

## Structure and Conduct of the Ocean Freight Cargo Container Industry



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**ABSTRACT:** The existence of globalization increases economic activity between countries. International trade activities are divided into two categories: exports and imports. Sea mode transportation requires tools to transport goods safely from the origin country to the destination country. These tools are called containers or cargo containers. The cargo container shipping industry is an industry that provides containers. The purpose of this study are to: 1) prove that the market structure in the ocean freight container cargo industry is oligopoly, 2) analyse the influence of market structure on behaviour in the ocean freight container cargo industry, and 3) prove the existence of market power in the ocean freight container cargo industry.

This research uses time series data from 2010–2022 and cross section data from 100 companies. Data collection was conducted through non-participant observation and interviews. By using secondary data from companies in the global cargo container industry and interviews. Using SCP theory, the analysis techniques used are concentration ratio, HHI, market entry barriers, behaviour, and market performance.

The results of the study found that the cargo container industry market is a moderately low-concentration oligopoly with high market entry barriers. Market structure influences corporate behaviour in the container industry. Market structure and company behaviour affect market performance through market power.

**KEYWORDS:** Shipping Line, SCP Theory, Concentration Ratio, HHI, Market Power

### I. INTRODUCTION

The existence of globalization increases economic activity between countries. Globalization causes all countries to indirectly run an open economic system. Indonesia has adopted an open economy system since 1970. Population growth is also one of the drivers of a country's ability to conduct international trade. The existence of international trade activities makes one country with another country complement each other. International trade activities include exports and imports. Export is the purchase of goods from other countries by companies in the country (Sukirno, 2016: 205). Import is the purchase of goods and services from abroad into a nation under a multilateral cooperation agreement (Benny, 2013).

Indonesia is a maritime country that has more than 10,000 islands, about two-thirds of the territory in Indonesia is in the form of the sea. The transportation sector is part of a system that is globally distributed for both passenger and freight services. Transportation holds an important key to supporting trade distribution activities; on the contrary, trade activities are one of the pillars of the sustainability of the transportation sector. Based on the International Merchandise Trade Statistics (IMTS) in 2010, the mode of transportation recorded in international trade in goods is a means of transportation of goods entering or leaving a country's economic area. Transportation in general is divided into four groups, namely land, sea, and air transportation.

Based on summary data from European Union (EU) statistics on the economic aspects of globalization, the largest mode of transportation in 2020 for the distribution of imports and exports will be sea transportation modes (Eurostat, 2022). The sea transportation mode uses water-area routes. This mode is considered the most effective for a large number of long-distance freight transports. The sea transportation mode is the main choice in international trade activities. According to BPS 2020 data, Indonesian sea mode transportation is still the main mode of transporting imported goods. As many as 98.21 percent of Indonesia's imported goods enter using sea transportation modes (Distribution Statistics, 2021). The increasing use of sea transportation modes created a tool that previously, since the beginning of trade, people used boxes, sacks, barrels, and containers of various sizes to transport goods. Containers of different sizes cause ineffective use of space, and transported goods have a greater potential for damage (Narguney, 2021). The standard cargo container was invented in 1956 and is still widely used today. More than 80 percent of international trade in goods is carried out by sea, and the percentage is even higher for most developing countries (UNCTAD, 2021). About 170 million containers are moving worldwide (Shin, 2021).

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In 2020 (UNCTAD, 2021), there was an increase in market share for non-mainline trade routes to more than 60 percent, and in 2020, demand for container goods increased more than expected. This was driven by the COVID-19 virus that spread throughout the world (UNCTAD, 2021). In UNICEF's brief report, the increase in container demand is the impact of a reduction in international air transport capacity at the global level in 2020 due to closures and restrictions (Meeus, et al., 2021).

Shipping rates in container transportation cause price competition between shipping companies around the world. Some of the world-famous shipping companies include MSC (Mediterranean Shipping Company), APM (AP Moller) – Maersk Company, CMA CGM, COSCO, Hapag-Lloyd, ONE, and so on (Marine Insight News Network, 2022). In competition between world shipping companies, companies have the opportunity to form cooperation between companies or the formation of subsidiaries. In 1990, Maersk Line and Sea Land Services teamed up to serve major routes in North America, Europe, and the Atlantic (Hirata, 2018). Followed by other companies. In 2014, it was shocked by the two largest companies making alliances, namely Maersk and MSC or the 2M Alliance. The two companies are rumoured to be carrying out their alliance until 2025. The 2M Alliance accounts for 34 percent of the total market share in the container industry (ALPHALINER, 2022). Both companies face the brunt of monopoly laws from the Federal Maritime Commission (FMC) and the European Commission (EC). The purpose of shipping companies making alliances is, among other things, to reach a *wider service route*, increase efficiency, and reduce other operational costs.

The market structure in the container industry is believed to be an oligopoly. This is proven through research conducted by (Christa Sys, 2019) and (Panadiotis, et al., 2016), which states that in general, the container shipping industry operates in an oligopolistic market structure. To prove the form of market structure in this industry, researchers use a theoretical approach, namely Theory S-C-P (*Structure-Conduct-Performance*). SCP theory is an approach that can be used to analyse market structure, conduct, and performance in an industry (Hananto, 2018).

A market's structure also affects the price level it offers. In a book written by Weiss (1989), it is stated that a high level of concentration will include a much higher price. (Nugroho, 2020), research found that the more concentrated the market, the easier it will be for a company to set prices in the market. Oligopoly markets with few sellers will find it difficult to compete on price because fellow sellers will offer similar prices. In an oligopolistic market, firms will avoid price competition because it is easily matched by their competitors (Mankiw, 2013). The concentrated market structure causes dominant companies in the market to be able to take advantage of their *market power*. (Charlampowicz, 2018), found that with one company that has a higher level of concentration, the company will have the power to dictate prices in the market. Competition carried out by shipping companies includes cooperation agreements, loyalty programmes, reputation, and so on.

The purpose of the study is to prove the shape of the market structure of the *cargo container ocean freight* industry is oligopoly, how companies behave in this industry, and the power of companies in dictating prices and monopolizing the market in the cargo container industry globally.

## II. LITERATURE REVIEW

### Market Structure

According to Mankiw in the book "Introduction to Microeconomics", a market is a group of buyers and sellers of a particular product or service. An important characteristic is that buyers and sellers meet and create transactions involving price and quantity (Hasibuan, 1994: 107). Market structure shows market characteristics such as the number of buyers and sellers, the state of the product, the level of knowledge of sellers and buyers, and the state of obstacles in the market. The market characteristics of an industry have an important meaning for competition between companies in the market in particular and economic conditions in general (Teguh, 2010). The form of market structure will give rise to different policies for a company. Market structure shows market attributes that affect the nature of competition. Market elements can be known by classifying the level of market concentration, market share, and obstacles (Jaya, 2019). One of the measuring tools in market structure is market concentration, which also describes the magnitude of *market power* in some companies (Bain, 1956; Bird, 1999).

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Table 2. 1 Types of Market Structures

Characteristics	Monopoly	Dominant Company	Oligopoly	Monopolistic	Perfect Competition
Main conditions	One company has an overall market share (100%)	One company without strong competitors (50-100%)	Combined market share of several companies (60-100%)	Many competitors and none of the companies have a market share of more than 10%	More than 50 competitors of which none have a prominent market share
Number of Manufacturers	One	Many	Little	Many	Huge
Entry/Exit Barrier	Very high	High	High	Low	Very low
Product Type	Heterogeneous	Heterogeneous	Homogeneous or Heterogeneous	Heterogeneous	Homogeneous
Determining Power	Very large	Relative	Relative	Small	None
Competition besides price	None	High	High	High	None
Information	Very limited	Simply Open	Limited	Simply Open	Open

Source : Jaya, 2019

### S-C-P Theory (Structure – Conduct – Performance)

The SCP approach was first introduced by economists Edward Chamberlin and Joan Robinson in 1933 and developed into a model by Joe S. Bain in his book "*Industrial Organization Economics*". In this approach, the market environment has a direct and short-term impact on market structure (Bianchi, 2013). Structure – Conduct – Performance (*Theory SCP*) is a study that concerns the relationship between market performance and market structure (Carlton & Perloff, 2015: 268). Market structure consists of factors that determine the competitiveness of a market. Market structure affects market performance through the conduct or conduct of the company. The market structure then has a direct influence on a company's economic behaviour, which in turn affects its market performance. Any feedback occurs in such a way that market performance can affect conduct and structure, or conduct can affect market structure (Lipczynski, 2017; Faccarello, et al., 2016).

### Market Share

Market share is defined as the share of the market controlled by a company or the representation of the sales of a company in the total sales of its largest competitors at a certain time and place (William J.S., 1984; Fitriyanti, 2015: 81). Market share also illustrates a better market structure compared to just looking at the number of competing companies in the industry concerned (Jaya, 1993: 33). Market share is used to determine the level of market power in an industry.

### Entry Barrier

Barriers to entry are barriers for new players looking to enter an industry. According to Bain (1956), defining barriers to market entry is the advantage of companies that have been in the industry first to control prices, so new companies will experience difficulties in the early stages of entering the industry. According to Sumarno and Kuncoro (2001), there are two types of entry barriers: structural barriers and strategic barriers.

### Conduct

According to Greer in his book titled "*Conduct of Industrial Companies*" in 1975, Conduct is the behaviour of a company in determining prices, production levels, products, advertising, and behaviour towards its competitors. The focus of corporate behaviour is how the company reacts to the conditions of its market structure and the interactions of its competitors. The conduct of a company can be seen in how it determines selling prices, product promotion or advertising, coordination of activities in the market, and research and development (Fitriyanti, 2015).

### Market Power

Market power is the ability of firms to set prices profitably above competitive levels (*marginal cost*) (Perloff & Carlton, 2015: 666–677). A firm with substantial market power has the ability to manipulate market prices and thus control its profit margins.

## CONCEPTUAL FRAMEWORK

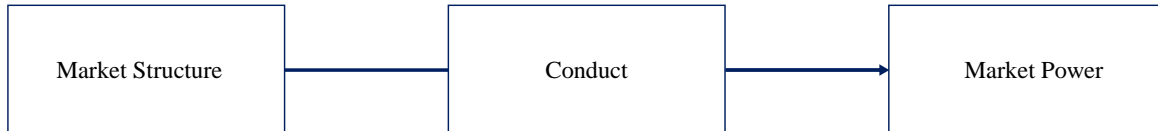
Structure–Conduct–Performance (SCP) theory is a linear relationship by which structure will influence behaviour and beyond. (Arini & Sugiyanto, 2013) in their research that there is a linear relationship between structure, conduct, and performance where structure affects industrial conduct and beyond. The structure of the company affects market performance through the conduct of the company. In an oligopoly market, the price change of a firm will cause rival companies to participate in price

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changes, so there is no reason for the company to change its price level (Sukirno, 2002: 318). (Fitriyanti, 2015), in the results of his research, found that market structure affects market conduct.

Market power is a form of response from the conduct of a company in the market to respond to competition in the business world. (Nugroho, 2020), in research obtained in the telekonomication industry in Indonesia that the more concentrated a market structure is, the easier it will be for a company to set prices in the market. The concentrated market structure causes dominant companies in the market to be able to take more advantage through their market power. Based on the description above, a conceptual framework can be compiled as a basis for determining the hypothesis as follows:

**Table 2. 2 Ocean Freight Container Cargo Industry Structure and Behavior Concept Framework**



### HYPOTHESIS

Based on the introduction and concept framework, there are three hypotheses in this study; 1) The market structure of the cargo container company globally is oligopolistic; 2) The market structure of the cargo container industry affects the conduct of the cargo container industry, and 3) The market structure and conduct of the company affect the market power of the company.

### III. METHODOLOGY

This research is causal-associative, using quantitative and qualitative approaches as complementary data. A quantitative approach is used to prove the shape of market structure and market power based on the S-C-P paradigm. Meanwhile, a qualitative approach is used to examine corporate behaviour in this industry in direct response to market competition. This study used time series data from 2010–2022 and a cross-section of 100 world shipping companies.

#### Data

The data used in this study are primary data and secondary data. Secondary data in the form of company output and inputs, market share, revenue, and container freight rate from the AXS Alphaliner website, the annual report of shipping companies from 2010–2022, Qualitative data in the form of an in-depth interview with one of the experts in a logistics service company.

#### Research Scope

This research limits the container industry analysed based on companies that own cargo containers and container carriers globally. In calculating market performance in the form of market power in the container industry, this study only examines the world's top two shipping companies because the focus of this study is to find out the existence of market monopoly power.

#### Analytic

This research uses a descriptive analysis method that explains the market structure and conduct of the ocean freight container cargo industry globally with SCP theory, which is a model that states that the economic performance of an industry is a function of the behaviour of sellers and buyers associated with the structure of the industry (Bain, 1956; McWilliams, 1993). The stage in testing the industrial structure is to use the market share test, concentration ratio (CR), Herfindahl-Hirschman Index (HHI), and Minimum Efficient Scale (MES) to determine market concentration with the following formula:

#### 1. Market Share (MS)

Market share is information that provides an overview of the total sales of a company to market segments. To calculate the market share, it is formulated as follows:

$$MS_i = \frac{S_i}{S_{total}} \times 100 \dots \dots \dots (1)$$

Remarks:

MS<sub>i</sub> = Market Share X Cargo Container Company (%)

S<sub>i</sub> = Output from the Company (inTEU)

S<sub>Total</sub> = Total Output from the Market (inTEU)

#### 2. Concentration Ratio (CR)

The concentration ratio is the percentage of overall industrial output produced by the largest firms. The CR calculation used in this study uses CR<sub>4</sub>, CR<sub>8</sub>, and CR<sub>20</sub>, which are used to measure the concentration of the four to 20 largest companies in one

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market. The concentration ratio ranges from 0 to 100. For oligopoly markets with low competition, CR is less than 25%, and for very high oligopoly markets, CR ranges from 75–100% (Arianto, 2008).

$$CR = \sum_{i=1}^N Si \dots\dots\dots(2)$$

Remarks:

N = Numbers of companies included

Si = Market Share (%)

### 3. Herfindahl-Hirschman Index (HHI)

The Herfindahl-Hirschman Index is another type of concentration measure. HHI is defined as the sum of the second-power market share of the entire company. According to the Business Competition Supervisory Commission in Indonesia (KPPU), in its merger guidelines, it divides the level of market concentration into two spectrums based on the value of IHL. Spectrum I (low concentration) with a HHI value below 1,800 and Spectrum II (high concentration) with a HHI value above 1,800 (KPPU, 2020). According to the U.S. Department of Justice and FTC, HHI values of 1,500–2,500 are considered to be moderately concentrated, and HHI values greater than 2,500 are highly concentrated (U.S. Justice Department, 2018).

$$HHI = \sum_{i=1}^n Si^2 \dots\dots\dots(3)$$

Remarks:

Si = 1,2,3,.....n (Market share from each company)

N = Numbers of companies included

### 4. Minimum Efficient Scale (MES)

MES is used to calculate market entry barriers, or the ability of new entrants to enter an industry that is approached through company output (Jaya, 2001). The more an industry can produce at the minimum average cost, the more it will discourage new entrants from entering the industry because it is more difficult to compete with old residents who can already produce at a low cost. MES has a value of more than 10%, hence the high market entry barrier (Alistair, 2004).

$$MES = \frac{\text{Average output from the four largest companies}}{\text{Total Output}} \times 100\% \dots\dots(4)$$

Source: (Natalia.dkk., 2012)

### 5. Industry Conduct

Market conduct analysis is analysed qualitatively by looking at efficiency strategies, alliances or collusions, and value-added services carried out by shipping companies around the world.

### 6. Lerner Index (LI)

The Lerner index is used to measure market power (a firm's ability to set prices above marginal costs). Lerner Index values range from 0 to 1. If the value of LI=1, then the monopoly market exists (Pruteanu Podpiera, et al., 2007).

$$LI = \frac{(Pst - MCst)}{Pst} \dots\dots\dots(5)$$

Remarks:

Pst = Ratio of total income to total assets

MCst = Marginal Cost

## IV. RESULTS

### Cargo Container Industry Overview

About 71 percent of the earth's surface is covered with water, or the ratio of oceans to land rounded up to 7:3 (UPI Directory). So it can be concluded that almost the entire world is surrounded by oceans. Hence the importance of sea trade routes. The existence of sea trade routes is needed to carry out export and import trade between countries and meet the needs of each country. Sea trade routes have advantages because they are unlimited in area, have minimal obstacles, and have a larger load capacity of goods than air routes. So that sea trade routes are considered more effective and efficient for exports and imports between countries. To move goods from the country of origin to other countries, or vice versa, tools are needed, namely container ships and container cargo to transport these goods. The importance of this need is that the problem raised in this study is the cargo container industry. Conduct research on companies that own container carriers and cargo containers globally during the period 2010–2022. This research leads to market structure and how the container industry behaves towards market performance in the form of market power owned by companies

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### Variable

#### 1) Output

A firm's output is the amount of goods or services produced in a given period of time that are expended by the firm, society, or government, either for direct consumption or reprocessing for further products. The output of the container industry is displayed in the form of a unit of volume, namely TEU (*Twenty-foot Equivalent Unit*).

Based on the data in Table 4.1, it shows that the output of each container company each year has increased significantly. In 2018, there was one shipping company from Japan, namely ONE (Ocean Network Express). ONE or One Network Express, is a Japanese company that is a consolidation of three companies, namely Nippon Yusen Kaisha (NYK), Mitsui O.S.K. Lines (MOL), and K Line. In mid-2019, the COVID-19 pandemic occurred, which had an impact on all sectors, including one of the economic sectors. The data in Table 4.1 shows that the COVID-19 pandemic has not had an effect on decreasing activity in this industry. This data will then be processed to calculate market share, Minimum Efficient Scale, and Lerner Index.

**Table 4. 1 Global Shipping Lines Companies (inTEUs)**

NO	Company	YEAR												
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1	MAERSK	2.116.300	2.147.831	2.539.090	2.591.101	2.953.110	2.946.590	3.193.142	3.287.236	4.039.434	4.177.168	4.192.742	4.182.551	4.263.788
2	MSC	1.827.450	1.863.449	2.121.747	2.307.964	2.547.894	2.546.181	2.768.750	2.939.142	3.251.245	3.556.429	3.766.049	4.041.145	4.501.626
3	CMA CGM	1.193.582	1.209.530	1.342.190	1.414.388	1.668.086	1.744.887	2.250.692	2.145.378	2.644.276	2.707.961	2.695.863	3.005.922	3.334.615
4	China COSCO	527.675	544.857	717.846	739.736	820.259	839.102	1.532.535	1.642.768	2.812.927	2.930.741	2.938.030	3.004.081	2.873.927
5	Hapag-Lloyd	589.877	596.774	638.338	680.815	982.312	965.888	916.850	966.975	1.590.788	1.684.330	1.717.889	1.772.312	1.760.681
6	Evergreen	609.356	603.766	731.955	720.984	952.328	972.406	957.731	991.306	1.168.976	1.297.258	1.276.568	1.362.385	1.606.167
7	ONE	-	-	-	-	-	-	-	-	1.543.231	1.573.830	1.581.368	1.586.396	1.506.539
8	HMM	282.272	286.875	353.320	339.115	372.037	377.060	437.512	470.505	416.043	408.285	388.526	842.192	818.075
9	YANG MING	319.241	322.091	359.411	365.656	429.131	480.593	582.039	568.582	637.716	634.109	646.630	617.725	708.403
10	ZIM	316.399	322.735	318.180	335.728	331.301	325.439	437.512	295.170	385.982	284.819	292.303	407.748	516.472
TOTAL		14.702.502	14.812.628	15.869.313	17.046.717	19.914.374	19.010.258	20.731.688	20.674.440	22.648.593	23.275.516	24.072.442	24.433.070	26.044.343

Source : ALPHALINER (edited by author)

#### 2) Market Share

The data used to calculate market share in this study came from 100 companies in the industry from 2010 to 2022. This data will then be processed based on the Concentration Ratio (CR) and Herfindahl-Hirschman Index (HHI). There are four companies that will have the largest market share during 2010–2022, as follows:

**Table 4. 2 Market Share from 4 Global Shipping Lines Companies 2010-2022**

NO	COMPANY	Market Share (%)												
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1	Maersk	14,39	14,50	16,00	15,20	14,83	15,50	15,40	15,90	17,84	17,95	17,42	17,12	16,37
2	MSC	12,43	12,58	13,37	13,54	12,79	13,39	13,35	14,22	14,36	15,28	15,64	16,54	17,28
3	CMA CGM	8,12	8,17	8,46	8,30	8,38	9,18	10,85	10,38	11,68	11,63	12,20	12,30	12,80
4	COSCO	3,59	3,68	4,52	4,34	4,12	4,41	7,39	7,95	12,42	12,59	11,20	12,30	11,03

Source : ALPHALINER (edited by author)

#### 3) Revenue

Revenue, according to Lam and Lau (2014: 317), is the gross inflow of economic benefits during the current period that arises in the usual course of activities of an entity when inflows are generated in capital additions other than those related to the contribution of equity holders. In this study, the revenue of a company can be seen from the annual report of each company. This data will then be processed based on the Lerner Index (LI) formula to obtain the calculation of Marginal Cost (MC) from Marginal Revenue (MR).

#### 4) Container Freight Rate

Tariffs are the imposition of taxes or customs duties on goods that cross the borders of a country (Diphayana, 2018). Freight rate is the amount paid to the carrier company for the transportation of goods from the point of origin to the agreed location. The tariff used in container shipping is *Freight All Kinds* (FAK). The tariff used in this research uses USD (\$), where USD is an international medium of exchange. Freight rates are sensitive to world oil prices, conflicts around the world, the acceleration and slowdown of developed country economies, outbreaks, and so on. This data will then be processed to calculate the Lerner Index (LI).

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### Market Structure of the Cargo Container Industry

Market structure analysis aims to identify the level of competition and character that occur in the cargo container market globally. Identification is done using an analysis of market concentration and barriers to market entry.

### Analysis of Market Concentration in The Cargo Container Industry Globally

CR or Concentration Ratio variable in this study uses the market share variable as the basis for calculation. The CR variable is used to look at the market structure of an industry with a certain CR level of this container industry. In this study, the CRn levels used were CR 4, CR 8, and CR20 from 100 companies. The concentration index used is for the period 2010–2022.

The results of Concentration Ratio analysis can be seen in Table 4.3, showing that the cargo container industry globally, based on the average CR value is an oligopoly with a moderate low concentration (Bain; Sutarta, 1995). This shows that the market structure of the cargo container industry has a moderate low concentration level. Market concentration is an indicator of market structure that determines conduct, performance, and the level of competition in the market (Arthathiani, et al., 2020).

**Table 4. 3 Concentration Ratio (CR)**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average
<b>CR4 (%)</b>	39,09	39,92	42,44	41,38	40,93	43,19	47	48,44	56,29	57,45	56,47	58,26	57,49	<b>48,33</b>
<b>CR8 (%)</b>	54,48	54,89	58,21	56,81	56,59	59,65	61,9	63,52	78,1	79,75	78,16	81,03	79,35	<b>66,34</b>
<b>CR20 (%)</b>	82,83	83,14	86,84	83,92	82,61	87,57	84,61	83,7	88,91	89,81	87,93	92,35	90,79	<b>86,54</b>

Source : ALPHALINER (edited by author)

Herfindahl-Hirschman Index (HHI) is a measure to measure the level of market concentration other than CR (Concentration Ratio). To obtain the Herfindahl-Hirschman Index is obtained using market share data squared.

The results of the Herfindahl-Hirschman Index analysis can be seen in Table 4.4, showing that, as well as the CR calculation results, the market structure of the cargo container industry has a moderate low concentration level. Judging from the categories issued by KPPU Indonesia and the U.S. Department of Justice and FTC, the average yield of IHL from 2010–2022 was 776.91%.

**Table 4. 4 Herfindahl – Hirschman index (HHI)**

NO	YEAR	HHI (%)
1	2010	578,63
2	2011	586,04
3	2012	661,12
4	2013	630,26
5	2014	603,22
6	2015	671,33
7	2016	697,38
8	2017	729,39
9	2018	959,46
10	2019	998,06
11	2020	963,14
12	2021	1023,72
13	2022	998,05
<b>Average</b>		<b>776,91</b>

Source : ALPHALINER (edited by author)

### Industry Entry Barriers Analysis

Calculating industry entry barriers using one of the indicators, namely the Minimum Efficient Scale (MES) using data from the four largest companies in the container industry during the research period of 2010–2022, Market entry barriers are used to analyse industry structure, where the number of producers in and out of the market will affect pre-existing producers. In previous studies, it has been found that the market structure in the cargo container industry is oligopoly, so it is proven by calculating industry entry barriers as one of the characteristics of oligopoly markets. The MES value in the cargo container industry of the 4 largest companies in 2010–2022 is shown in Table 4.5.

Based on Table 4.5, it can be seen that the cargo container industry globally has high market entry barriers, with an MES value of 12.01%. Where according to Alistair (2004), the MES value is above 10%, the barrier to entry into the industry is high. The

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cargo container industry has a market entry barrier of 12.01%. This means that new companies have high barriers to entry into the cargo container industry that match the characteristics of the oligopoly market.

**Table 4. 5 Minimum Efficient Scale (MES) 2010-2022**

<b>NO</b>	<b>YEAR</b>	<b>MES (%)</b>
1	2010	9,60
2	2011	9,70
3	2012	10,60
4	2013	10,30
5	2014	10,03
6	2015	10,60
7	2016	11,70
8	2017	12,10
9	2018	14,07
10	2019	14,36
11	2020	14,12
12	2021	14,56
13	2022	14,40
<b>AVERAGE</b>		<b>12,01</b>
Source : ALPHALINER (edited by author)		

### Cargo Container Industry Conduct

Conduct is the behaviour of a company in determining prices, production levels, products, advertising, and behaviour towards its competitors. Market conduct in the cargo container industry globally is analysed descriptively to obtain information on corporate behaviour in the cargo container industry, which is explained through efficiency strategies, alliances or collusions, and value-added services. The analysis data was obtained based on in-depth interviews with sources related to logistics companies and other supporting sources.

#### 1) Efficient Strategy

Logistics actors are looking for ways to maintain logistics efficiency. Just like in the cargo container industry, the container shipping industry is classified as a logistics company. The challenge for logistics companies is an increase in cost burdens such as rising prices for fuel, machinery, and equipment. So in terms of efficiency, it has always been the main focus in this industry. Based on the results of the analysis conducted and the company's efforts to improve service efficiency and costs, the company has the opportunity to cooperate with other container shipping companies by increasing the service routes owned by each company. Cooperation can also fulfil the intention of the company to meet the needs of transport ships so that it will save fuel and operational costs and increase ship productivity. Shipping companies also reduce the cost of replacing container ships with larger capacities so as to minimize costs such as operational costs and fixed costs.

#### 2) Alliance

A strategic alliance is a formal relationship between two or more groups in order to achieve a mutually agreed-upon goal or to independently meet the needs of each organisation. Alliances provide newly created firms and structures with the strength to gain a competitive advantage (Jeffrey, et al., 2008; Casseres, 2008).

The shipping line alliance began in the 1990s, and its members continue to increase their global cumulative market share (Pelindo, 2021). In 2020, the global cumulative market share of shipping line alliances reached 81%, of which the three largest alliances are 2M (Maersk and MSC), Ocean Alliance (CMA CGM, COSCO, and Evergreen), and The Alliance (Hapag-Lloyd, Yang Ming, and ONE) (Pelindo, 2021). Alliances in shipping lines are driven by the need to face competition from major players, expand service areas and ship availability, leverage economies of scale, and lower costs. According to the results of research through interviews, with alliances, companies can use larger ship capacities and combine the contents of the ship with other companies. As a result, companies can save operational costs, and they do not need to reduce prices, but they indirectly reduce the burden of shipping costs or inputs (Hirata, 2017).

The 2M Alliance is the largest alliance in the container industry, namely the alliance of Maersk and MSC companies. This alliance, in 2022, took over 34 percent of the entire market share. In this regard, this alliance has been supervised by the FMC (Federal Maritime Commission) and EC (European Commission), where in the EU regulation on "CBER (Regulation on the



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exemption of consortium blocks (in))" the combined market share operating should not exceed 30 percent (EC, 2009) (Gunwoo, 2003).

Table 4.6 shows some of the alliance events carried out by shipping line companies globally.

**Table 4. 6 List of Shipping Lines Alliances**

Year	Description	Source
1990	Maersk and Sea-Land Start an alliance system	(Hirata,2017)
1994	The Global Alliance (APL, MOL, OOCL, & Nedlloyd)	(Hirata,2017)
1995	Grand Alliance ( Hapag-Lloyd, NYK, NOL, P&O)	(Hirata,2017)
1998	New World Alliance ( APL, HMM, & MOL)	(Hirata,2017)
2000	CKYH Alliance (COSCO, Yang Ming, K-Line, & Hanjin Shipping)	(Lu, et al.,2006)
2011	G6 Alliance (APL, HMM, MOL, Hapag-Lloyd, NYK, & OOCL)	(Hirata,2017)
2014	2M Alliance (Maersk & MSC)	(Maersk Line, 2014)
2014	O3 Alliance (CSG, CMA-CGM, & UASC)	(CMA CGM, 2014)
2014	CKYHE Alliance (COSCO, K-Line, Yang Ming, Hanjin & Evergreen)	(Evergreen, 2014)
2017	Ocean Alliance (CMA CGM, COSCO, Evergreen, & OOCL)	(Hirata,2017)
	The Alliance (Yang Ming, Hapag-Lloyd, & ONE)	

### 3) Value Added Service

Value Added Services (VAS) is an offer of services or services that provide added value for consumers (Iswara & Hermawanto, 2013). (Verwoerd, 1999), Value added logistics is a concept that aims to rearrange the logistics chain in a unique, more integrated way aimed at reducing total costs and improving service quality.

The results of research through interviews found that one container shipping company implements services that provide added value to consumers or users. The company offers value-added services, the main purpose of which is to provide and improve services for consumers. Shipping companies also maintain relationships with consumers, and other examples of shipping companies also maintain good relations with third parties include forwarding services. The importance of maintaining good relations with consumers is one strategy for being able to compete with competitors. To increase added value, shipping line companies expand their business as port operators; this strategy is driven by the potential for increasing the competitive advantage that can be owned by shipping lines. This expansion is carried out through share ownership or subsidiaries. COSCO Shipping has successfully expanded by investing as an operator in 30 port terminals worldwide. Meanwhile, Maersk is expanding through its subsidiary, APM Terminal, which is one of the largest global port operators. This is done with the aim of improving the quality of service at the port.

### Industry Performance in Market Power Practices

Market power according to Lipczynski (2017) and Faccarello et al. (2016), is a state where market structure directly affects the economic conduct of the company, which in turn affects its market performance. There is feedback that occurs in such a way that market performance can affect conduct and structure, or conduct can affect market structure. Market power analysis in the cargo container industry globally is analysed using Lerner Index (LI) calculations. The Lerner Index calculation is used to measure the market power of an industry. By using data from two shipping line companies, namely Maersk Line and CMA CGM. The market power of the two business actors is analysed through the Lerner Index, which will be further analysed in the following discussion.

#### 1) Lerner Index (LI)

Calculating market power is done using one indicator, the Lerner Index (LI). The Lerner index can also be used to observe the behaviour of a company in determining prices. The Lerner Index measures the difference between price and marginal cost

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resulting from exercising that market power. In calculating market power, circumstances are assumed  $MR = MC$ , where the company has maximised profits within a certain period of time.

$$LI = \frac{P-MC}{P}, \dots MR=MC$$

$$MR = \frac{\Delta TR}{\Delta Q} \dots \dots \dots (6)$$

Table 4.7 and Table 4.8 show the results of the calculation of the Lerner Index for Maersk Line and CMA CGM companies. These two companies have dominated the container industry market for 13 years of research. The reason for choosing these two large companies in the container industry is to find out how these large companies use their ability to monopolise the market. The calculation results in Table 4.7 and Table 4.8 get an average Lerner Index value of 0.9999. The lowest LI value was 0.9999, and the highest was 1. In other words, both Maersk and CMA CGM companies have market power.

No	Year	Company	Lerner Index (LI)
1	2010	Maersk	0,9999
2	2011	Maersk	0,9999
3	2012	Maersk	1
4	2013	Maersk	1
5	2014	Maersk	0,9999
6	2015	Maersk	0,9999
7	2016	Maersk	1
8	2017	Maersk	1
9	2018	Maersk	0,9999
10	2019	Maersk	1
11	2020	Maersk	0,9999
12	2021	Maersk	1
13	2022	Maersk	0,9999
Average			0,9999462

Source : Annual Report A.P.Moller -Maersk (Processed)

Table 4. 7 Lerner Index Maersk Line 2010-2022

No	Year	Company	Lerner Index (LI)
1	2010	CMA -CGM	0,9999
2	2011	CMA -CGM	0,9999
3	2012	CMA -CGM	0,9999
4	2013	CMA -CGM	1
5	2014	CMA -CGM	1
6	2015	CMA -CGM	1
7	2016	CMA -CGM	1
8	2017	CMA -CGM	1
9	2018	CMA -CGM	0,9999
10	2019	CMA -CGM	0,9999
11	2020	CMA -CGM	1
12	2021	CMA -CGM	0,9999
13	2022	CMA -CGM	0,9999
Average			0,99994615

Source : Annual Report CMA-CGM Group (Processed)

Table 4. 8 Lerner Index CMA CGM 2010-2022

## Market Structure of the Cargo Container Industry Influencing the Conduct of the Cargo Container Industry

The hypothesis in the study states that the market structure of the cargo container industry influences the conduct of the cargo container industry. Conduct is a direct response to a market structure (Carlton & Perloff, 2015: 268). The results of the container industry analysis show that this industry belongs to the oligopoly market type with high barriers to entry. Barriers are complex, and large barriers can strengthen the market power of a dominant firm. New competitors or old competitors with a small market share will find it difficult to operate. So that in this market, the conduct of a company to win the competition or to strengthen its business. The shipping lines alliance in 2020 contributed a cumulative market share globally reaching 81%. Where the purpose of making alliances is to expand service routes, strengthen bargaining power, and save operational costs. According to Mereket et al. (2018), a global shipping line alliance that has an impact on container transportation can reduce unit costs and cause competition in the concentrated market.

Companies, in the face of competition, offer value-added services to consumers. The Company offers and improves services for consumers or customers. Contracts or agreements between providers and consumers mostly use long-term contracts because consumer satisfaction is needed and companies need to maintain their reputation and good image with consumers. The Company also maintains good relations with third parties, namely forwarding parties. Another effort made by shipping companies is to expand their business as port operators. This expansion is carried out through share ownership or subsidiaries. COSCO Shipping invests as an operator in 30 port terminals around the world. Meanwhile, Maersk is expanding through its subsidiary, APM Terminal. These efforts are carried out with the aim of increasing added value by increasing control over the quality of service at the port. Non-price competition in the container shipping company market can be said to be very fierce due to the existence of alliances between companies, the added value of each company, and the company's reputation.

## Market Structure and Conduct of the Company Affect the Market Power of the Company

Another hypothesis in the study states that the market structure and conduct of the company affect its market power. In the s-c-p paradigm, market performance is a response to the conduct of companies in the market; therefore, to measure performance in this industry, it is done by measuring the market strength of two giant container companies. The Lerner Index takes into

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account the market power of a company. The calculation of the Lerner Index gets a value of 0.9999, meaning that large companies such as Maersk and CMA CGM have market power, with the average Lerner Index for 2010–2022 being 0.9999 or 1. In other words, the average Maersk and CMA CGM company is able to set a price higher than its marginal cost of 99.99%.

Market power in this industry is associated with high barriers to market entry, as shown by the calculation of the Minimum Efficient Scale (MES), which gets a result of 12.01%. This means that new companies face high barriers to entering the container industry. Where new companies must be able to produce output above 12.01% or 2,226,102 TEU (12% of 26,735,484 TEU) to survive in the container industry. The three major companies, Maersk Line, MSC, and CMA CGM, have a market share of 47% (in 2022) of the total market share. However, the study found that while both giants have the ability to dictate prices, they do not have the ability to dictate prices in the global market. This is in accordance with research conducted by Matsuda et al. (2021) and Hirata (2018), who found that the container shipping market does not have the ability to dictate prices and does not have a monopolistic nature. The results of the analysis of the concentration of the cargo container industry show that this industry has a low concentration.

Alliances between container shipping companies are sometimes suspected of creating market forces or monopoly effects. However, research conducted by Hirata (2017) shows that alliances do not inhibit competition, but alliances have the goal of lowering unit operating costs so as to emphasise the marginal costs of container shipping companies. The relationship between MSC and Maersk is not as solid as other alliances. 2M VSA refers to a ship-sharing agreement and represents a lower level of cooperation compared to "Alliance." MSC and Maersk only deploy 24% and 39% of each fleet to be operated together, which is lower than other alliances (KMI, 2022).

The results of the study show that the freight rate is determined by the world economy. Events that occur in the world, such as plagues, wars, and the policies of each government. Supply and demand, economic slowdowns, and economic accelerations that occur in major countries will affect growth in this industry. The policy applied to container shipping companies recently is the green fleet. In Hirata's research (2017), fuel shows an increased relationship with freight rates.

**Table 4. 9 Conclusions**

Theory	Purpose	Results	Conclusions	Hypothesis		
S	Structure	Proving the market structure of the cargo container industry is an oligopoly	Using CR, HHI, and MES indicators	CR4 = 48,06%	Type IV: Low concentration oligopoly	High market entry barriers and fierce non-price competition give rise to corporate behaviours in the cargo container industry: 1) efficiency strategy, 2) Alliance, 3) VAS
				CR8 = 65,98%		
				CR20 = 86,14%		
				HHI = 776,91 %		
C	Conduct	Analyse the behaviour of cargo container industry companies.	Using interview methods and associated with high barriers to market entry.	MES = 12,01%	Oligopoly with fierce competition	The company increased its market share with an alliance strategy of cooperation that led to an increase in market power, especially for large companies. However, due to the low concentration, the market power of companies in the cargo industry does not cause a monopoly effect.
				1. Efficiency Strategy		
				2. Alliance or Collusion		
P	Performance	Proving the existence of market power in the cargo container industry	Using the LI indicator	LI = 0,9999 / 1	Both major companies in the cargo container industry have market power but haven't used it to set prices.	
				Maersk Line = 0,9999		
				CMA CGM = 0,9999		

Source : SCP Theory (Joe S.Bain)

## V. CONCLUSIONS

The results of the analysis show that the market structure of the cargo container industry globally proved to be oligopolistic. The results of this study are in accordance with the calculation of concentration ratio (CR), Herfindahl-Hirschman Index (HHI), and market entry barriers using the Minimum Efficient Scale (MES) indicator in accordance with the characteristics of oligopoly markets.

The market structure of the cargo container industry influences the conduct of companies in the cargo container industry. Using the s-c-p paradigm, the results show that market entry barriers and high competition influence the conduct of companies in direct response to the market structure of the cargo container industry.

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The market structure and conduct of the company influence its market power in the cargo container industry globally. The calculation results show that both giant companies in the cargo container industry have market power in this industry, using the Lerner Index (LI) calculation. Two companies (Maersk and CMA CGM), despite having market power, do not use their ability to dictate prices in the market. Market structure affects market performance through the conduct of firms (s-c-p theory). Shown by alliances between companies to develop the company's market share.

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