

A Study on the Relationship between National Controlling Fleets and the Managerial Performance of Ship Management Companies in Korea

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Abstract : This study investigates the relationship between national controlling fleets and the managerial performance of ship management companies in Korea. As industries clearly show interrelations between upstream and downstream entities, it is likely that the managerial performance of ship management companies in Korea is affected by the size of national fleet. Therefore, the present study analyzes the impact of Korean fleet size on the growth and the profitability of ship management firms. To this end, the performances of 10 major ship management companies in the period from 2012-2022 are examined through panel data regressions. The results indicate that the size of the national fleet has a positive impact on growth in both the assets and the sales of ship management companies. Specifically, the size of the Korean-flagged fleet is the most crucial factor, while that of the foreign-flagged fleet has no significant effect. In stark contrast to the findings regarding growth, the size of national fleet is found to have no significant impact on the profitability of ship management companies. This study's findings are expected to provide valuable implications informing both the managerial decision-making of ship management companies as well as policy-making for shipping and its related industries.

Key words : national controlling fleet, ship management, growth, profitability, Korean-flagged fleet

1. Introduction

It is widely agreed that survival of a shipping company depends on its ability to adapt itself into ever-changing business environment. Especially, as ESG (Environmental, Social, Governance) has been emerging as a buzzword of the shipping industry in recent few decades, shipping service providers have to optimize their business operation amid the trade-off between keeping safety of crews and hulls and minimizing the costs.

While the traditional A-to-Z model of the shipping business suggests that a shipping company owns, manages, operates and maintains its fleet, it is observed in recent years that players in the shipping industry tend to be specialized into a certain sector. The most prominent trend of specialization in the shipping industry is the separation of owning and operating ships with emergence of ship-owning companies. In addition, another eye-catching trend is outsourcing management of ships into ship-management specialists. As of 2018, 25% of world fleets are managed by ship management companies and the vast majority of the market share are occupied by top 10

players(Ministry of Oceans and Fisheries, 2019).

Korea is not an exception to this trend and the adoption of Ship Management Industry Development Law in 2012 plays a pivotal role in fostering the ship management industry. According to the Korea Maritime Institute (2018), attracting one foreign-flagged ship into domestic ship management companies can create 25 on-board and 5 land operation jobs. However, the growth of the ship management industry in Korea seems to face deadlock while the number of companies has reduced from 420 in 2017 to 369 in 2022 (Korea Ship Managers' Association, 2023). In similar vein, the number of ships under the specialized ship management service has also decreased from 1,988 to 1,969 during the same period.

Against this background, a stream of research suggests the ways how the Korean ship management industry gains its competitiveness edge(Lee and Yeo, 2006; Ryoo et al., 2008; Shin, 2018). Among a variety of factors affecting the ship management industry, this study pays particular attention to the size of national controlling fleets of Korea. Specifically, this paper highlights the impact of national controlling fleets on managerial performance of Korean ship

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management companies. Given the inter-related nature between the shipping and the ship management industries, it is likely that the size of national controlling fleets has a significant impact on the sales and the profits of ship management companies.

The rest of this study is organized as following: Section 2 provides review of previous literature on ship management industry in Korea. Section 3 describes the dataset and the methodologies employed in this study. Section 4 presents the empirical results. Finally, Section 5 discusses the findings in this study and concludes.

2. Literature Review

A strand of research focuses on the ways to enhance the ship management industry in Korea. Ryoo et al.(2008) suggests some revisions in related laws and regulations. Specifically, they argue amendments in regulations in crew management. In addition, Lee and Yeo(2006) recommend the expansion of the business area of ship management companies by law revisions. Lee et al.(2010) analyze factors affecting the competitiveness of ship management companies. The results of analytic hierarchy process indicate that human resources management for both shipboard and land is the primary factor for ship management companies' competitiveness. Shin(2018) performs SWOT analysis and finds five ways of competitiveness enhancement of the ship management industry: perceiving the importance of the ship management industry; enhancing quality of shipboard crew; alternating business organizations centered on ship management; preventing excess competition among ship management companies; finally, benchmarking leading ship management companies overseas. In addition, Shin(2014) examines the applicability of relationship market strategy into ship management business.

Some studies highlights international competitiveness of the Korean ship management industry. Cho et al.(2003) examine international competitiveness of ship management subsidiaries of Korean shipping companies by comparing with multinational ship management specialist firms. The results present that domestic ship management companies lack competitiveness in both price and non-price factors. Park and Kwak(2010) analyze the rise and fall of the Japanese ship management industry and provides some lessons for the Korean ship management industry. Han(2014) suggests the ways to enter into the Japanese

ship management market, specifically targeting the market for Japanese ship-owning companies.

The review of previous literature on the ship management industry reveals several significant research gaps. Especially, it is obvious that previous studies fail to investigate what factors affect managerial performance of ship management companies. Therefore, this paper pays particular attention to the size of national controlling fleets of Korea and its impact on business performance of ship management firms.

3. Data and Methodology

Managerial performance of ship management companies are measured from accounting information in financial statements(statement of financial position and income statement). However, there are only 10 ship management companies of which accounting information is publicly available for the period of 2012-2022. Further, there are missing observations for some companies during the sample period for the reasons of mergers or new starting businesses. Therefore, as many as 78 observations for financial information are estimated in this study.

The Bank of Korea, the central bank, publishes Financial Statments Analysis on a annual basis and there are three major managerial performance indicator groups: growth, profitability and stability. Among them, this study employs growth and profitability as managerial performance indicators of ship management companies because those two are likely to be affected by the size of national controlling fleets.

While growth is measured in sales growth and assets growth, profitability is measured in operating margin and net profit margin, respectively, as following:

$$Sales\ Growth = \frac{Sales_t - Sales_{t-1}}{Sales_{t-1}}$$

$$Assets\ Growth = \frac{Assets_t - Assets_{t-1}}{Assets_{t-1}}$$

$$Operating\ Margin = \frac{Operating\ Profits_t}{Sales_t}$$

$$\text{Net Profit Margin} = \frac{\text{Net Profits}_t}{\text{Sales}_t}$$

Table 1 shows the average of growth and profitability indicators for the period of 2012–2022. Since growth indicators are calculated from the observations for previous years, statistics for those indicators are shown only from 2013.

Table 1 Annual average of managerial performance of Korean ship management companies(2012–2022)

Year	Sales Growth		Assets Growth		Operating Margin		Net Profit Margin	
2012	-	-	-	-	-1.00%	(5)	-2.10%	(5)
2013	8.67%	(5)	6.46%	(5)	-0.06%	(5)	-2.08%	(5)
2014	-7.60%	(5)	2.66%	(5)	7.27%	(5)	5.85%	(5)
2015	0.44%	(5)	6.35%	(5)	6.17%	(5)	4.36%	(5)
2016	-23.19%	(5)	-1.51%	(5)	4.56%	(7)	-8.30%	(7)
2017	24.85%	(7)	-4.90%	(7)	6.74%	(8)	5.47%	(8)
2018	-3.62%	(8)	16.51%	(8)	5.21%	(8)	5.16%	(8)
2019	16.79%	(7)	24.39%	(7)	3.38%	(8)	1.64%	(8)
2020	14.37%	(8)	9.22%	(8)	6.91%	(9)	6.21%	(9)
2021	16.08%	(9)	23.42%	(9)	6.69%	(9)	7.64%	(9)
2022	22.09%	(9)	19.56%	(9)	6.43%	(9)	10.06%	(9)

Note : Numbers in (.) are the numbers of observations.

Source : Financial statements of individual ship management companies

To investigate the impact of the size of controlling fleets, we first collected the dataset of the national fleets size of Korea(Fleet) in terms of the number of ships (No) and the sum of deadweight ton (DWT in thousand), respectively. In addition, we also divided the national fleets size into two parts: namely, the Korean-flagged fleets(Korean) and foreign-flagged fleets(Foreign). The two sub-divisions are also collected in terms of No. and DWT., respectively. Furthermore, we employ some macroeconomic indicators as control variables. These are the interest rate for government bonds(Bond, %), foreign exchange rate with regard to US dollar(FX, Won/Dollar) and gross domestic product of Korea(GDP, billion Won). Table 2 provides the

descriptive statistics for independent variables.

Table 2 Descriptive statistics for independent variables

Variable		Mean	Median	Max.	Min.	St. Dev.
Fleet	No	1,633	1,627.5	1,672	1,595	23.7
	DWT	86,296	85,261	99,227	79,517	6201.5
Korean	No	721	721	742	693	15.3
	DWT	14,082	13,941.5	15,851	11,374	1369.0
Foreign	No	912	908	952	895	16.1
	DWT	72,214	70,746.5	83,662	66,986	5744.5
Bond		1.8	1.6	2.7	0.8	0.7
FX		1,145.35	1,138	1,292	1,053.2	63.9
GDP		1,830,364	1,866,945	2,161,774	1,500,819	214,839

Sources : National Statistical Office for Fleet, Korean and Foreign; Bank of Korea for Bond, FX and GDP

The impact of the size of national controlling fleets on managerial performance of Korean ship management companies is estimated in pooled regressions, a kind of panel data analysis as following:

$$\text{Performance}_{i,t} = c_t + \text{Fleet}_t + \text{Bond}_t + \text{FX}_t + \text{GDP}_t + \epsilon_t$$

where $\text{Performance}_{i,t}$ is the managerial performance of ship management company i at year t in terms of sales growth, assets growth, operating margin and net profit margin, respectively; Fleet_t is the size of national controlling fleets at year t in terms of No and DWT, respectively.

4. Empirical Results

Table 3 presents the estimation results for sales growth. As seen in the result of Model 4, the size of Korean-flagged fleets in terms of DWT has a positive impact on sales growth of ship management firms and it is significant at 5% level. However, there are some counter-intuitive observations in results for sales growth. The size of national controlling fleets and foreign-flagged fleets have negative and statistically significant impact on sales growth.

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Table 3 Regression results for sales growth

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Fleet (No)	-5.188 ** (-2.436)					
Fleet (DWT)		-0.257 (-0.311)				
Korean (No)			-0.117 (-0.061)			
Korean (DWT)				1.242 ** (2.526)		
Foreign (No)					-4.269 ** (-3.014)	
Foreign (DWT)						-0.800 (-1.076)
Bond	0.073 (1.132)	0.080 (1.181)	0.077 (1.140)	0.077 (1.201)	0.084 (1.333)	-0.800 (-1.076)
FX	0.293 (0.355)	-0.052 (-0.062)	-0.074 (-0.087)	-1.477 (-1.509)	0.265 (0.331)	0.085 (1.276)
GDP	0.376 (0.842)	-0.969 (-0.499)	-0.817 (-0.430)	0.935 (0.484)	0.596 (0.326)	-1.142 (-0.603)
C	0.075 (0.379)	0.124 (1.311)	0.112 (1.291)	0.053 (0.614)	0.056 (0.674)	0.149 (1.605)
Adj. R ²	0.062	-0.024	-0.026	0.068	0.103	-0.007

1) *** and ** denote the statistical significance at 1% and 5%, respectively.

2) Values in (.) are t-statistics

Table 4 offers the estimation results for assets growth of ship management companies. All coefficients for the fleet sizes are positive and those for national controlling fleets in terms of DWT and Korean-flagged fleets in terms of number are statistically significant at 10% level.

Table 4 Regression results for assets growth

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Fleet (No)	3.076 (1.491)					
Fleet (DWT)		1.403 * (1.847)				
Korean (No)			2.988 * (1.693)			
Korean (DWT)				0.735 (1.540)		
Foreign (No)					1.036 (0.729)	
Foreign (DWT)						1.062 (1.531)
Bond	0.047 (0.749)	0.032 (0.510)	0.056 (0.895)	0.043 (0.697)	0.042 (0.669)	0.033 (0.531)
FX	-0.083 (-0.104)	-0.019 (-0.024)	-0.044 (-0.056)	-0.687 (-0.723)	0.054 (0.067)	0.217 (0.276)
GDP	-1.418 (-0.781)	0.056 (0.032)	-1.022 (-0.583)	0.340 (0.182)	-1.050 (-0.572)	-0.288 (-0.163)
C	0.159 * (1.937)	0.074 (0.859)	0.135 * (1.688)	0.101 (1.212)	0.150 * (1.793)	0.088 (1.020)
Adj. R ²	-0.005	0.013	0.005	-0.003	-0.032	-0.003

1) * denotes the statistical significance at 10%.

2) Values in (.) are t-statistics

Table 5 and Table 6 show the results for operating margin and net profit margin, respectively. However, there is no statistically significant results for both profitability

indicators.

Table 5 Regression results for operating margin

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Fleet (No)	-0.157 (-1.457)					
Fleet (DWT)		-0.145 (-1.565)				
Korean (No)			-0.057 (-0.106)			
Korean (DWT)				0.017 (0.112)		
Foreign (No)					-0.071 (-1.509)	
Foreign (DWT)						-0.094 (-1.545)
Bond	0.006 (0.795)	0.007 (0.313)	0.009 (0.394)	0.009 (0.403)	0.006 (0.266)	0.006 (0.296)
FX	-0.010 (-0.608)	-0.001 (-0.003)	-0.041 (-0.147)	-0.064 (-0.197)	-0.014 (-0.052)	-0.024 (-0.089)
GDP	0.170 (0.279)	0.052 (0.085)	0.145 (0.235)	0.169 (0.255)	0.159 (0.262)	0.097 (0.160)
C	0.048 * (1.720)	0.056 * (1.947)	0.045 (1.591)	0.044 (1.513)	0.048 * (1.733)	0.053 * (1.890)
Adj. R ²	-0.020	-0.016	-0.050	-0.050	-0.018	-0.017

1) * denotes the statistical significance at 10%.

2) Values in (.) are t-statistics

Table 6 Regression results for net profit margin

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Fleet (No)	-0.140 (-0.793)					
Fleet (DWT)		-0.133 (-0.878)				
Korean (No)			0.799 (0.922)			
Korean (DWT)				0.215 (0.872)		
Foreign (No)					-0.068 (-0.875)	
Foreign (DWT)						-0.092 (-0.923)
Bond	0.051 (1.421)	0.052 (1.453)	0.058 (1.616)	0.052 (1.460)	0.051 (1.421)	0.051 (1.439)
FX	-0.275 (-0.608)	-0.266 (-0.588)	-0.362 (-0.797)	-0.536 (-1.028)	-0.278 (-0.615)	-0.286 (-0.636)
GDP	-0.347 (-0.349)	-0.455 (-0.455)	-0.414 (-0.417)	-0.033 (-0.031)	-0.033 (-0.031)	-0.416 (-0.418)
C	0.053 * (1.155)	0.060 (1.279)	0.047 (1.022)	0.040 (0.853)	0.053 (1.167)	0.058 (1.261)
Adj. R ²	-0.011	-0.009	-0.008	-0.010	-0.010	-0.008

1) Values in (.) are t-statistics

5. Conclusion

This paper examines the relationship between the size of national controlling fleets and managerial performance of ship management companies in Korea. To this end, managerial performance of major 10 ship management companies are measured in sales growth, assets growth, operating margin and net profit margin, respectively, for the period 2012–2022. The empirical results estimated in pooled regressions generally indicate that the size of national

controlling fleets has a positive impact on growth of ship management companies, while there is no significant impact for profitability. Especially, the positive impact on growth is largely driven by the size of Korean-flagged fleets.

The findings in this study offers some important implications both for managerial decision-making policy-making for the ship management industry. Specifically, the results indicate that the Korean ship management industry has successfully achieved growth in size, but not in profitability. This result implies that ship management companies of Korea should expand their area from the current technical management based business model to commercial management including sales & purchase, insurance, finance, accounting and consulting.

Despite the valuable findings, this paper has some limitations that call for further research in the future. Foremost, the findings in this study are based on only 10 major ship management companies in Korea. As there are as many as slightly less than 400 ship management companies running their business in Korea, it is likely that research in this area can benefit from more ample number of observations. Moreover, distinction among ship management companies with different business models can offer some other valuable implications.

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