PARCEL TANKER TRANSPORTATION IN CANADA

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I. Introduction

Transportation by ship tankers dates back to 1886, when the Gluckauf, a prototype of the modern oil tanker was launched. It was only in the 1940s and 1950s that the present day highly specialized tankers were built and it was not until the late 1950s that the world's first parcel tanker was built. The interest in parcel tanker transportation was sparked by an investigation by the Department of Justice in the US which resulted in large fines.

This paper reviews parcel tanker transportation in Canada. Section II examines the background of ship tankers, the definition of parcel tankers, the major carriers in parcel tanker transportation in the globe and Canada. Part III reviews the regulations. Part IV examines the parcel tanker investigation in the US, EC and Canada. Part V suggests a theory for the investigations. Part VI is the conclusion.

II. Parcel Tanker Transportation

1) Background

Ship tankers can be classified into: crude oil tankers; product carriers; and others. Crude oil tankers are large dedicated ships that solely carry crude oil. These tankers can vary considerably in size and fall into the following groups: 1. Panamax (60-80,000 DWT); Aframax (80-120,000 DWT), Suezmax (120-160,000 DWT); Very large crude carriers (160-319, 999 DWT); and Ultra large crude carriers (320,000 DWT+). 2. Product carriers are smaller ships and fall into the following groups: Handy (25-50,000 DWT); Large (50-100,000 DWT); and Very large product carriers (100,000 DWT). 3. Other tank carriers fall into the following groups: Tank barges; Combination carriers; and Parcel tankers. The three groups of tankers can also be classified by their cargoes. Crude oil tankers are dedicated ships that usually carry crude oil. It is possible for these tankers to carry petroleum but the costs of cleaning the tank make it uneconomical so that in practice it is rarely done. Product carriers are built to facilitate the carriage of segragated multiple products simultaneously.

Other tank carriers cargoes' differ widely. For example, tank barges can transport oil and its by-products, combination carriers can carry bulk oil products to dry bulk commodities and parcel tankers carry specialized cargoes such as liquefied petroleum gas and liquefied natural gas.

Carriers of liquefied petroleum gas (LPG) and liquefied natural gas (LNG) are usually considered to operate outside the tanker transportation market.[1]

2) Definition of Parcel Tankers

Parcel Tankers have been defined by the US DOJ as "Parcel tanker shipping is the ocean transportation of bulk chemicals, edible oils, acids and other specialty liquids. Parcel tankers are deep sea vessels equipped with compartments designed to carry shipments of various sizes. The temperature and other specifications of the compartments can be regulated according to the specific requirements of the type of liquid being transported." The word parcel has been used because each tank in the ship constitutes a 'parcel' of cargo. The tanks are often made of stainless steel which enables them to be easily cleaned given the diverse range of products and chemicals shipped ranging from molasses to sulphuric acid. Parcel tanker transportation is recognized as a distinct form of transportation because substantial cost reductions can be achieved relative to shipments in individual containers on conventional ships.

3) A Brief History of Parcel Tanker Transportation

The extensive development in petrochemicals in the 1930 established the need for specialized tankers. Not surprising, chemical companies owned the first ships (*E. Wilson* and *Marine Dow Chem*) used for bulk chemical transportation. However, Norwegian companies have been credited with being the pioneers in the development of parcel tanker transportation. Iver Bugge's *Svanaas*, built in 1949, has the distinction of being the world's first purpose built parcel tanker though vessels converted for the segregation of cargo existed before this date.

In the post war period, European shipping companies played an important role in the intercontinental seaborne transportation of chemicals. In 1949, the Dutch Broere brothers began to ship chemicals from US ports focussing on short distances. In the same year, three Norwegian companies launched a transatlantic service: Parcel Tankers Service (later known as Anco Transport Service and then Athel-Anco); Stolt-Nielsen; and Odfjell. Athel-Anco had its roots in Britain and Norway. Athel originated in the 1930s from United Molasses Company Ltd., a holding company for British Molasses (incorporated in 1915) and Pure Cane Sugar (incorporated 1919), and was basically involved in transporting molasses. In 1958, it became involved in the parcel tanker trade and entered into an agreement with Anco Tanker Services. In

1969, AS Anco Tanker Service was formed from this and in 1973 control of it passed to British interest. Its strategy and commitment to the parcel tanker market was not clear. Stolt-Nielsen was founded in 1891, however, it entered the parcel tanker market much later (the 1950s). Its strategy in this market initially consisted of conversion rather than new buildings and by the end of the 1960s it had a fleet of 20 parcel tankers most of which were chartered. In 1968, it ordered the building of seven new parcel tankers and became the number one firm in this market. Odjfell's was incorporated in 1915 and in 1939 it had one vessel that carried different liquid cargoes. Its initial strategy consisted of specialization. By 1968, it became a dedicated chemical tanker operator pioneering the stainless steel tanks, establishing terminals for storage, concentrating on the more demanding parts of the chemical market and pooling with Westfal-Larsen. These 3 companies continued to be the leading intercontinental chemical shippers till the first half of the 1970s, with Panocean (a Br. comp) the only new challenger.

Panocean was formed in 1969 as a joint enterprise between two leading British companies Peninsular and Oriental (P&O) and Ocean Transport and Trading. In 1974-5, it made major investments in specialized tankers, barges and terminals for storage of bulk liquid and embarked on a joint venture with Lloyd Company. Its initial strategy was to concentrate on the European market and west to east routes. In 1975, Panocean and Anco merged. These two British companies with sound financial backing appeared to provide a challenge to the Norwegian entrepreneurs. The market by now was characterized by a high degree of concentration which was reinforced by the recently introduced code on stringent regulations. Panocean's swift climb to a leading position indicates that though barriers to entry existed, they were not insurmountable for companies with sufficient financial resources.[2]

The recession in the mid 1970s had a major impact on parcel tanker owners, particularly the Norwegians (due to limited financial reserves and new buildings). Stolt-Nielsen was rescued by a loan from British Petroleum and Odjfell was rescued by vessel sales, re-financing and reduced market exposure due to its pooling. With the end of the recession in the late 1970s, both Stolt-Nielsen's and Odjfell's recovery was faster due to their new buildings and increased stainless steel capacity. In contrast, Panocean-Anco's recovery was handicapped by its: high share of contract coverage (at a low rate); and failure to modernize its fleet. In addition, the company was faced with withdrawal of support

from one of its financial supporters together with its faltering interest. An attempt by the company to modernize its fleet ended in failure and they entered into an agreement with Stolt-Nielsen which resulted in a merger between the two in Nov. 1982. By the mid-1980s, Stolt-Nielsen and Odfjell remained leaders in the parcel tanker market.[3] Their duopoly appeared to be shortlived with the entry of JO Tankers (a division of the Odfjell group between two branches of the family) which moved into the big three in chemical transportation. These 3 companies controlled 4/5 of the intercontinental market by 1985.

4) Parcel Tanker Transportation Today

In 2005, the *core* chemical tanker market had a total fleet of 9.7 million dwt (i.e., ships 13, 000 dwt and above) and 341 ships. The major parcel tanker owners are: Odfjell; Stolt-Nielsen; JO Tankers; and Tokyo Marine with market shares of 22%, 20.6%; 7.4% and 7%, respectively. They are examined briefly hereafter. The others majors account for 34.9% and a few minor companies account for 8.2%.[4]

Stolt-Nielsen Transportation Group (SNTG) had a fleet of 149 parcel tankers, product tankers and river tankers as of April 30, 2006. Of the 149 parcel tankers, 71 ships provide intercontinental service, 39 ships provide regional service and 39 ships provide inland or river service. The company owns 71 ships of the fleet, has an interest in 14 ships via joint ventures and has time charter, either directly or indirectly with 64 ships. To handle the diverse range of products shipped, its highly specialized ships for intercontinental parcel tankers have 45 to 58 separate cargo tanks of varying sizes. SNTG operates its major intercontinental services through the Stolt Tankers Joint Service (STNS). STNG owns or has investments in five bulk liquid storage terminals, 2 are in the US and 1 is in Brazil.

Odfjell Seachem's fleet consist of approximately 95 ships of which 77 are operated globally. The fleet consist of a variety of ship types – both in terms of size, sophistication, number of tanks and tank configuration. Some of their ships are involved in a "round the world" trade, servicing ports in Europe, the US, Asia Pacific and Africa. Its revenue from parcel tanker shipping for 2006 was $944m. It is also involved in the tank terminal business and has six fully and partly owned terminals in USA, Europe and The Far East. In addition, their terminal network consist of nine associated terminals in S. America and Canada, owned and operated by their partners.

JO Tankers operates a chemical tanker fleet with 40 parcel tankers, ranging from 3,000 dwt to 40,000 dwt. The total capacity of the fleet is around 900,000 dwt. Their ships are involved in the Trans Atlantic, Caribbean, African and Far East trades. They are designed to carry nearly any kind of liquid products ranging from specialized chemicals and acids, to edible oils and portable alcohols. Each vessel has up to 40 fully segregated cargo tanks, the majority of which are constructed from stainless steel. It operates the third largest chemical tanker fleet and employs 900 people worldwide.

Tokyo Marine operated as many as 51 chemical parcel tankers, owned and chartered (approximately 5,000 to 25,000 DWT), as of March, 2006. Out of the total of 51vessels (with 13 to 31 segregated tanks), 44 vessels in the fleet are with cargo tanks of stainless steel. They provide services on the Pacific Ocean route, the European route via Suez Canal, the Arabian Gulf-Asia route and the Asian short sea trade route. In addition, they provide world-wide tramping services. The company is the fourth largest parcel tanker company. It is one of the most dedicated in both its past and present sailing for the oils and fats trade.[5]

Other potential competitors in this business are: Aurora, Clipper Wonslid Tankers, Dorval Shipping, Novamar International, Team/Blystad and M.T. Maritime Managment, MISC, Hiltveit Associates, Fairfield Chemical Carriers, Formosa Marine, Seatrans, Ermefer, Iver ships, UCT Chemical Tankers, TORM and Brostrom Tankers SA, Hoyer, VOGT Tanktainer, United Tank Transport, Bulkhaul, Suttons, Interflow, Leschaco, Dana Nippon Concept and Taby.

The major parcel tanker trade lanes are from the US and Europe to Asia, India, the Middle East and South America. In addition, there is a considerable bilateral trade between the US and Europe. Sea-going transport from the Arabian Gulf to destinations both in the East and in the West is increasing together with the Far East to overseas markets.

5) Parcel Tanker Transportation in Canada

a. East Coast: The ship parcel tanker trade lanes between East Coast of Canada and Europe is basically dominated by SNTG and Odjfell. It major customers are petroleum and chemical companies. The volume of business is estimated to be $10m.

b. West Coast: The ship parcel tanker market in the West Coast of Canada is basically dominated by Tokyo Marine. Unlike the East Coast,

SNTG and Odjfell do not operate on the West Coast-Asia trade lane. The major customers of Tokyo Marine are the petroleum/chemical companies: Shell, Dow and Esso. The estimated volume of business is $100m.

In sum, parcel tankers fall into the group of ship tankers classified as 'other tankers'. These parcel tankers have been recognized as a distinct form of ocean transportation for the carriage of specialty liquids in compartments of varying sizes. The first purpose built parcel tanker was in 1949 and since then, these tankers have grown into a fleet of more than 341 ships today. The four major companies - Odjfell, SNTG, JO Tankers and Tokyo Marine - have a worldwide market share estimated to be in excess of 57%. In Canada, the market share depends on the trade lane. The trade lane between Canada's East Coast and the European Union is dominated by SNTG and Odjfell and the trade lane between Canada's West Coast and Asia is dominated by Tokyo Marine.

III. Regulations Pertaining to the Parcel Tanker Transportation

1) International - The issue of chemical tanker safety was first raised in the international Maritime Organization (IMO) in the mid 1960s as the range of products from the chemical trade increased requiring specialized tanks. A new committee was then formed to consider ship design and equipment and agreed to prepare a code to cover: design criteria, construction and equipment of chemical tankers. The most important regulations relating to parcel tankers are: 1) The Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code later known as IBC Code); and 2) The 1973 MARPOL - Annex II.

In 1970, the Committee drew up an interim recommendation and in October 1971 the IMO Assembly adopted the BCH Code setting out agreed international standards for the carriage and equipment requirements for such cargoes to ensure safe carriage of these substances. These included "... requirements on ship capability for surviving damage and cargo tank location, according to the type of products carried: type I ships would be designed to carry products requiring maximum preventive measures to preclude escape of cargo; type II for products requiring significant preventive measures; and type III covered product requiring a moderate degree of containment. The code gave a list of more than 100 chemicals with the appropriate recommended ship type - based on the evaluation of those chemicals according to a list of specified hazards, including flashpoint, of chemical and health hazards."[6] The code applied to ships built on or after April 12, 1972 and several countries with a significant number of chemical tankers in their fleet implemented the Code into their national

legislation.

The 1973 MARPOL Convention - Annex II was concerned with preventing or minimizing the operational discharge and accidental release of these chemical substances into the sea. The regulations require governments to ensure reception facilities would be available to receive chemical residues. The regulations also recognized the wide diversity in physical and biological properties of the substances discharged and divided them into four categories: noxious liquid substances which present a major hazard; noxious liquid substances which present a hazard; noxious liquid substances which present a minor hazard; and noxious liquid substances which present a recognizable hazard. Other liquid substances which fall outside these four categories were also recognized.

Category A substances can only be discharged into reception facilities and Category B substances can never be discharged in quantities greater than one cubic metre. Areas where it could or could not be discharged were also indicated. Problems of implementation (i.e., complexity in calculation of discharge, providing for reception facilities, and monitoring equipment to measure control) led to important changes to this Annex. In 1985, this Annex was amended: to encourage efficiencies to reduce amount of residues; to adopt simplified procedures for discharge; and to reduce quantities of categories B and C substances discharged. Besides making the IBC Code mandatory, there were also a number of other amendments including revision of the list of Chemical substances in Annex II. This Annex became binding for parties in 1987. Improvements in technology and the need for simplifying the 4 categories have led the IMO to reconsider the amount of minimum discharges of residue in cleaning tanks together with simplifying the categories to 3. On Jan. 1, 2007, Annex II was revised, the last category was eliminated reducing it to three and the maximum discharge was reduced to 75 litres for the three categories from the previous 100 or 300 litres depending on the category.

Other types of more general regulations and regulations to specific products apply. For example, International Convention for the Safety of Life at Sea; Code for the construction and equipment of ships carrying liquified Gases in bulk (1975); and Internt. Gas Carrier Code (1983).

2) Domestic - In Canada, the most relevant regulations pertaining to

parcel tankers are the *Dangerous Chemicals and Noxious Liquid Substances Regulations* (SOR/93-4) made pursuant to the *Canada Shipping Act*. These regulations which entered into force on February 16, 1993 pertain to the safety of carrying dangerous chemicals or noxious liquid substances in bulk and to the prevention of pollution of water by them when discharged from ships or from loading or unloading facilities. They replace and update the *Chemical Carrier (Steamship) Regulations*.

This seven part regulation covers: construction; inspection and certificates; operational requirements and control of cargo operations; noxious liquid substance discharges; transfer operations; foreign ships in respect of which the pollution convention does not apply; and pollution convention. These regulations apply to the carriage of substances by ships within Canadian waters except for the Arctic shipping safety control zones. The geographical application of these regulations is divided into two divisions to incorporate different environmental protection requirements for specific water areas of Canada. Though implementation of these regulations will impose costs on Canadian shipowners and terminal operators of bulk noxious liquid substance they have a beneficial impact. These are: (a) reducing hazards to human health; (b) reducing damage to living marine resources; (c) reducing interference with uses of navigational waterways; and, (d) improving the environment for better recreational facilities and amenities of a aesthetic nature.[7]

In sum, there are two types of regulations pertaining to parcel transportation: international and domestic. The most important international regulations are: the BCH or ICB code; and the 1973 Marpol Convention contained in Annex II. The first sets out agreed international standards for the carriage of equipment for parcel cargoes to ensure safe carriage. The second is concerned with preventing or minimizing the operational discharge and accidental release of these parcel cargoes into the sea. The most important domestic regulation is the *Dangerous Chemicals and Noxious Liquid Substances Regulations.* This regulation pertains to the safety of carrying dangerous chemicals and the prevention of pollution of water by them.

IV. Parcel Tanker Investigation in the US, Europe and Canada

1) United States **-** At the turn of the last millennium (November 22, 2002), the Antitrust Division of the Department of Justice (DOJ) in the

United States began a criminal investigation into anticompetitive practices in the parcel tanker shipping industry. The investigation was prompted in part by an article published in the *Wall Street Journal* reporting that "Stolt-Nielsen has been engaged in 'illegal antitrust activities' that violate U.S. and international law 'against price-fixing and other illegal collusive conduct." This was revealed to the *Journal* by SNTG's former counsel who had been forced to resign from SNTG because he reported the illegal collusive conduct to the company and SNTG refused to cease the conduct.

On January 15, 2003, the Government entered into a Conditional Leniency Agreement with SNTG on January 15, 2003. The Agreement not to prosecute is expressly conditioned on truthfulness of SNTG's representations in the Agreement, and its full and truthful cooperation with the Antitrust Division. Less than three months after signing the Agreement, the Division learned from other sources that SNTG had continued to participate in the conspiracy and on April 8, 2003, it notified SNTG that it was considering whether to withdraw the Agreement.

On June 24, 2003, former Managing Director of Tanker Trading for SNTG, was charged in a one-count criminal complaint with participating in the parcel tanker shipping conspiracy.

A few months later, on September 29, 2003, the DOJ laid charges against Odfjell Seachem AS and two executives (Sjaastad and Nilesen) for participating in an international cartel to allocate customers, rig bids and fix prices on parcel tanker affreightment contracts for the shipment of specialty liquids to and from the United States and elsewhere between August 1998 and November 2002. The accused where charged with violating section 1 of the *Sherman Act*. Section 1 of the Act states:

> Every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is declared to be illegal. Every person who shall make any contract or engage in any combination or conspiracy hereby declared illegal shall be deemed guilty of a felony, and, on conviction thereof, shall be punished by a fine not exceeding $10,000,000 if a corporation, or, if any other person, $350,000, or by imprisonment not exceeding three years, or by both said punishments, in the discretion of the court.

The three elements of this section that must be proven beyond a reasonable doubt are: the conspiracy was formed and was in existence at about or about the time alleged; the defendant knowingly formed or participated in the conspiracy; and the activity which was the object of the conspiracy was within the flow of, or substantially affected, interstate

or foreign commerce.

According to the US DOJ New release (September 29, 2003), the conspiracy was carried out by: 1) attending meetings and engaging in discussions in the U.S. and elsewhere concerning customers for and prices of contracts of affreightment for parcel tanker shipping of products to and from the U.S. and elsewhere; 2) agreeing during those meetings and engaging in discussions to allocate customers and to create and exchange customer lists in order to implement and monitor this agreement; 3) agreeing during those meetings and engaging in discussions not to compete for one another's customers either by not submitting prices or bids to certain customers, or by submitting intentionally high prices or bids to certain customers; and 4) discussing and exchanging prices to certain customers so as to not undercut one another's prices. In other words, to allocate customers, rig bids and fix prices. Odfjell Seachem AS agreed to pay a $42.5 million fine for its role in the cartel, one executive agreed to pay $250,000 and serve 4 months in prison and the other executive agreed to pay $25 000 and serve 3 months in prison.

On April 19, 2004, Jo Tankers and its former co-managing director pleaded guilty to conspiring to eliminate competition on contracts of affreightment in the parcel tanker shipping industry. The former was fined $19.5 million and the latter was fined $75,000 and three months in prison.

On February 6, 2004, SNTG and the former Managing Director of Tanker Trading of SNTG filed individual complaints in the District Court prohibiting the Division from indicting them without obtaining a pre-indictment judicial determination (given the Conditional Leniency Agreement and the Antitrust Division's decision to withdraw the Agreement). Eleven months later, the court permanently enjoined the United States from indicting plaintiffs for any violations of section 1 of the *Sherman Act*. In March 2006, the Court of Appeals for the Third Circuit reversed the District Court decision and, in June 2006, denied petitions for rehearing. Attempts by SNTG and one of its executives to recall and stay the mandate of the Third Circuit failed on August 24, 2006 and the District Court dissolved the injunction against the Antitrust Division. On September 6, 2006, a federal grand jury in Philadelphia returned an indictment against SNTG (i.e. Stolt-Nielsen and its two subsidiaries) and two executives (one of which was the former Managing Director of Tanker Trading of SNTG).

As indicated earlier, the U.S. Justice Department was considering revoking its amnesty agreement with SNTG. It did so and sought criminal indictment against the company. The indictment was dismissed

by a federal judge for the District Court of Pennsylvania on November 29, 2007 on grounds that there was lack of credible evidence that SNTG participated in the customer allocation conspiracy after March 2002. On December 27, 2007, the U.S. Justice Department decided not to appeal the decision of the Court as it respects the role of the Court in making the factual determinations that support the decision.

To date, the inquiry has resulted in fines of $62.35 million against five companies and five individuals. The DOJ said that consumers in the market for international parcel tanker shipping services paid non-competitive and higher prices for parcel tanker shipping, as a result of the conspiracy.

2) European Commission - In February 2003, the European Commission started an investigation into the international parcel tanker shipping industry to determine whether there has been any breach of article 81 of the EU Treaty or article 53 of the EEA. On April 11, 2007, European Union regulators confirmed that they have issued formal charges against several shipping lines. The Commission sent a so-called Statement of Objections to the carriers alleging that they were involved in bid-rigging, price-fixing, allocating customers and exchanging confidential market information in the transport of liquid chemicals. The Commission didn't name the carriers but its officials previously said they had visited the offices of three Norwegian lines, Odjfell ASA, Stolt-Nielsen SA and Jo Tankers, and Tokyo Marine of Japan. The 4 companies account for about 2/3 of the$2.5 billion-a-year deep-sea chemical shipping market.[8]

On May 8, 2008, the European Commission closed its five-year investigation of the inquiry without bringing any charges. The commission said "there was a possibility that the services at stake were indeed tramp vessel services," which would mean they were excluded from regulations governing bulk shipping at the time of the alleged offences, and the commission did not have jurisdiction in the matter. Between 1998-2002, when the alleged offences took place, it was excluded from the European regulation governing shipping. The exclusion was repealed in 2006.[9]

3) Canada - The conspiracy provision in Canada is contained in sections 45(1) to 45(8) of the *Competition Act* (formerly sections 32(1) to 32(7) of the *Combines Investigation Act*. Section 45(1) states:

> "Every one who conspires, combines, agrees or arranges with another person
>
> (a) to limit unduly the facilities for transporting, producing, manufacturing,

> supplying, storing or dealing in any product, (b) to prevent, limit or lessen, unduly, the manufacture or production of a product or to enhance unreasonably the price thereof, (c) to prevent or lessen, unduly, competition in the production, manufacture, purchase, barter, sale, storage, rental, transportation or supply of a product, or in the price of insurance on persons or property, or (d) to otherwise restrain or injure competition unduly,
>
> is guilty of an indictable offence and liable to imprisonment for a term not exceeding five years or to a fine not exceeding ten million dollars or to both.

The basic allegation in this case is that of market sharing. In Oct. 2008, the Competition Bureau reached an agreement with Stolt Nielsen's transportation group resolving the matter. It agreed to pay C$200,000 towards the Bureau's investigative costs to end the investigation, as well as agreeing by federal court order to continue efforts to ensure the company complies with Canadian competition law. It has not admitted wrongdoing, and will not be charged with any violations of the competition law.

In sum, investigations into anti-competitive practices in the parcel tanker shipping were begun by the USA, EU and Canada. The investigation in the US has resulted in fines on two companies of $62.35 million for allocating customers, rigging bids and fixing prices. The investigation in the EU has been dropped due to lack of jurisdiction and the investigation in Canada has been settled with Stolt.

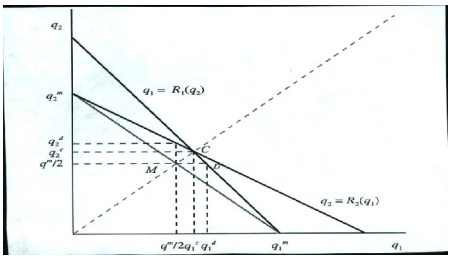
V. Possible Theory Behind the Antitrust Allegations?

The rationale for collusion is that firms have an incentive to coordinate their production and pricing activities to increase their collective and individual profits by restricting market output and raising market price. This is because a firm's profit goes up when it forms a cartel even though competitive firms may be "maximizing their profit".[10] As each firm in the competitive situation ignores the increase in profits to other firms from a reduction of its own output, which it believes to be insignificant since it cannot affect price. In contrast, a cartel is able to capture the benefits of a reduction of output by its members.

Since it may be pointed out that the structure of the parcel tanker market is not of a competitive market structure, the above argument does not apply. Therefore, a situation shall be described where there are only two shipping companies operating on a particular origin-destination route i.e., the market structure is a duopoly. The earliest and perhaps the best known writer who considered this problem was A. Cournot in 1838.

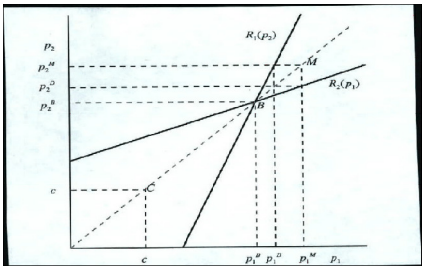
In such a situation, both firms know that they can unilaterally increase their market share and increase their profits by producing more. However, the firms also know that if they aggressively compete for more

market share they will both be worse off as prices will be lower and so will individual profits. Equilibrium in this market, where both firms produce their profit-maximizing output is shown in terms of best response output functions. That is the profit maximizing choice of output of firm 1 for any output produced by firm 2 and similarly the profit maximizing choice of output of firm 2 for any output produced by firm 1. This is shown in diagram 1. The intersection of these two functions at C is the equilibrium output where firms maximize their profits.



Source: Church Jeffrey and Roger Ware, *Industrial Organization A Strategic Approach.*

The monopoly output in the above situation for firm 1 is where firm 2's output is zero and the monopoly output for firm 2 is where firm 1's output is zero. In the diagram, the monopoly outputs are q_1^m and q_2^m. "If the marginal cost functions are the same, $q_1^m=q_2^m=q^m$. ..., if marginal cost is constant, any division of the monopoly output q^m between the two firms will give industry profits equal to monopoly profits. All possible divisions of the monopoly output between the two duopolists is shown by the line segment q_1^m and q_2^m . An equal division of the monopoly output and profit corresponds to point M. ...the Cournot equilibrium is also symmetric, as indicated by point C with equilibrium quantities $q_1^c=q_2^c=q^c$. Monopoly profits will be greater than Cournot industry profits, and 1/2 of monopoly profits are greater than 1/2 of Cournot industry profits. Both firms are better off if the outcome is at M rather than at C."[11]



Source: Church Jeffrey and Roger Ware, *Industrial Organization A Strategic Approach.*

Both firms therefore have an interest in colluding. If they each restrict

their output to half of the monopoly output ($q^m/2$), rather than produce their Cournot quantities, the profits of each will be higher.
If it is argued that firms compete over price (as believed by Joseph Bertrand) rather than quantities as assumed in the above model, the same conclusion is nevertheless arrived at. Equilibrium in this market, where both firms produce their profit- maximizing price is shown in terms of best response price functions. The intersection of these two functions at B is the equilibrium price where firms maximize their profits and the point M is the equilibrium if the two firms collude. This can be seen in the diagram. It is worthwhile noting that at point M, the prices of the two duopolists are higher than at point B, the Bertrand prices. Hence the incentive for the duopolist to price collude.

In either the Cournot or Bertrand case, it is worthwhile noting that the collusive agreement is not sustainable, since either firm will have an incentive to increase its profit by increasing its output or lowering its prices unilaterally (i.e., cheating). The incentive to increase profit also provides a rationale why firms prefer to divide the market by different routes, since there is no incentive to cheat and there is no cost to enforce the agreement. In sum, regardless of the market structure, economic theory indicates that firms have an incentive to coordinate their production and pricing activities to increase their collective and individual profits. By reducing output and raising prices consumer welfare is reduced. It is therefore not surprising that such collusive activities are outlawed in most parts of the world.

VI. Concluding Remarks

Ship tankers can be classified into: crude oil tankers; product carriers and others. Others have been classified into: tank barges; combination carriers; and parcel tankers. These groups can also be classified by their cargoes. Parcel tankers are recognized as a distinct form of ocean transportation for the carriage of specialty liquids in compartments of varying sizes.

The four major parcel tanker companies - Odjfell, SNTG, JO Tankers and Tokyo Marine - have a worldwide market share estimated to be in excess of 57%. The major parcel tanker trade lanes are from the US and Europe to Asia, India, the Middle East and South America. In Canada, the market share depends on the trade lane. The trade lane between Canada's East Coast and the EU is dominated by SNTG and Odjfell and

the trade lane between Canada's West Coast and Asia is dominated by Tokyo Marine.

There are two types of regulations pertaining to parcel transportation: international and domestic. The important international regulations are: the BCH or ICB code; and the 1973 Marpol Con. contained in Ann. II. The important domestic regulation is the *Dangerous Chemicals and Noxious Liquid Substances Regulations.*

The investigation in the US was a result of an article published in the *Wall Street Journal* in 2002. The information was provided to the *Journal* by SNTG's counsel who had been forced to resign from SNTG. The Government entered into a Conditional Leniency Agreement with SNTG and subsequently, Odfjell and Jo Tankers were fined $62m. for allocating customers, rigging bids and fixing prices. Several months later in Feb. 2003, the EU began its investigation into bid-rigging, price-fixing, allocating customers and exchanging confidential market information in the transport of liquid chemicals. On May 8, 2008, the EU discontinued its investigation as it did not have jurisdiction in the matter. In Canada, the Competition Bureau reached an agreement with Stolt Nielsen's transportation, and it will not be charged violations of the competition law. Bid-rigging, price-fixing, and market sharing have been outlawed in most countries. Canadian courts have been extremely critical of the system of rigging tenders and have found these practices to be completely devoid of business ethics. Its denunciation as a criminal act is most apparent because of the deceptive manner in which various schemes such as bid covering, bid-suppression, bid rotation, or market sharing are put into effect. As indicated by the Restrictive Trade Practices Commission, such practices "have no other purpose than to deceive the authority calling tenders."

Endnotes/Bibliography

1. Kumar, S.N., *Tanker Transportation*, Unpublished Paper. 2. p. 21. 3. p. 30. 4. Odfjell Annual Report 2005, p. 79.

5. Newbuildings to the backbone of the 1980's fleet, reorganization of its services have made it truly second to none." (Ken Tree of KTR Maritime writes - Transport, Logistics & Storage). 6. Marpol - 25 years, October 1998, p. 12.

7. See Regulatory Impact Analysis Statement, SOR/93-4, *Canada Gazette Part II*, Vo. 127, No. 1, p. 57. These regulations have not been updated to take account of the revisions to Annex II of MARPOL Convention 1973, which went into effect on January 1, 2007. 8. EU charges chemical carriers with price-fixing, April 11, 2007, www.joc.com

9. "Commission drops shipping cartel probe", *Global Competition Review*, May 9, 2008.

10. Assuming a competitive case. 11. Church and Ware, *Industrial Organization A Strategic Approach*, 2000, p, 245.