlantic, and Pacific salmon).

The paper is divided into six sections. Following the introduction, a background section describes the nature of the trade sanction and how it corresponds with changes in the trends in Norway's salmon exports to China and Vietnam. A discussion of related literature and relevant theory follows this. Subsequently, the variables created from the available data are described prior to the model development. The results are presented in the fifth section, with the key findings summarized in the conclusion section.

II. Chronology of Sanctions and Trends in Norway's Salmon Trade with China and Vietnam

The Chinese Communist Party never formally declared a trade sanction on Norwegian salmon. However, on December 13, 2010, China implemented new testing and quarantine procedures for fresh Norwegian aquacultural products (WTO, 2011). The Beijing Capital Airport Entry-Exit Inspection and Quarantine Bureau issued an order requiring Norwegian seafood entering through Capital Airport to follow these procedures (Chen and Garcia, 2016). This order was followed by regulations to strengthen inspection and quarantine procedures, focusing on fresh/chilled salmon, under Document No. 9 entitled "Notice on Strengthening Inspection and Quarantine on Imported

Salmon," issued on January 20, 2011, by the General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) of the People's Republic of China (WTO, 2011).

Chen and Garcia (2016) further noted irregularities in China's import licensing system. In 2011, changes in the approval of licenses for shipments from Norway were reported in interviews with stakeholders involved with importing salmon into China. Previously, the AQSIQ granted licenses for any volume of salmon requested by a trader, regardless of country of origin. However, due to diplomatic tensions, license applications for salmon from Norway received approval only on small volumes (e.g., 10-30 tons).

Norway initially blamed the loss of its market share (a 70% decrease in shipments) on China imposing politically motivated measures on imports of fresh/chilled Norwegian salmon, such as a more burdensome licensing system, stricter testing and inspection, and more time-consuming quarantine procedures, which coincided with the awarding of the NPP. Norway expressed its concerns to the WTO Secretariat, formally questioning the appropriateness of China's measures, the types of tests performed, the scientific basis for the testing, whether the tests were performed on all salmon shipments from all countries, and the need to understand how the testing and quarantine procedures would protect Chinese consumers (WTO, 2011). China responded that the measures were in accordance with existing laws and regulations. Its authorities had discovered numerous shipments of Norwegian salmon contaminated with fish lice, pathogenic microorganisms, and an excess of veterinary drug residues. China noted that this resulted in strengthening existing procedures on imported salmon without singling out any WTO member state. According to Chinese experts, Norway's fresh/chilled salmon posed a high food safety risk, and its failure to meet inspection requirements was the reason for the reduction in exports (WTO, 2013).

Compliance with the World Organization for Animal Health's (OIE) notification requirements exacerbated the problem of marketing Norwegian salmon in China. In 2014, the OIE added pancreas disease (PD) and infectious salmon anemia (ISA) to the list of viral infectious diseases affecting salmon that a country was required to monitor and notify if they were present. The Norwegian Veterinary Institute (NVI, 2016) confirmed the presence of PD and ISA, and salmon lice, a parasite, in some Norwegian salmon stocks. The Norwegian Food Safety Authority (NFSA) stated that the aquaculture industry was facing serious challenges as a result of ISA outbreaks in Northern Norway and PD outbreaks in Southern Norway, and that combating salmon lice had become more difficult as drug resistance increased (NFSA, 2016, and 2017). However, the NFSA and NVI's concerns about disease and salmon lice were related to farmed fish welfare and mortality rates rather than the safety or quality of Norwegian salmon for human consumption.

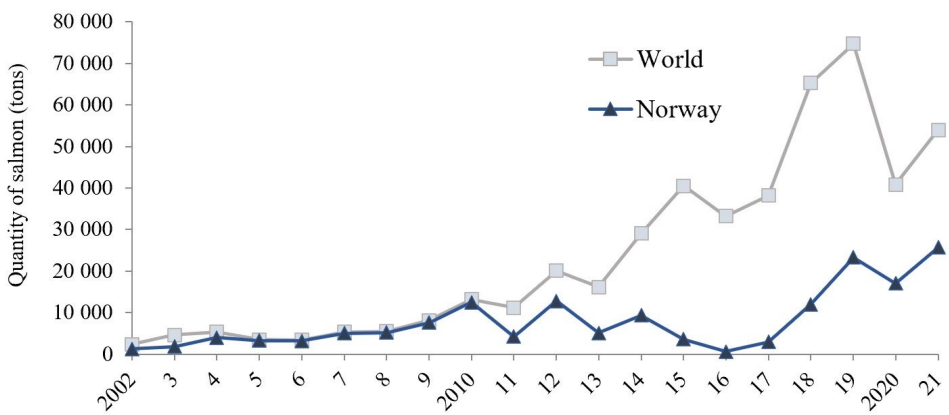
Nevertheless, China responded with a partial ban on Norwegian salmon, demanding guarantees that Norway source its fresh/chilled salmon from disease-free producing regions (Tallaksen, 2015). The AQSIQ warned that it would increase testing for the presence of ISA-viruses in all salmon imported from Norway and suspend all imports of fresh Norwegian salmon from infected areas.

In March 2015, China formally banned all whole, head-on salmon from three Norwegian regions (Nordland, Troms, and Trondelag) accounting for roughly one-fifth of Norway's salmon export to China in 2014 (Tallaksen, 2015). Exports to all other Norwegian regions would be accepted only if accompanied by certificates certifying that the salmon was free of PD and ISA. The NFSA stated that compliance would be difficult because the regulation was inoperable as China did not differentiate between pathogenic and nonpathogenic variants of the ISA virus (Tallaksen, 2015). The NFSA insisted that there was no risk of the ISA virus contaminating Chinese salmon because Norwegian salmon was shipped directly to consumer markets (Wright, 2015), and that there was no risk of ISA to human health because there is no evidence that the virus can be transmitted to humans (NFSA, 2016). The NFSA was also concerned about whether other salmon exporting countries were subject to the same rules.

The NFSA collaborated with Chinese authorities to ensure that China was satisfied with its requirement for a guarantee, that is, the wording of the certificate stating that the salmon was ISA-free. Despite normalizing diplomatic relations in November 2016 (Ministry of Foreign Affairs, 2016) and removing the earlier "politically motivated" trade barriers, China continued to subject Norway's salmon exports to a complex control regime of partial bans and certification requirements until early 2019. With the signing of a bilateral protocol (MTIF, 2019), China lifted the final sanctions on fish-farming facilities owned by Leroy Seafood Group, Nordlaks, and SalMar, complying with the OIE aquatic code and the WTO Sanitary and Phytosanitary (SPS) Agreement (*Undercurrent News*, 2019).

Figure 1 depicts the trends in China's total import of whole, fresh/chilled (Atlantic and Pacific) salmon and the change in the import pattern of Norwegian Atlantic salmon, which appears to coincide with the awarding of the 2010 NPP and continues through 2018 until the protocol is signed.

Figure 1. Annual imports of whole, fresh/chilled Atlantic and Pacific salmon into China

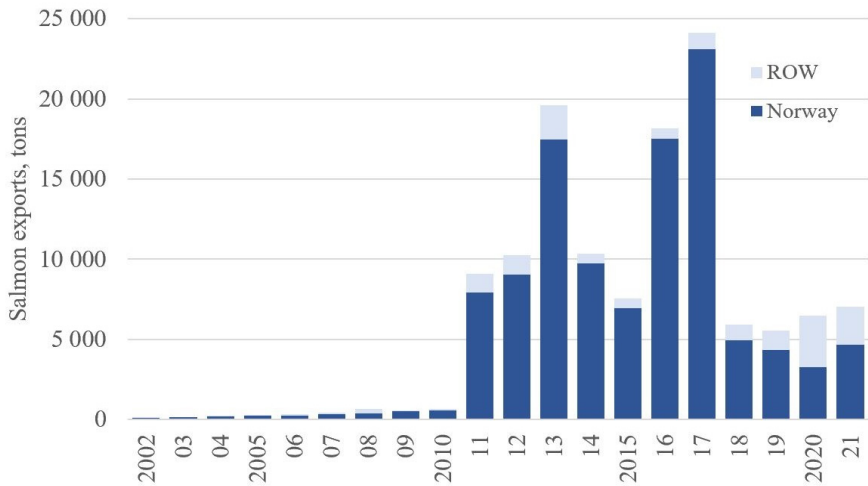


(Source) UN Comtrade data.

Norway held a commanding 80% share of the Chinese salmon market until 2010. In 2011, Norway's export volumes fell in both absolute and relative terms. Despite a recovery in export volume in 2012, the gap between China's total imports and Norway's share widened until 2019.

Figure 2 depicts how annual imports of whole, fresh/chilled Norwegian salmon into Vietnam began to rise in 2011. Import volumes increased from less than 1,000 tons to nearly 10,000 tons within a year. Most of the fresh/chilled (Pacific and Atlantic) salmon imported into Vietnam during 2010-2018 was from Norway, accounting for more than 90% by volume and value. From 2018, the total annual volume of imports into Vietnam decreased to approximately 5,000 tons.

Figure 2. Annual exports of whole, fresh/chilled salmon to Vietnam



(Source) UN Comtrade data.

Vietnam's increase in imports was abrupt and disproportionate, with no discernible change in any economic indicator (e.g., national income, relative prices, population, or marketing efforts) to account for such a structural change in demand. The official trade data of Vietnam do not report transshipment or re-exporting of salmon. There have been no reports of the development of a salmon processing industry for smoking, canning, or freezing salmon products. Furthermore, according to reports, the Vietnamese consume relatively little fresh salmon (Kynge, 2018), supported by pre-2011 data. By contrast, the Chinese middle class prefers Japanese-style raw fish, which includes salmon, and is commonly served in food service outlets.

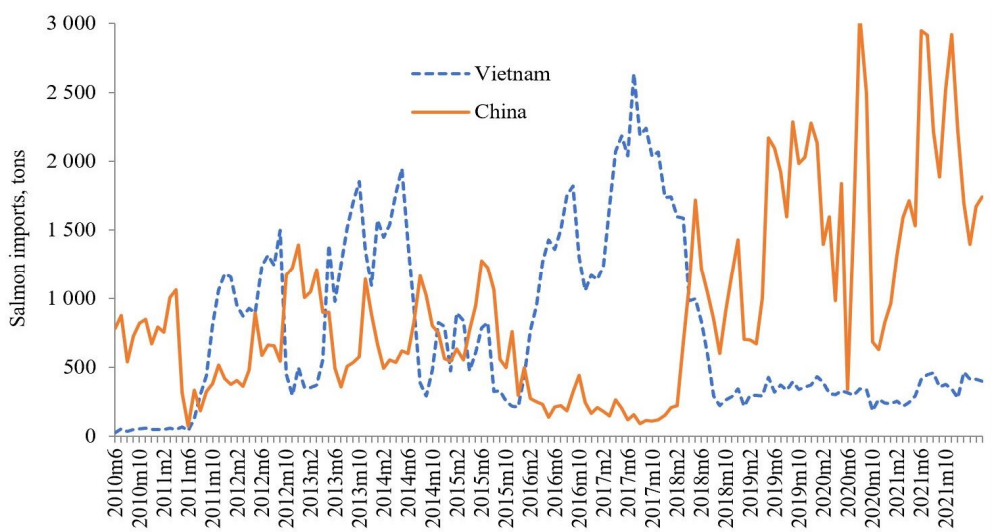
In 2000, Norway committed to long-term marketing campaigns and spending to promote salmon in China. Seafood Norway, a government-sponsored lobbying group, cultivated the Chinese market by heavily investing in supply chains to ensure that exported fish arrived fresh at wholesale and retail markets (Lewis, 2011). Norway's marketing was unparalleled in China's seafood market,

which may explain its pre-2011 dominance of the salmon market (Godfrey, 2015). No such efforts were made in Vietnam.

Thus, if Vietnam's consumption patterns remained unchanged and Chinese preferences for Norwegian salmon remained strong, illegal transshipments could explain the shifting import patterns, especially if wholesale level prices in China increased relative to the border price. Some estimates suggested that at least half of the salmon on the Chinese market was smuggled in 2017, and roughly 80% of the salmon Norway sent to Vietnam was smuggled into China (Seaman & Harkell, 2018).

Figure 3 depicts Vietnam's monthly tons of Norwegian salmon imports versus China's monthly imports. Beginning in 2011, the pattern suggests that as imports into China decreased, imports into Vietnam increased, and vice versa. When China's import volumes fall below 1,000 tons, Vietnam's monthly import volumes frequently exceed 1,000 tons. The pattern ended in late 2018, when monthly import volumes into Vietnam stabilized below 500 tons, unaffected by China's monthly import volume. This raises two questions. First, do the data in Figures 1 and 2 provide statistical evidence of a structural break in the data on salmon import volumes into Vietnam? Second, do the data in Figure 3 show that import volumes into China influenced the decision to import salmon into Vietnam between 2011 and 2018?

Figure 3. Monthly imports of whole, fresh/chilled Norwegian salmon into Vietnam and China



(Source) UN Comtrade data and Norwegian Seafood Council.

Evidence of a structural break in the data could establish a statistical link between the sudden increase in the volume of Norwegian salmon imports into Vietnam and China's sanction restricting salmon on its market. When no relationship would be expected to exist, the inverse relationship between imports into Vietnam and China could suggest that a decrease in China's imports led

to an increase in imports into Vietnam, where market agents could profit from smuggling. The lack of any other obvious demand-side explanation for the change in Vietnamese imports and any official trade statistics to support re-exports or other legal transshipments of salmon from Vietnam could suggest that the markets were integrated through smuggling. Furthermore, the popular press reported on salmon smuggling into China and government crackdowns on smuggling rings (Godfrey, 2019a, 2019b; Kynge, 2018).

III. Related Literature and Theory

China's formidable economic growth in the 2000s and its position in international trade have resulted in the government's increased capacity and willingness to engage in economic diplomacy, particularly the use of policy to interfere with a country's exports to China when China perceives itself to be negatively affected in international relations. Fuchs and Klann (2013) study the trade effects of countries that host the Dalai Lama, Tibet's spiritual leader. For China, the status of Tibet, and thus the Dalai Lama's leadership role, is an internal matter. Thus, diplomatic recognition of the Dalai Lama through state visits invites severe tensions in relations and a deterioration in trade relations, primarily in the form of reduced access to China's market.

Fuchs and Klann (2013) use a gravity trade model to estimate econometrically the extent to which official meetings with the Dalai Lama affect the volume of exports to China from 1991 to 2008. The model includes the usual gravity model variables (gross domestic product [GDP], population, and exchange rate) and a dummy variable for time-specific factors such as receiving the Dalai Lama. The dataset is divided into two periods: 1991-2001 and 2002-2008. The latter period includes the effects of China's WTO membership and the rapid rise of China's economic and political power. The empirical results confirmed the existence of a "Dalai Lama effect," a negative effect on exports to China during 2002-2008 following an official visit.

The awarding of the 2010 NPP elicited a diplomatic and economic response similar to other cases of interferences in China's internal matters. Statistics Norway (SSB, 2011, 2012) provided early descriptive analyses of the award's economic effect. SSB (2011) reported that apart from fish exports, there was no reduction in overall Norwegian exports even one year after the diplomatic tensions. Despite a worsening trade balance with China, both imports, and exports increased in 2011. Long-term contracts had an unknown effect, and some sectoral groups were unsure whether their sector would be associated with the political effect of the award. It was noted that goods could be shipped through Hong Kong, but no unusual shifts in patterns had occurred, except for fish exports.

The SSB (2012) follow-up study concluded no significant immediate changes, and overall trade was higher than before the award. Furthermore, aside from worsening relations, other

factors, such as a decline in global industrial activity and a slowdown in China's GDP growth, could explain any sectoral effects on Norwegian exports. It was argued that the biggest potential effect for Norway would be the effect of not creating new markets in China (SSB, 2012) and the lost economic opportunities because political estrangement erodes personal contacts and Chinese goodwill is based on maintaining close relations (Sverdrup-Thygeson, 2015).

Sverdrup-Thygeson (2015) studied whether China's use of economic and political levers against Norway reflected yet another instance of the "Dalai Lama effect," in which exports to China are sanctioned. By combining descriptive statistics with interviews of key political actors and business representatives, Sverdrup-Thygeson (2015) focused on the effects of the political fall-out on Norway's exports up to 2013. Despite the immediate freezing of political relations, suspension of bilateral free trade negotiations, cancellation of official visits, and visa difficulties, the effect on Norway's overall goods export to China was less severe than expected. This included the seafood sector except for the salmon sub-sector. Norway's total export value to China increased in 2011, fell in 2012 but remained above 2010 levels, and trended upward through 2014, reaching record levels (UN, 2022).

Overall, no punitive border measures harmed the seafood industry. However, the salmon sector has features that set it apart from other export sectors. China processes Norwegian seafood for re-export, which helps to create jobs in the country. Still, fresh salmon is a product internationally associated with Norway that is easily substitutable with imports from other countries, minimizing any negative economic effects on China. Salmon is also the only major Norwegian export that goes directly to the Chinese consumer market. The reduction in salmon exports could be attributed to discriminatory inspection, quarantine, and import licensing, but not to a popular consumer boycott, which is frequently associated with expressions of China's displeasure sparked by state media, such as in territorial disputes. In the case of the 2010 NPP, however, the public was largely unaware of Liu Xiaobo because the communist party was unwilling to publicize him. Thus, because the overall trade relationship had not been affected, Sverdrup-Thygeson concludes that China intended to maintain economic relations as usual. As a result, China's reaction to the 2010 NPP does not fit the pattern of the Dalai Lama effect found by Fuchs and Klann (2013).

Chen and Garcia (2016) combine personal accounts from stakeholders involved in the Norway-China salmon trade with changes in trade patterns of whole, fresh/chilled Norwegian salmon after the NPP was awarded. The accounts of stakeholders corroborated claims made by the Norwegian Seafood Council (NSC) and through official complaints lodged by Norway at the WTO and reported in the popular press that China applied disproportionate border measures. Moreover, the stakeholders confirmed that, while sourcing salmon from other countries was one coping mechanism, importers appeared to be busting the sanction by evading border controls in a variety of ways. Illegal transshipments included rerouting of Norwegian salmon, mislabeling of country-of-origin documentation, smuggling, port shifting within China to ports where restrictions

were less strictly enforced, and synchronization of import-licensing applications for smaller volumes at various ports to circumvent license restrictions on larger volumes.

Kolstad (2016) studied the effects of the NPP on Norwegian fish exports to China. Kolstad questioned the implicit assumption that exports should have been expected to maintain the same high growth rates as before 2010, arguing that identifying a causal effect of the NPP necessitates the creation of a credible counterfactual. Thus, a synthetic Norway is created by taking the weighted average of the other countries. The period 2000-2009 is used to compute the average of predictor variables to compare synthetic exports to actual exports for 2011-2014.

The evolution of exports and foreign policy in the synthetic control country is used as a counterfactual to estimate the evolution of Norwegian exports and foreign policy. While awarding the NPP to a Chinese dissident is not surprising, the timing of the decision cannot be predicted *a priori*. Thus, the 2010 NPP could be considered an exogenous event. The results of this approach suggest that the effect on direct exports to China was significant, especially when compared to other studies that used more *ad hoc* counterfactuals. In 2012, the differences in exports compared to their synthetic control units were greatest. It also noted that the sanctions appeared to be temporary, as Norway's fish exports were returning to pre-sanction levels in 2014. This may have been true for all fish exports. However, salmon exports would continue to be affected by China's ban based on SPS concerns, which Norway continued to challenge as disproportionate (i.e., regulations were harsher than necessary to achieve the stated objective) and discriminatory (i.e., regulations were applied to Norwegian salmon to the exclusion of other salmon exporting countries).

These studies confirm the existence of the sanction and the effect of China's sanction on Norwegian salmon exports. While many of these studies acknowledge that salmon smuggling may have occurred through Vietnam, the implications for Vietnam were not specifically addressed. This study aims to establish a link between the change in Norway's trade pattern with Vietnam and the sanction period, during which Norway's salmon exports to China are affected.

Chen and Garcia (2016) emphasized that because consumer preferences for Norwegian salmon are strong enough in China, import restrictions motivated private sector agents to devise coping strategies to circumvent the barriers and avoid the sanction. Early (2009) contrasted the realist and liberal perspectives on sanctions busting. While the realist viewpoint considers trade to take place between states, the liberal viewpoint focuses on the roles of firms and individuals in determining trade flows. According to the realist theory, sanction busting is the behavior of third countries. Third-country actions are determined by their country's relations with the sender (the country imposing a trade sanction) and the target country (that country to which the sanctions are intended to adversely affect). The liberal theory explains sanction busting through the economic considerations of trading firms and/or individuals. That is, if economic/trade sanctions create profitable opportunities for economic agents, they will pursue those opportunities through sanction-busting activities (Early, 2009). The transshipment of Norwegian salmon through Vietnam would

result from private agents seeking rents rather than Vietnam seeking to improve its relationship with Norway.

Transshipment and smuggling are two common strategies private sector agents use to circumvent sanctions. Miller et al. (2018) defined transshipment as the exchange of cargo, supplies, or personnel between two vessels, often at sea, and far from a home port. Transshipment is defined by Andriamananjara et al. (2004) as routing an export shipment through an intermediate location before it reaches its destination, for example, re-exporting. Transshipment can help to reduce shipping costs, capitalize on economies of scale, or act as a link in a regional supply chain to expand the range of services or routes available to consumers. This does not appear to be the case in the transshipment of fresh/chilled Norwegian salmon between Vietnam and China. Miller et al. (2018) express concerns about traceability and transparency in the seafood industry, which are relevant in the context of smuggled fresh/chilled salmon. In the case of a sanction, for example, the sending country may impose a boycott on the import of a specific commodity from the target country. If the sender country has strong preferences for these goods, firms or individuals may be involved in illegal transshipment from third countries to circumvent border controls, a role that Vietnam appears to play.

Smuggling is defined as the illegal movement of a commodity from one side of a border to the other. There are two potential concerns, the movement of prohibited goods and the avoidance of customs and duties on traded goods. Smugglers use borders to take advantage of differences in demand and supply, taxation, or the legality of trading specific goods (Bruns and Miggelbrink, 2012). The transshipment of salmon from Vietnam to China reflects both behaviors, gaining market access by avoiding non-tariff barriers imposed by the government and avoiding 11% value-added taxes (Seaman & Harkell, 2018).

IV. Data and Methodology

The study of the sanction period employs monthly trade data from July 1997, when Vietnam first began importing salmon from Norway, to December 2018, when the protocol was signed. The NSC provided data on the monthly volume and value of Norwegian exports of whole, fresh/chilled salmon to China and Vietnam. These data are consistent with those available in the UN Comtrade database (UN, 2022). Dividing the value of exports by the volume exported gives the unit value of exports, free on board (fob).

Generally, market integration studies focus the relationship between prices in different markets. The volume of trade flows is the focus here. A regression model of Vietnam's current monthly import volume on its lagged monthly imports and on China's lagged monthly imports is estimated using ordinary least squares.

Equation (1) has the current month of Vietnam's quantity of imports (VNQM) as a dependent variable which is a function of the lagged monthly imports into both Vietnam and China. This is expressed as:

$$\Delta \ln VNQM_t = \gamma_0 + \Sigma\, \gamma_{1i}\, \Delta \ln VNQM_{t-i} + \Sigma\, \gamma_{2i}\, \Delta \ln CHQM_{t-i} + \varepsilon_t \quad (1)$$

where $\ln VNQM_t$ and $\ln CHQM_t$ are the current month's quantities of whole, fresh/chilled salmon imported from Norway into Vietnam and China, respectively (in logarithm form and first differenced). The subscript i refers to the number of lags in the monthly import volume, and γ_0, γ_{1i} and γ_{2i} are parameters to be estimated, and ε is the error term. The lag length is determined through a selection procedure that employs the Akaike information criteria (AIC).

In earlier specifications, equation (1) was regressed with other economic variables suspected of affecting Vietnam's Norwegian salmon imports, such as real GDP, GDP per capita, the exchange rate, and a price ratio of salmon from competing source countries. These variables were excluded because they were not statistically significant in those regressions.

To account for the sanction's role, we established a dummy variable, SANCTION, for the sanction period, with the variable taking on a value of 1 for months when border measures were strengthened, partial bans were imposed, and certification procedures were required. The dummy variable looks for structural breaks that can cause differences in intercept, slope, or both (Gujarati, 2003). An interaction term is specified between the dummy variable and the lags of the dependent variable and between the dummy variable and the lags of the independent variable. Equation (1) is modified as follows:

$$\begin{aligned}\Delta \ln VNQM_t = {} & \delta_0 + \Sigma\, \delta_{1i}\, \Delta \ln VNQM_{t-i} + \Sigma\, \delta_{2i}\, \Delta \ln CHQM_{t-i} + \delta_3\, SANCTION \\ & + \Sigma\, \delta_{4i}\, \Delta \ln VNQM_{t-i} \cdot SANCTION + \Sigma\, \delta_{5i}\, \Delta \ln CHQM_{t-i} \cdot SANCTION + \varepsilon_t.\end{aligned} \quad (2)$$

Once equation (2) is estimated, a test is conducted for the joint significance of the interaction terms and the dummy variable itself. The null hypothesis is that $\delta_3 = \delta_{4i} = \delta_{5i} = 0$ for all i, implying no structural break exists. A Wald test is performed to test for the structural break under the assumption that the month of the break is unknown. The test aids in determining whether and when a structural break in the data occurs (Stata, 2019). The sample is divided into two periods by a single break. A Chow test, which compares the residual sum of squares of the sub-period regressions and the whole-period regression, is traditionally used to test for a structural break. One of the Chow test's assumptions is that the error terms in the two periods are homoscedastic, which limits the test's performance (Gujarati, 2003). Meanwhile, the Wald test is robust to unknown types of heteroscedasticity (Stata, 2019). The null hypothesis states that no structural break exists in the data.

If a structural break exists, equation (1) is re-regressed for the two sub-periods, July 1997-February 2011, and March 2011-December 2018. Granger causality is a probabilistic method of determining causality that employs empirical data to find patterns of correlation. The data sets are analyzed to determine whether the variables are correlated. Rather than estimating a cause-and-effect relationship in which Vietnam's (China's) previous imports cause Vietnam's current import volume, Granger causality enables the researcher to determine whether one variable precedes another in the time series. Granger causality is a "bottom up" procedure in which the data-generating processes in a time series are assumed to be independent variables. If the variables are dependent, they are analyzed to determine whether they are generated independently. Granger's method expresses a stationary time series dependent variable (Vietnam's current import volume) as a function of its own lagged volume (Vietnam's previous months' import volume) and a lagged independent variable (China's lagged imported volume). That is, Granger causality establishes whether Vietnam's current monthly salmon imports are linked to previous months' imports into Vietnam and China.

Prior to the sanction, Vietnam's imports were expected to be determined by its previous monthly imports. The δ_{1i} coefficients would be statistically significant, whereas China's previous months' imports would have no effect, implying that the δ_{2i} coefficients would not be statistically significant. If Vietnam's current import volume was negatively affected by China's previous months' imports during the sanction period (i.e., $\delta_{2i} < 0$), then periods when monthly imports into China decreased would be related to increased current imports into Vietnam. The scarcity of Norwegian salmon on the Chinese market would be linked to increased imports into Vietnam, implying that the salmon markets were integrated through smuggling. The null hypothesis to be tested is that there was a sanction period. During this period, Vietnam's current import volume of Norwegian salmon was negatively affected by the previous months' import volume of Norwegian salmon into China.

V. Results and Discussion

First, the volume data are converted to natural logarithm form and checked for stationarity using an augmented Dickey-Fuller test, where the original series are non-stationary. The first differences in the data are taken into account, and the test is repeated. The first differenced series are stationary at the 1% significance level.

Second, the optimal number of lags for Vietnam's import volume must be determined. Given this option, China's number of lags is fixed. The AIC, which works fine with quarterly data (Greene, 2003), compares alternative regressions of equation (1) with different numbers of lags. The final model includes five lags for both variables. In this initial regression, the sanction is not taken into account.

Diagnostic tests for serial correlation and heteroscedasticity are performed. The Breusch-Godfrey lagrange multiplier test finds that the residuals are not serially correlated at the 5% level. White's test and the Breusch-Pagan test are used to test for the presence of heteroscedasticity. The Breusch-Pagan test was performed because the p-value from the White's test was greater than 0.01 but lower than 0.05. The p-value of that test is less than 0.01, allowing the null hypothesis of constant variance to be rejected (i.e., heteroscedasticity is present). The heteroscedasticity problem is solved by using robust standard errors, which can change the standard errors but leave the coefficients unchanged. Table 1 shows the regression results of Vietnam's current salmon imports on five of its own monthly lags as well as five months of lags in China's salmon imports from Norway (with robust standard errors).

Table 1. *Regression Results of Equation (1) with Five Lags*

	Coefficient	Robust std. errors	t-statistic
lnVNQM			
Lag 1	-0.25926	0.07896	-3.28***
Lag 2	-0.03512	0.07280	-0.48
Lag 3	-0.05105	0.06616	-0.77
Lag 4	-0.05089	0.07639	-0.67
Lag 5	-0.01297	0.06827	-0.19
lnCHQM			
Lag 1	-0.21564	0.09783	-2.20**
Lag 2	-0.13631	0.09914	-1.37
Lag 3	-0.18445	0.09610	-1.92*
Lag 4	-0.19981	0.06750	-2.96***
Lag 5	-0.28336	0.09312	-3.04***
Constant	0.03469	0.02104	1.65
Observations	252		
F(10, 241)	3.8100		
R-squared	0.1569		
Root MSE	0.3278		

Note. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

The R^2 estimate indicates that the model explains only about 16% of the variation in Vietnam's salmon imports from Norway. All of the coefficients are negative. A negative coefficient on the lag on monthly import volume suggests that higher import volumes into Vietnam or China in previous months should result in less import volume into Vietnam in the current month. Only the coefficient for the first month's lagged import volume into Vietnam is statistically significant. It is significant at the 1% level. Four of the coefficients for lagged import volumes into China are statistically significant. If the markets are separate, China's import volume should have no bearing on Vietnam's salmon imports (i.e., no official records of re-export or transshipment of

Norwegian salmon). The estimation for the entire period provides some statistical evidence of the relationship between the two markets, even without considering the existence of a sanction.

Because China never officially declared its sanction on Norwegian salmon, there is no exact starting month of the sanction. Looking at the monthly data on Norwegian salmon imports to Vietnam, the volume suddenly triples in March 2011. In January 2011, China's imports fell almost entirely. Given that the dependent variable is monthly imports into Vietnam, March 2011 is a better indicator of the beginning of the structural break in the data.

The inclusion of the dummy variable for the sanction period, SANCTION, and the interaction of the sanction with the lagged monthly import volumes in estimating equation (2) allows a statistical test to determine whether a structural break occurred in March 2011. Under the null hypothesis of no structural break, a Wald test was used to look for an unknown structural break. The data support a structural break when a time series abruptly changes (Stata, 2019). The test determines whether the data rejects the null hypothesis. The dummy variable and the interaction terms' joint significance serves as evidence of the structural break. The Wald test identifies April 2011 as the month of the break. The estimation results suggest that the choice of either March or April as the start of the break is inconsequential. The p-value for the F-test is 0.000, which is lower than 0.01. Thus, the null hypothesis of no joint significance, or that the dummy, and the interaction terms' coefficients are equal to 0, can be rejected at the 1% level, implying a break.

Table 2 presents the regression results of equation (2), including the SANCTION dummy. The R^2 value indicates that the model explains 33% of the variation in Vietnam's imports. As with the regression of equation (1), all of the lagged monthly imports have negative coefficients, and seven of the ten monthly lags are statistically significant at the 1% or 5% level. Thus, Vietnam's current import volumes are negatively affected by both increasing volumes in lagged monthly imports into Vietnam and China.

Table 2. *Regression Inclusive of the Sanction Dummy and Its Interaction Terms*

	Coefficient	Robust std. errors	t-statistic
lnVNQM			
Lag 1	-0.66696	0.08841	-7.54***
Lag 2	-0.29932	0.10323	-2.90***
Lag 3	-0.29255	0.10322	-2.83***
Lag 4	-0.29689	0.10017	-2.96***
Lag 5	-0.12234	0.08491	-1.44
lnCHQM			
Lag 1	-0.24091	0.10323	-2.33**
Lag 2	-0.24223	0.10609	-2.28**
Lag 3	-0.87814	0.11263	-0.78
Lag 4	-0.07208	0.10943	-0.66
Lag 5	-0.32730	0.11006	-2.97***

Table 2. *Continued*

	Coefficient	Robust std. errors	t-statistic
SANCTION	-0.05893	0.04081	-1.44
lnVNQM_SANCTION			
Lag 1	0.82807	0.12796	6.47***
Lag 2	0.13952	0.14022	1.00
Lag 3	0.36096	0.13939	2.59***
Lag 4	0.23927	0.13535	1.77*
Lag 5	0.11472	0.12367	0.93
lnCHQM_SANCTION			
Lag 1	0.09646	0.13314	0.72
Lag 2	0.27497	0.13196	2.08**
Lag 3	-0.05929	0.13781	-0.43
Lag 4	-0.09468	0.13644	-0.69
Lag 5	0.18893	0.13572	1.39
Constant	0.06631	0.02511	2.64
Observations	252		
F(21, 230)	5.3800		
Prob > F	0.0000		
R-squared	0.3296		
Root MSE	0.2993		

Note. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

The intercept remains unchanged. SANCTION, the dummy variable, is not statistically significant at the 10% level. However, some of the interaction coefficients, between lagged monthly import volumes and the sanction period are statistically significant and positive.

The study period is divided into two sub-periods to perform Granger causality before and after the break, from July 1997 to February 2011 (prior to the sanction) and from March 2011 to December 2018 (application of the sanction). Table 3 summarizes the Granger causality results.

The R^2 values obtained from the regressions before and after the sanction account for 39% and 21% of the variation in quantity imported into Vietnam, respectively. The coefficients differ between the two time periods. Prior to the sanction, the current monthly import volume into Vietnam was only related to the previous five months' import volumes into Vietnam. The coefficients are negative and statistically significant at the 1% level for the first four lagged months. This suggests that lower current import volumes were associated with higher import volumes in previous months. As expected, China's monthly import volumes have no relationship to Vietnam's current import volume. That is, prior to the sanction, there is no market integration and no reason to suspect smuggling.

Table 3. *Results of the Granger Causality Regression*

	Sub-period: Jul 1997 - Feb 2011			Sub-period: Mar 2011 - Dec 2018		
	Coeff.	Robust sdt error	t-stat	Coeff.	Robust sdt error	t-stat
lnVNQM						
Lag 1	-0.6513	0.0920	-7.08***	0.1222	0.1047	1.17
Lag 2	-0.2935	0.1223	-2.40***	-0.1720	0.1061	-1.62
Lag 3	-0.2937	0.1215	-2.42***	0.0960	0.1041	0.92
Lag 4	-0.2969	0.1076	-2.76***	-0.0636	0.1061	-0.60
Lag 5	-0.1396	0.0853	-1.64*	0.0121	0.1042	0.12
lnCHQM						
Lag 1	-0.0712	0.1289	-0.55	-0.2499	0.0938	-2.66***
Lag 2	0.0831	0.1393	0.60	-0.1260	0.0876	-1.44
Lag 3	0.2048	0.1463	1.40	-0.2134	0.0885	-2.41**
Lag 4	0.1288	0.1207	1.07	0.1743	0.0909	-1.92**
Lag 5	-0.2295	0.1255	-1.83	-0.2014	0.0913	-2.20**
Constant	0.0546	0.0232	2.36***	0.0247	0.0365	0.68
Observations		158		Observations	94	
F(10, 147)		9.310		F(10,83)	2.160	
Prob > F		0.000		Prob > F	0.028	
R-squared		0.389		R-squared	0.207	
Root MSE		0.271		Adjusted R	0.111	
				Root MSE	0.352	

Note. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

However, during the sanction period, Vietnam's current monthly imports were no longer related to its previous monthly import volumes. Instead, the current monthly import volume into Vietnam was linked to the previous month's import volume into China. In other words, small current import volumes into Vietnam were associated with larger monthly import volumes into China. The coefficient for China's one-month lag is significant at the 1% level, and the coefficients for the third, fourth, and fifth lagged months are significant at the 5% level. (Only the second month's lag was not statistically significant.) There is no reason to expect such a relationship between independent markets. Thus, the results support the conclusion that the sanction period exists and that the salmon markets of Vietnam and China became integrated through smuggling during the sanction period. Because when previous monthly import volumes coming into China directly from Norway were large, the current month's import volume into Vietnam was smaller as the opportunity to smuggle salmon decreased. In previous months, a scarcity of Norwegian salmon on the Chinese market signaled Vietnamese importers to increase current imports to smuggle salmon into China.

Table 4 shows the F-test results for Granger causality in the two sub-periods. The p-value is greater than 0.1 for the pre-sanction period, implying that the null hypothesis of no joint

significance (i.e., no Granger causality) cannot be rejected at the 10% significance level. Thus, prior to the sanction, a change in China's import volume of Norwegian salmon did not, as expected, "Granger-cause" a change in Vietnam's import volume of Norwegian salmon. The F-test, however, produced a different result with a p-value less than 0.01 for the regression of the sanction period. Therefore, in the sanction period, lagged Norwegian salmon imports into China "Granger-caused" Vietnam's current import of Norwegian salmon. The null hypothesis of no Granger causality is rejected at the 1% level of significance.

Table 4. *Results of the Granger Causality Test in the Two Sub-periods*

Sub-periods from July 1997 - February 2011	Sub-period from March 2011 - December 2018
Lag 1 lnCHQM = 0	Lag 1 lnCHQM = 0
Lag 2 lnCHQM = 0	Lag 2 lnCHQM = 0
Lag 3 lnCHQM = 0	Lag 3 lnCHQM = 0
Lag 4 lnCHQM = 0	Lag 4 lnCHQM = 0
Lag 5 lnCHQM = 0	Lag 5 lnCHQM = 0
F(5,147) = 1.4700	F(5,83) = 3.3900
Prob > F = 0.2014	Prob > F = 0.0078

Moreover, the causality was unidirectional. That is, Vietnam's lagged import volume had nothing to do with China's imports of Norwegian salmon. Unidirectional causality is an expected result as China's sanction was hypothesized to affect Vietnam's current imports.

The regressions and tests provided compelling evidence that Vietnam's sudden increase in Norwegian salmon imports was related to the sanction period, and that smuggling was reflected in the inverse relationship between Vietnam's current monthly imports and China's import volumes in previous months. Press reports confirmed salmon smuggling. Smugglers obtained Norwegian salmon and had it flown to Vietnam, where it was transported to the border by a logistics company. Smugglers transported the salmon across the border and on to Guangzhou, Shanghai, Shenzhen, Beijing, and other cities for sale (Seaman & Harkell, 2018). Contraband also arrived in Chinese ports on vessels labeled as domestic rather than international (Godfrey, 2019b). Other activities included the formal import of salmon but under-reporting the value of consignments (Kynge, 2018) or mislabeling salmon as mackerel or other lower-end species to pay lower customs duties or enter duty-free for processors to re-export (Wright, 2015; Godfrey, 2019b).

Cracking down on smuggling addressed multiple objectives. Concerned about unfair competition from both informal actors and organized criminal smuggling operations, legitimate taxpaying importers, distributors, and retailers put pressure on the government to reduce tax avoidance (Godfrey, 2016, 2019a). However, border controls were also specific to the illegal seafood trade, which was a major concern for the industry. Several smuggling incidents and high-profile arrests (Kynge, 2018; *Salmon Business*, 2018) lent credence to the government's commitment to food safety. This added to the ASQIQ's goal of formalizing the trade and distribution channels for

seafood marketing and addressing corruption among customs and other officials (Godfrey, 2016).

During the sanction period, fob monthly prices of fresh/chilled salmon at Norwegian ports destined for Chinese and Vietnamese markets moved in lockstep about 75% of the time, within a 5% price differential. Thus, the cost of imported salmon, including tariffs applied at the bound rate of 10% in both countries (WTO, 2019a, 2019b), was roughly the same. Suppressing smuggling while maintaining the sanction resulted in wholesale prices of Norwegian salmon being 50% higher year-on-year at the start of 2018, creating incentives for smugglers to profit from wholesale-border price differentials (Seaman & Harkell, 2018; Godfrey, 2018). Thus, the motivation for illegal transshipment must be based on the price difference between wholesale in China and the cost of importing Norwegian salmon into Vietnam.

The data showed no seasonality patterns. Imports into Vietnam fluctuate regardless of whether it is summer or winter. It is possible that fresh salmon was imported in the summer but then temporarily frozen in transit on its way to wholesale markets in China. This could have reduced the quality of fresh fish and/or harmed consumers who paid for fresh fish but were served frozen salmon, even if only for a few days.

Vietnam's import volume confirms that markets were integrated through smuggling. Domestic tax avoidance (value-added or sales taxes) and rent seeking would be the motivation, as reflected in the price differential between the wholesale market price in China and the border price in Vietnam. Further study into market integration should attempt to quantify the degree to which price differences at the wholesale level in China and the landed price in Vietnam were interrelated.

VI. Conclusions

This study establishes two statistical relationships that coincide with China imposing sanctions on Norwegian salmon after the NNC awarded the 2010 NPP. First, the volume of Norwegian salmon imported into Vietnam increased dramatically. Although no significant change occurred in import demand factors in Vietnam, a structural break in the data has been found. Second, during the sanction period, March 2011 to December 2018, the salmon markets of China and Vietnam appear to have become integrated through smuggling. Econometric analysis and Granger causality tests of two sub-periods, the years preceding China's sanction and the sanction period, show that Vietnam was the source of smuggled salmon into China, corroborating press accounts of smuggling and Chinese border arrests.

More conclusive econometric evidence would examine the relationship between wholesale salmon prices in China and relative border prices between China and Vietnam. The removal of the sanction should be a positive development for Chinese consumers and society overall as the marketing of salmon will flow along "regular channels." This should ensure food safety and

quality, enforce proper pricing and labeling, and reduce corruption, tax avoidance, rent-seeking behavior, and illegal transshipments. It should also serve as a warning to China's foreign policy executors that a unilateral, undeclared sanction can be a costly signal of international relations because it is more easily busted by private agents who may cause unintended societal costs.

References

Andriamananjara, S., Arce, H., & Ferrantino, M.J. (2004). *Transshipment in the United States* (Working Paper, No. 2004-04-B). U.S. International Trade Commission, Office of Economics, Available from: https://www.usitc.gov/publications/332/ec200404b.pdf

Berglund, N. (2010). *Nobel prize can carry high price*. News in English: Views and News from Norway. Available from: https://www.newsinenglish.no/2010/10/11/nobel-prize-can-carry-high-price/

British Broadcasting Corporation News (BBC). (2010, October 8). *China's Nobel Anger as Liu Xiaobo Awarded Peace Prize*. Available from: https://www.bbc.com/news/world-asia-pacific-11505164

Bruns, B., & Miggelbrink, J. (Eds.). (2012). *Subverting borders: Doing research on smuggling and small-scale trade*. Wiesbaden: VS Research. Available from: https://link.springer.com/content/pdf/10.1007/978-3-531-93273-6.pdf?pdf=button

Chen, X., & Garcia, R. J. (2016). Economic sanctions and trade diplomacy: Sanction-busting strategies, market distortion and efficacy of China's restrictions on Norwegian salmon imports. *China Information, 30*(1), 29-57. https://doi.org/10.1177/0920203X15625061

Early, B.R. (2009). Sleeping with your friends' enemies: An explanation of sanctions-busting trade. *International Studies Quarterly, 53*(1), 49-71. Available from: https://academic.oup.com/isq/article/53/1/49/1811225?login=true

Fuchs, A., & Klann, N. (2013). Paying a visit: The Dalai Lama effect on international trade. *Journal of International Economics, 91*(1), 164-177. Available from: https://reader.elsevier.com/reader/sd/pii/S0022199613000482?token=9FF740C9FB98E9B5C94AD44882D5A25D582C703059110F8A9FC9046A1C17A080D24CC35BB31B3C567E8BA74782CCDE60&originRegion=eu-west-1&originCreation=20230124145640

Godfrey, M. (2012). *Norwegian salmon exporters feel China's wrath.* Seafood Source. Available from: https://www.seafoodsource.com/news/supply-trade/norwegian-salmon-exporters-feel-china-s-wrath

Godfrey, M. (2015). *How Norway set the standard for marketing seafood in Chin*a. Seafood Source. Available from: https://www.seafoodsource.com/features/how-norway-set-the-standard-for-marketing-seafood-in-china

Godfrey, M. (2016). *China customs crackdown hurting Hong Kong seafood distributors*. Seafood Source. Available from: https://www.seafoodsource.com/news/supply-trade/china-customs-crackdown-hurting-hong-kong-seafood-distributors

Godfrey, M. (2018). *December raids in China net 58 seafood smugglers.* Seafood Source. Available from: https://www.seafoodsource.com/news/supply-trade/december-raids-in-china-net-58-seafood-smugglers

Godfrey, M. (2019a). *China tackling tax evasion in seafood sector on many fronts*. Seafood Source. Available from: https://www.seafoodsource.com/news/supply-trade/china-tackling-tax-evasion-in-seafood-sector-on-many-fronts

Godfrey, M. (2019b). *Salmon smuggling update: China cracking down on triad crime.* Seafood Source. Available from: https://www.seafoodsource.com/news/supply-trade/salmon-smuggling-update-china-cracking-down-on-triad-gangs

Greene, W. (2003). *Econometric Analysis*. Upper Saddle River, NJ: Prentice Hall.

Gujarati, D. N. (2003). *Basic Econometrics*. New York: McGraw-Hill.

Kolstad, I. (2016). Too big to fault? Effects of the 2010 Noble Peace Prize on Norwegian exports to China and foreign policy. *International Political Science Review, 41*(2), 207-223. https://journals.sagepub.com/doi/pdf/10.1177/0192512118808610

Kynge, J. (2018). *China-focused salmon-smuggling 'syndicate' spawns raids*. Financial Times. Available from: https://www.ft.com/content/ee94b4fe-3df6-11e8-b9f9-de94fa33a81e

Lewis, M. (2011). *Norway's salmon rot as China takes revenge for dissident's Nobel prize*. The Independent. Available from: https://www.independent.co.uk/news/world/europe/norways-salmon-rot-as-china-takes-revenge-for-dissidents-nobel-prize-2366167.html

McDonell, S. (2017). *China's propaganda war over dying Nobel prize winner Liu Xiaobo*. British Broadcasting Corporation News. Available from: https://www.bbc.com/news/blogs-china-blog-40552818

Miller, N.A., Kroodsma, D. A., Amos, J., Hochberg, T., & Roan, A. (2018). Identifying global patterns of transshipment behavior. *Frontiers in Marine Science, 5*(240), 1-9. htttp://doi.org/10.3389/fmars.2018.00240

Milne, R. (2013). *Norway sees Liu Xiaobo's Nobel prize hurt salmon exports to China*. Financial Times. Available from: https://www.ft.com/content/ab456776-05b0-11e3-8ed5-00144feab7de

Ministry of Foreign Affairs, Government of Norway. (2016). *Full normalization of relations with China* [Press release]. Available from: https://www.regjeringen.no/en/aktuelt/normalization_china/id2524797/

Ministry of Trade, Industry and Fisheries (MTIF), Government of Norway. (2019). *Protocol on inspection, quarantine and sanitary requirements for Atlantic salmon imported from the Kingdom of Norway into the People's Republic of China* [Press release]. Available from: https://www.regjeringen.no/contentassets/00dab48a2b2e44709bd0bcd48f74f307/lakseprotokoll-norge-kina-20052019.pdf

Norwegian Food Safety Authority. (2016). *Annual Report 2015.* Oslo: NFSA. Available from: https://www.mattilsynet.no/om_mattilsynet/annual_report_the_norwegian_food_safety_authority_2015.22993/binary/Annual%20report%20The%20Norwegian%20Food%20Safety%20Authority%20(2015)

Norwegian Food Safety Authority. (2017). *Annual Report 2016*. Oslo: NFSA. Available from: https://www.mattilsynet.no/om_mattilsynet/annual_report_the_norwegian_food_safety_authority_2016.26919/binary/Annual%20report%20The%20Norwegian%20Food%20Safety%20Authority%20(2016)

Norwegian Nobel Committee (NNC). (2010). *The Nobel Peace Prize for 2010* [Press release]. Available from: https://www.nobelprize.org/prizes/peace/2010/press-release/

Norwegian Veterinary Institute (NVI). (2016). *Fish Health Report 2015* (Report series No. 3). Oslo: NVI, Available from: https://www.vetinst.no/rapporter-og-publikasjoner/rapporter/2016/fish-health-report-2015

Salmon Business. (2018). *Woman arrested in Chinese anti-smuggling operation owned company with SalMar*.

Available from: https://salmonbusiness.com/woman-arrested-in-chinese-anti-smuggling-operation-owned-company-with-salmar/

Seaman, T., & Harkell, L. (2018). *Norway salmon's 'big three' deny any China smuggling links as prices rise.* Undercurrent News. Available from: https://www.undercurrentnews.com/2018/04/06/norway-salmons-big-three-deny-any-china-smuggling-links-as-prices-rise/

Stata®. (2019). *Tests for structural breaks in time-series data.* Retrievd from https://www.stata.com/stata14/structural-breaks/

Statistics Norway (SSB, Statistisk sentralbyra). (2011). *Ingen Nobel-effekt foreløpig* [No Nobel Effect Yet]. Oslo: Statistics Norway publication. Available from: https://www.ssb.no/utenriksokonomi/artikler-og-publikasjoner/ingen-nobel-effekt-forelopig

Statistics Norway (SSB, Statistisk sentralbyra). (2012). *Mindre eksport til Kina, men mer laks"* [Less export to China, but more salmon]. Oslo: Statistics Norway publication. Available from: https://www.ssb.no/utenriksokonomi/artikler-og-publikasjoner/mindre-eksport-til-kina-men-mer-laks

Sverdrup-Thygeson, B. (2015). The flexible cost of insulting China: Trade politics and the 'Dalai Lama effect'. *Asian Perspective 39*(1), 101-123. https://www.jstor.org/stable/pdf/43738116.pdf

Tallaksen, E. (2015). *China warns of partial ban on Norwegian salmon imports.* Undercurrent News. Available from: https://www.undercurrentnews.com/2015/03/19/china-warns-of-partial-ban-on-norwegian-salmon-imports/

Undercurrent News. (2019). *China lifts salmon sanctions on Leroy, SalMar, Nordlaks plants.* Available from: https://www.undercurrentnews.com/2019/05/21/china-lifts-salmon-sanction-on-leroy-salmar-nordlaks-plants/

United Nations (UN). (2022). *Comtrade online database*. Available from: https://comtrade.un.org/

World Trade Organization. (2011). *Quarantine and testing procedures applied to salmon imported from Norway - Questions to China* (G/SPS/GEN/1090). WTO document, Committee on Sanitary and Phytosanitary Measures. Available from: https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=96589&CurrentCatalogueIdIndex=0&FullTextHash=&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True

World Trade Organization. (2013). *Specific trade concerns: Note by the Secretariat* (G/SPS/GEN/204/Rev.13). WTO document, Committee on Sanitary and Phytosanitary Measures. Available from: https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/G/SPS/GEN204R13.pdf&Open=True

World Trade Organization. (2019a). *Goods schedules and tariff data. WTO Secretariat, Member information for China*. Available from: https://www.wto.org/english/thewto_e/countries_e/china_e.htm

World Trade Organization. (2019b). *Goods schedules and tariff data. WTO Secretariat, Member information for Vietnam*. Available from: https://www.wto.org/english/thewto_e/countries_e/vietnam_e.htm

Wright, J. (2015). *New restrictions on Norway salmon entering China now under way*. Seafood Source. Available from: https://www.seafoodsource.com/news/supply-trade/new-restrictions-on-norway-salmon-entering-china-now-under-way