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## Article

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## Original Article

## Analysis of the preference on type of retirement pension for the seafarers in Korea

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## ABSTRACT

The shortage of seafarers continues in the global shipping market. In particular, the retention of skilled officers has not been maintained. One of the reasons why the number of officers working on merchant ships is because of the working conditions onboard the ship. For instance, there are work-life balance, contractual employment, high workload and stress levels, insufficient shore leave, and career progression, and so on. Therefore, some public system is required for the seafarers to prepare for a stable life after they leave a ship while working on the ship to relieve anxiety. Among the many ways, the seafarer's retirement pension system is a practical and effective way to ensure a stable life for seafarers. The retirement pension system can be applied differently depending on the characteristics of the employees and companies that are subscribers, and their effects can also be different. So, in this study, we are intended to analyze what type of retirement pension seafarers prefer in Korea. Retirement pension is generally classified into defined benefit (DB), defined contribution (DC) and individual retirement pension (IRP). To survey the seafarers' preference on retirement pension by type, six hypotheses were established using company variables and seafarer variables. Company variables include the type of business and the number of seafarers employed by shipping company while seafarer variables include the service term, age, type of duty (ship's officer, sailor), and annual wage of the seafarer. To verify the established hypotheses, the survey of the seafarers who are currently employed by the shipping company was carried out. A cross-tabulation analysis among the statistical analysis approaches was performed and the chi-squared statistic was calculated to validate the hypotheses. Consequently, the preference varied depending on the service term and age of the seafarers. That is, the shorter the service term and the younger, individual retirement pension which allows personal asset management was preferred while those who have longer service term and older-age tended to prefer defined benefit. The outcome of this study is expected to be useful for the shipping company to design the retirement pension system for seafarers. Ultimately, the introduction of a seafarer retirement pension system will contribute to the influx of skilled crews, the competitiveness of the shipping company, and reduced marine accidents.

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## 1. Introduction

Seafarers play an important role to take charge of the works relating to ship operation in the shipping industry and fishing industry. But, the problem of seafarer shortage has been raised continuously from the past in the global shipping market. For

example, in the early 1970s, there was a severe shortage of seafarers in the traditional maritime nations and the owners recruited seafarers from the Far East (Moreby, 2004). According to the Manpower report 2015, there was a shortage of 16,500 officers in 2015, with 92,000 expected in 2020 and 147,500 in 2025 (BIMCO & ICS, 2015; Li & Wonham, 1999). Especially, ship officer is unique sources of maritime professional land-based positions. Therefore, seafarers are an important part of advancing the land and supporting the shipping industry in addition to the operation of ships (Alderton & Winchester, 2002).

One of the reasons for the lack of officers working on merchant ships is the working conditions onboard the ship. The poorer work environment than land service, more and more seafarers tend to

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evade working on the ship which has to threaten the constant growth of the shipping and fishing industry. Seafarers, unlike the workers on land duty, work in a particular environment (Lee & Lee, 2017, 2017b), being exposed to the marine environment at all times. For instance, the work environment of seafarers typically involves time-zone crossing, noise, heat, and motion. Also, seafarers are required to sign long-term contracts with shipping companies specifying the number of months or weeks that they must remain on board, which implies a lengthy separation from their families and society (Chung, Lee, & Lee, 2017). Employees voluntarily leave the organization for reasons either personal such as family changes, further training, and new job offer or organization with unfair treatment, moral issues (Papachristou, Stantchev, & Theotokas, 2015; Heather, 2004). In the case of Korea, Korean seafarers are on board ships, fishing vessels, and merchant ships of foreign nationality. In 2000, the number of seafarers employed was 52,172, but in 2018, the number decreased to 34,751. The number of Korean seafarers working on merchant ships decreased from 52,463 in 2000 to 40,058 in 2018, and the number of Korean seafarers working in overseas employment ships declined from 6372 in 2000 to 2956 in 2018. On the other hand, the seafarers for coastal shipping continued to rise and fall slightly from 8016 in 2000, but 8153 were on board in 2018 (KOSWEC, 2019). Also, the employment of foreign seafarers increased due to the shortage of Korean seafarers, and nationality is also multicultural with Myanmar and Indonesia (Park, 2016).

The wage of the seafarer is relatively higher than those on land duty. However, as recruiting through a shipping management agency is increasingly growing, a short-term employment contract becomes dominant. Recruiting through shipping management company contributes to a higher turnover rate and lower severance pay, making it difficult for the seafarers to plan for their later years.

The International Labour Organization adopted the Seafarers' Pension Convention in 1946 to ensure the retirement of seafarers, which went into effect in 1962 and was ratified by 13 countries around the world (ILO, 1946). Countries that ratified the convention include Algeria, Argentina, Bulgaria, Djibouti, Egypt, France, Greece, Italy, Lebanon, Netherlands, Norway, Panama, and Peru. Some maritime countries such as the United States, Finland, New Zealand, Germany, and Australia which have not ratified the convention have set up and implemented separate pension plans. For instance, in the case of Finland, the Seafarer's Pension Fund was established to enact the Seafarer's Pension Act in 1956. The U.S. has adopted the Seafarers' Pension Plan, New Zealand's Maritime Retention Scheme, Germany's Seafarers' Special Fund and Australia's Seafarers Retention Fund to protect stable old-age lives after the retirement of their country seafarers.

In the case of Korea, Korea has not ratified the ILO's Seafarers' Pensions Convention and does not have any pension system for Korean seafarers. The Korean government thus recognized the need for establishing the institutional foundation in preparation for the later life of the seafarers to encourage them to devote themselves to their works in the long term. The Ministry of Maritime Affairs and Fisheries of Korea began pushing ahead with the retirement pension for the seafarers in 2013 and established the basic plan and then organized the "Labor-Management-Government Committee" in January 2014 to design the pension system for the seafarers (MOF, 2014). Viewing the system, severance payment in [Seafarers Act] will be converted to the pension and contribution jointly from the government, labor and management will create the incentive pay. Such a new retirement pension system was proposed in September 2016, which however has yet to pass the deliberation of the Korean National Assembly's Agricultural and Fisheries Committee.

The seafarers must prepare for a stable life after they leave a ship while working on the ship to relieve anxiety. There are many

ways, but the most realistic and effective of them is to introduce a seafarer retirement pension system. By ensuring a stable life for seafarers through the system, the crew job needs to be attractive and the working environment needs to be improved.

South Korea has introduced and implemented a retirement pension system for companies since 2005. However, there have been few cases in which the government introduced the retirement pension system to seafarers working for shipping companies.

The choice of a retirement pension system may be applied differently depending on workers and companies, and the effect may be different. Therefore, it is important to choose an appropriate retirement pension system depending on the worker and companies who are subscribers. Shipping companies need to choose what kind of pension to retire from the seafarers. In this study, the preferred retirement pension system for seafarers is examined to analyze the differences depending on the type of business of the shipping company, the working period of seafarers, age, and rank.

The research can be used by shipping companies in the future when they design the retirement pension system for seafarers, and ultimately attract talented crews. This is expected to contribute to strengthening the competitiveness of shipping and reducing maritime accidents.

As aforementioned, the studies were mostly on the problem with the retirement pension system for ordinary businesses and how to promote it but the study on seafarer's retirement pension was very few. This study thus focuses on retirement pension system for the seafarers, particularly for the aged and shipping companies which have employed them and are intended to propose the solution based on an empirical study on the benefit of the retirement pension system by type for the shipping companies which will introduce the pension system in Korea.

For more clarification, we structure our paper as follows: Research gaps are identified through a review of relevant studies in Section 2. In Section 3, we describe the retirement pension system in brief. In Section 4, we establish a model for analysis and verify the validity of the model. Finally, we offer our result of the analysis, and then conclude the study and present development for further research in Section 5.

## 2. Literature review

### 2.1. Drivers and barriers for retention of seafarers

Bhattacharya (2015) studied the relationship of engagement with retention of seafarers and also identified the driver and barriers of retention. He summarized the barriers to retention: poor human resource (HR) practices, work-life balance, contractual employment, poor shipboard working condition, high workload, and stress levels, insufficient shore leave, lack of shore support, career progression, and isolation from friends and families. On the other hand, the drivers of retention are workload, valued by the company, pay, and benefits, fair process, employment security, training, teamwork and autonomy, a caring organization with no blame culture, career advancement, recognition of work, work/life balance, adequate work resources, and involvement in decision making. Especially, he identified the QoSL (Quality of Shipboard Life) as the strongest driver predictive of retention and suggested practical implication strategies.

Studies show that this poor working environment is also associated with seafarer obesity. Giulio et al. (2019) surveyed the Philippines, India, Italy, and Romanian seafarers for their overweight ratios. The results showed that seafarers were on average 4 percent to 43 percent heavier than regular workers. For seafarers, the ship is not only the working place but a real living environment for quite long periods. And because of the high workload, the

time spent exercising is also relatively lower than that of ordinary workers.

Above all, the lack of resource practice management by ship-ers has led to an increase in anxiety about life after seafarers, thus reducing the number of people who continue to work as crews.

## 2.2. Research on retirement pension system in Korea

Since the retirement pension system was first introduced in 2005 in Korea, many studies in various sectors have been conducted to improve or activate it. It was pointed the polarization problem of participation rate depending on the size of the company and ineffective management of reserves and asserted the mandatory membership of all employees after laying the legal and institutional foundation to deal with the polarization (Jang, 2014). Also, to deal with operational inefficiency, proposed the system to make the balance of the power concentrated on the management (Ko, 2016). It was estimated the income replacement rate of defined benefit and life annuity by benefit period and proposed the improvement of pension conversion rate (Son, 2015). When it comes to defined benefit, the shorter the benefit period the higher the income replacement rate but more difficult to grant the later life while the longer the benefit period the lower the income replacement rate but easier to grant the later life. When it comes to a life annuity, the result was similar to the defined benefit with a longer benefit period but it's granted till the death, securing a stable later life. As part of the way to activate the retirement pension system, proposed the mandatory membership for retirement pension, organization dedicated to the retirement pension system, expanded tax privilege, and mandatory training program for the pension holders (Yang, 2015). A small businesses-centered retirement pension system was proposed to promote, and the key promotion plan includes expanded financial subsidy, the permission of individual retirement pension (IRP) for the workers at less-than-30 person workplace, irrespective of the availability of retirement pension by the employer and the measure to convert the severance pay to a pension (Ko, 2016). It was pointed the problem with low participation in retirement pension system by small & medium-sized businesses and low operational efficiency and compared with the retirement pension systems in advanced countries and proposed the mandatory participation in the retirement pension system, expansion, and promotion of defined contribution and more tax privilege (Kim, 2017).

Shin and Lee (2015) compared and analyzed the case of the retirement pension system in Asian countries such as Korea, Japan, Hong Kong, Singapore, and Malaysia.

Shin, Lee, Eum, and Seo (2014) surveyed 1102 listed companies in Korea Stock Exchange and Korea securities dealers automated quotation index (KOSDAQ) and analyzed their relationship of choosing retirement pension system based on the number of employees, cash dividend rate, debt ratio, sales, and current assets. As a result, the empirical analysis shows that some factors, such as business period, debt ratio, asset total, and liquidities, have a significant influence on the selection of retirement pension plan type. But, the number of employees, cash dividend rate and sales statistically show no effects at all.

In previous studies, most of the research on the retirement pension systems was conducted by general companies. The retirement pension system for shipping companies, especially seafarers employed by shipping companies, has not been reviewed. This study is different from previous researches in analyzing what kind of pension management system is effective according to various conditions such as the size of the shipping company and the age of seafarer and so on when retirement pension system is introduced to the seafarer.

## 3. The operation status of retirement pension system in Korea

### 3.1. Concept and features of retirement pension system

The retirement pension system has been implemented since 2005 in Korea. The employer deposits the fund at external financial institutions every year in preparation for a lump-sum or installment payment to the employees to help them live their stable life after retirement, which, unlike the national pension, is not compulsory but optional.

The retirement pension system is first able to deal with the employer's bankruptcy which may fail in paying the severance pay. When the enterprise becomes insolvent, the employees may not receive the wage or severance payment but the retirement pension system, if available, could safeguard severance pay since the reserve fund is deposited at the external financial institution. Second, the right to select the method about operation and reception of retirement pension is granted. That is, the type of pension and operation method may be determined at the discretion of the labor and the employer. Third, a response to changing the asset management environment is possible promptly. The proper response to changing financial environment is achievable by investing the retirement pension fund in various financial products. Fourth, sufficient financial resources can be accumulated until retirement. An interim payment is severely restricted to avoid spending it for living and the fund remains unwithdrawn even in case of job-change.

### 3.2. Type of retirement pension

The type of retirement pension is categorized into defined benefit (DB), defined contribution (DC), and individual retirement pension (IRP). In DB, retirement pension is calculated by multiplying a three-month average wage from the retirement date by service term. The employer shall deposit at least 60% of estimated severance payment at the external financial institution and the fund to deposit varies depending on fund management performance. That is, the amount to be borne by the employer is dependent on fund management performance and the employer shall select the product and take the risk accordingly depending on wage increase, quit rate, and operating earnings. In DC, reserve for retirement by the employer is previously defined and the severance pay to the employee varies depending on fund management performance. When the employee deposits more than 8.3% of the annual total wage according to pension regulation, the employee selects the fund management option proposed by the retirement pension fund manager. The external financial institution manages the reserve for retirement and severance pay varies depending on management performance accordingly. IRP is the dedicated account for severance payment which cannot be spent by the employee immediately after retirement. It's the system designed to prevent severance payment from being spent for living due to frequent job change or interim settlement. Severance payment remains at the account even after the job-change for the later life of the employee.

In the case of developed countries, Aart-Jan and Noora (2018) carried out the analysis of income redistribution through the pension system in Finland. They found out that the changes in income after retirement were influenced by sex, the timing of retirement, age, length of work history, and sector of job. In the case of Denmark, there are two types of defined contribution (DC) pension saving accounts, and private accounts, similar to IRAs. Employer-sponsored and private DC accounts have equivalent tax properties but are completely independent, which makes them close substitutes. Within both the employer-sponsored and the private DC pension plans, there are two types of tax-preferred accounts. Especially, Danish firms, employers, set contributions to pension saving



accounts by the saving preferences of their workforce, and that they respond immediately and significantly to changes in their employees' savings incentives (Itzik, Jessica, & Torben, 2016).

### 3.3. Cases of the retirement pension system for seafarers

In the case of New Zealand, there is a Maritime Retirement Scheme (MRS) established on 1 April 2016 for seafarers. The MRS's objective is to provide retirement and other benefits for workers in the seafarer industry. It is an employer-subsidized, defined contribution scheme registered under the Financial Markets Conduct Act 2013. Therefore, all seafarers employed by an employer who participates in the scheme, and all seafarers who are either employee of the Maritime Union of New Zealand (MUNZ) or financial members of MUNZ are required to join the scheme. The MRS collects contributions from its members and their employers, invest those contributions to earn a return on the accumulated savings of members and then pays benefits to members when they finish working as a seafarer and leave MUNZ. As of 31 March 2018, there are 1411 members registered in MRS, and member's total account balance is \$ 191.4 mil. NZD (MRS, 2020).

In the case of Finland, There is the Seafarers' Pension Fund (MEK) which is an authorized pension provider that handles statutory earnings-related pension provision for seafarers. And also, this fund awards and pays seafarer earning-related pension under the Seafarers' Pensions Act (MEL), which Finland's first earnings-related pension legislation for the private sector, came into force on 1 June 1956. The seafarer's pension fund was established to enact the legislation. In the early 1960s, MEL was expanded to include the survivor's pension and the funeral grant. Retirement age became 60 for crews and 65 for ship's officers. The pension provision expenditure is divided among seafarers themselves, shipping companies, and the State. In the 1980s, there are many changes in the shipping industry in the world. For example, the pension provision became a problem for Finnish seafarers who worked on reflagged vessels. The Finland seafarer's pension fund has been amending continuously to solve the problems and develop the benefits and financing of the seafarers' pension system. In recent, the new seafarers' pension act with retirement ages and accrual rates was entered into force on 1st January 2017. As of the end of 2018, the insured seafarers are 7350 and 8219 seafarers are receiving a pension from this fund. The total incomes are 52.2 million Euro from insurance contributions and 52.1 million Euro from investment respectively (SPF, 2020).

There is Seafarer's Special Fund to supports the retirement of seafarers in Germany. The seafarer's special fund provides a "bridging allowance" and "benefits paid after reaching the standard minimum pensionable age" for seafarers after their employment or self-employment in the seafaring industry has ended (Federal Ministry (2020)). The seafarer is offered the opportunity of early retirement by providing a pension payment bridging the period between the retirement from sea service and the start of the standard old-age pension payments but required to apply to all municipal social security agencies. The seafarer's special fund is financed by the contribution of the insured shipping companies and seafarers. The benefits of the seafarer's special fund are regarded as income which entails a compulsory contribution to the statutory maritime health and nursing care insurance. As of 2020, the contribution rates for seafarer's special fund are 4.0% that employer and employee are 2.0% respectively (SSF, 2020).

In the case of the United States, The Seafarers Pension Plan is a multi-employer employee benefit plan. It provides defined benefit pensions for employees of employers who have collective bargaining agreements with the Seafarers International Union of North America, Atlantic, Gulf, Lakes, and Inland Waters or affiliated unions. The Plan is funded through contributions made by these employers. The contribution rate is actuarially determined.

**Table 1**  
Reserve for retirement pension by type of the system in Korea.

Year	DB	DC	IRP	Total
2016	99.6 (67.8%)	35.0 (23.9%)	12.4 (8.4%)	147.0 (100%)
2017	110.9 (65.8%)	42.3 (25.1%)	15.2 (9.1%)	168.4 (100%)

Unit: Trillion Korean-won.

Source: Korean Statistical Information Service (2017).

The assets of the Plan are held in trust for the participants and beneficiaries (US union). This pension plan provides five different kinds of pension benefits for both seamen of deep-sea and boatmen of inland. These five pension benefits are "Regular Normal Pension", "Deferred Vested Pension", "Early Normal Pension", "Special Early Normal Pension", "Disability Pension". The credit is accumulated based on the seafarer's days of service at sea and determines the amount of pension received after retirement (SIU, 2019).

In the case of Australia, The Seafarers' Retirement Fund is known as the superannuation fund that was established by a trust deed on 3 May 1973. In this fund, an employer is contributing to the benefit of the seafarers as an employee with a contribution period by Australian Superannuation legislation. But Australia Business Number (ABN) has been canceled for the seafarers' retirement fund and this fund was no longer be operating from 28 Feb. 2009. There is another fund, called Maritime Super, which the first industry super fund established in 1967 by employers and by the workers such as stevedores, seafarers related to the maritime industry. In 1992, the Superannuation Guarantee (SG) was introduced, making a compulsory entitlement for all Australians (Maritime Financial Services Pty Limited (2019)). This fund is consists of employer and employee contributions and investment earnings for operating. As of June 2019, there are over 27,000 members and 262 million AUD received in contributions (AG, 2019).

### 3.4. Retirement pension system in Korea

As mentioned above, there is no seafarers pension system in Korea. But, there is a general retirement pension system. Domestic retirement pension management agency totaled 48 in 2017 which was reduced by 2 from 2016, but the total reserves in 2017 were 168 trillion Korean-won (149 billion U.S. dollars) which was rather increased from 147 trillion Korean-won (130 billion U.S. dollars) in 2016. They are mostly banks, securities companies, and life insurance companies. Table 1 shows the reserves for retirement pension by type and as of 2017, DB totaled 111 trillion Korean-won (98 billion U.S. dollars), DC 42 trillion Korean-won (37.2 billion U.S. dollars) and IRP 15 trillion Korean-won (13.3 billion U.S. dollars).

Table 2 shows the retirement pension system in operation by the size of the company which indicates DC accounted for 54% of the total. The large company with more than 100 employees adopted DB while a small company adopted DC. As seen, the retirement pension system has been introduced differently by the scale of the company.

## 4. Analysis of selection by type of retirement pension for seafarers

### 4.1. Model

Since 2014, the Korean government has formed a tripartite council with labor, management, and government to conduct active discussions to introduce the seafarers' pension system, and is planning to introduce the system. The seafarers' retirement pension system has a public feature because it is aimed at seafarers supporting the shipping industry, the national infrastructure in Korea. Therefore, when the seafarers' retirement pension system was

**Table 2**

Retirement pension system adopted differently by size of company in Korea.

Classification	Total	Object of company (A)	Adopted company (B)	Rate (%)
Total	340,030 (100%)	1,181,464 (100%)	318,374 (100%)	26.9
Less than 5 persons	84,446 (24.8%)	632,910 (53.6%)	69,228 (21.7%)	10.9
5–9	98,270 (28.9%)	295,071 (25.0%)	94,596 (29.7%)	32.1
10–29	97,952 (28.8%)	177,778 (15.0%)	96,024 (30.2%)	54.0
30–49	23,648 (7.0%)	32,380 (2.7%)	23,273 (7.3%)	71.9
50–99	20,088 (5.9%)	25,169 (2.1%)	19,797 (6.2%)	78.7
100–299	11,427 (3.4%)	13,424 (1.1%)	11,285 (3.5%)	84.1
More than 300 persons	4199 (1.2%)	4732 (0.4%)	4171 (1.3%)	88.1

Source: Korea Statistical Information Service (2017).

**Table 3**

The type of retirement pension system by size of company in Korea.

Classification	Total	Type of retirement pension			
		DB	DC	IRP	Mixed
Total	340,030 (100%)	108,499 (31.9%)	182,204 (53.6%)	25,936 (7.6%)	23,391 (6.9%)
Less than 5 persons	84,446 (24.8%)	24,145 (28.6%)	45,933 (54.4%)	13,197 (15.6%)	1171 (1.4%)
5–9	98,270 (28.9%)	26,781 (27.3%)	58,725 (59.8%)	9731 (9.9%)	3033 (3.1%)
10–29	97,952 (28.8%)	32,920 (33.6%)	56,062 (57.2%)	2677 (2.7%)	6293 (6.4%)
30–49	23,648 (7.0%)	9737 (41.2%)	10,653 (45.0%)	175 (0.7%)	3083 (13.0%)
50–99	20,088 (5.9%)	8539 (42.5%)	7460 (37.1%)	93 (0.5%)	3996 (19.9%)
100–299	11,427 (3.4%)	4918 (43.0%)	2961 (25.9%)	45 (0.4%)	3503 (30.7%)
More than 300 persons	4199 (1.2%)	1459 (34.7%)	410 (9.8%)	18 (0.4%)	2312 (55.1%)

Source: Korean Statistical Information Service (2017).

introduced, the operation method is very important for the establishment of the system.

In this study, verification analysis with shipping companies to identify what type of retirement pension system will be preferred when the retirement pension system for seafarer is introduced near future in Korea. Since no retirement pension system for seafarer has yet to be introduced although shipping companies want, they have to use ordinary retirement pension systems. 16 ocean shipping companies and 61 coastal shipping companies only joined retirement pension systems which are very low participation rates in Korea. One of the reasons seafarers leave the ship is the poor human resource practice of shipping companies (Nguyen, Ghaderi, Caesar, & Cahoon, 2014). On the other hand, young seafarers are interested in the investment techniques, and the communication means of the ship are also developed to meet the needs of young seafarers. Therefore, shipping companies must also meet the needs of the seafarers. In this perspective, the selection of the type preferred by the employees is more than important in activating the system.

Given that there may be differences between the shipping company and seafarer in preference about the retirement pension system, the hypothesis to identify the difference was established. And the preference may be different depending on the type of business of the shipping company. For instance, in the case of ocean shipping companies, seafarers' unpaid leave or higher turnover rate is expected and thus retirement pension would possibly be preferred but on the contrary, coastal shipping companies operate the routine route and employment is relatively stable with the full-time positions and thus different type of pension system could be preferred (Table 3).

In this study, thus, for establishing the hypothesis, type of business of shipping company, the number of employees on sea duty are used as company's variable while using service term, age, type of duty such as officer and sailor, and annual wage of the seafarer as the employee's variable. Six hypotheses were established depending on the type of business of shipping company, the number of employees on sea duty, service term, age, type of duty, and annual wage of the seafarer as described in Table 4.

**Table 4**

Established hypotheses for analysis.

No.	Hypotheses
H1	There may be difference in preference by type of business
H2	There may be difference in preference by number of employees on sea duty
H3	There may be difference in preference by service term
H4	There may be difference in preference by age of seafarer
H5	There may be difference in preference by type of duty (ship's officer, sailor)
H6	There may be difference in preference by amount of annual wage

Source: Author.

A cross-tabulation analysis which is one of the statistical analysis methods was used for verification analysis. The table is produced by crossing two categorical variables in rows and columns and Chi-Square test statistic is calculated using frequency value in a cross-tabulation. That is, the relationship between the type of retirement pension and the variables above hypotheses is examined to identify which type and seafarer-related factors influence on choice.

#### 4.2. Verification analysis result

The subjects for this sampling survey were seafarers employed by the ocean-going and coastal shipping company, and the survey was conducted through mail and e-mail for three weeks from Jan 22, 2018. 350 copies of questionnaires were distributed and 250 were used for analysis among 280 after excluding 30 insincere answers. Analysis of basic statistics such as shipping company and the number of employees on sea duty is as Table 5.

Hypotheses established were verified through cross-tabulation analysis and the verification result of hypothesis 1 (H1) is as Table 6. Significance probability (*p*-value) was 0.111 and no difference in preference of retirement pension system by type of business was seen and thus alternative hypothesis (H1) was rejected and the null hypothesis was adopted instead.

**Table 5**  
Analysis of basic statistics by survey.

Classification	Description	Frequency (person)	Rate (%)
Shipping company	Ocean freighter	82	32.8
	Home-waters freighter	45	18.0
	Home waters passenger liner	123	49.2
Sub total	250	100	
No of employees on sea duty	Less than 100 persons	174	69.6
	100–300	68	27.2
	More than 300	8	3.2
Sub total	250	100	
Service term	Less than 10 years	174	69.6
	10–30	63	25.2
	More than 30	13	5.2
Sub total		250	100
Age	20s	43	17.2
	30s	19	7.6
	40s	21	8.4
	50s	65	26.0
	60s	94	37.6
	70s	8	3.2
Sub total		250	100
Gender	Male	247	98.8
	Female	3	1.2
Sub total		100	
Type of duty	Marine technician	210	84.0
	Staff member	40	16.0
Sub total		250	100
Wage system	Annual wage	177	70.8
	Wage by class	44	17.6
Subtotal		250	100
Annual wage	Less than 30 mil	30	12.0
	30–40 mil. Korean-won	77	30.8
	40–50 mil. Korean-won	55	22.0
	50–70 mil. Korean-won	48	19.2
	More than 70 mil. Korean-won	40	16.0
Sub total		250	100
Type of current severance pay	Single (legal)	156	62.4
	Progressive	62	24.8
	Others	32	12.8
Subtotal		250	100

Source: Author.

**Table 6**  
Verification of hypothesis (H1) on preference of retirement pension system by type of business.

Classification		Type of retirement pension				Total
		DB	DC	IRP	Mixed	
Business	Ocean shipping company	45 (54.9)	8 (9.8)	14 (17.1)	15 (18.3)	82
	Coastal passenger shipping company	27 (60.0)	3 (6.7)	11 (24.4)	4 (8.9)	45
	Coastal shipping company	56 (45.5)	8 (6.5)	43 (35.0)	16 (13.0)	123
Total		128 (51.2)	19 (7.6)	68 (27.2)	35 (14.0)	250

$\chi^2 = 10.363$ , d.f. = 6,  $p$ -value = 0.110 ( $\alpha < 0.05$ ).

Source: Author.

**Table 7**  
Verification of hypothesis (H2) on preference of retirement pension system by number of employee.

Classification		Type of retirement pension				Total
		DB	DC	IRP	Mixed	
No of employee	Less than 100 persons	89 (51.1)	15 (8.6)	47 (27.0)	23 (132)	174
	100 or more	39 (51.3)	4 (5.2)	21 (27.6)	12 (15.7)	76
Total		128 (51.2)	128 (51.2)	19 (7.6)	68 (27.2)	35 (14.0)

$\chi^2 = 7.107$ , d.f. = 6,  $p$ -value = 0.311 ( $\alpha < 0.05$ ).

Source: Author.

The verification result of hypothesis 2 (H2) is as [Table 7](#). Because the number of answers in the case of the employees more than 300 persons was too low, it's classified into less than 100 persons and 100 persons or more. Significance probability ( $p$ -value) was 0.311 and no difference in preference of retirement pension system by the number of employees was seen and thus null hypothesis was adopted.

The verification result of hypothesis 3 (H3) is as [Table 8](#). Service term was classified into less than 10 years, 10 years or longer, less than 30 years, and 30 years or longer. Significance probability ( $p$ -value) was 0.087 and the difference in preference on the type of retirement pension satisfied the significance level ( $\alpha < 0.1$ ) and thus alternative hypothesis (H3) was adopted.

**Table 8**

Verification of hypothesis (H3) on preference of retirement pension system by service term.

Classification		Type of retirement pension				Total
		DB	DC	IRP	Mixed	
Service term	Less than 10 years	85 (48.9)	10 (5.7)	54 (31.0)	25 (14.4)	174
	10–30 years	36 (57.1)	6 (9.5)	11 (17.5)	10 (15.9)	63
	More than 30 years	7 (53.8)	3 (23.1)	3 (23.1)	0 (0)	13
Total		128 (51.2)	19 (7.6)	68 (27.2)	35 (14.0)	250

 $\chi^2 = 11.044$ , d.f. = 6,  $p$ -value = 0.087 ( $\alpha < 0.1$ ).

Source: Author.

**Table 9**

Verification of hypothesis (H4) on preference of retirement pension system by age.

Classification		Type of retirement pension				Total
		DB	DC	IRP	Mixed	
Age	20s	18 (41.9)	3 (7.0)	17 (39.5)	9 (11.6)	43
	30s	9 (47.4)	1 (5.3)	6 (31.6)	3 (15.8)	19
	40s	9 (42.9)	1 (4.8)	7 (33.3)	4 (19.0)	21
	50s	40 (61.5)	5 (7.7)	15 (23.1)	5 (7.7)	65
	60s or older	52 (50.9)	9 (8.8)	23 (22.5)	18 (17.6)	102
Total		128 (51.2)	19 (7.6)	68 (27.2)	35 (14.0)	250

 $\chi^2 = 26.368$ , d.f. = 15,  $p$ -value = 0.034 ( $\alpha < 0.05$ ).

Source: Author.

**Table 10**

Verification of hypothesis (H5) on preference of retirement pension system by type of duty.

Classification		Type of retirement pension				Total
		DB	DC	IRP	Mixed	
Type of duty	Marine technician	107 (51.0)	18 (8.6)	57 (27.1)	28 (13.3)	210
	Staff member	21 (52.5)	1 (2.5)	11 (27.5)	7 (17.5)	40
Total		128 (51.2)	19 (7.6)	68 (27.2)	35 (14.0)	250

 $\chi^2 = 2.064$ , d.f. = 3,  $p$ -value = 0.559 ( $\alpha < 0.05$ ).

Source: Author.

**Table 11**

Verification of hypothesis (H6) on preference of retirement pension system by annual wage.

Classification		Type of retirement pension				Total
		DB	DC	IRP	Mixed	
Annual wage	30 mil. Korean-won or less	14 (46.7)	2 (6.7)	8 (26.7)	6 (20.0)	30
	30–40 mil. Korean-won	45 (58.4)	5 (6.5)	19 (24.7)	8 (10.4)	77
	40–50 mil. Korean-won	23 (41.8)	3 (5.5)	21 (38.2)	8 (14.5)	55
	50–70 mil. Korean-won	27 (56.3)	5 (10.4)	12 (25.0)	4 (8.3)	48
	70 mil. Korean-won or more	19 (47.5)	4 (10.0)	8 (20.0)	9 (22.5)	40
Total		128 (51.2)	19 (7.6)	68 (27.2)	35 (14.0)	250

 $\chi^2 = 11.632$  d.f. = 12,  $p$ -value = 0.476 ( $\alpha < 0.05$ ).

Source: Author.

The verification result of hypothesis 4 (H4) is as Table 9. The age was classified into twenty, thirty, forty, fifty, and sixty or older. Significance probability ( $p$ -value) was 0.034 and the difference in preference on the type of retirement pension satisfied the significance level ( $\alpha < 0.05$ ) and thus alternative hypothesis (H4) was adopted.

The verification result of hypothesis 5 (H5) is as Table 10 and the type of duty was classified into the marine technician and staff member. Significance probability ( $p$ -value) was 0.559 and as the difference in preference on the type of retirement pension system failed to satisfy the significance level, the alternative hypothesis (H5) was rejected and thus null hypothesis was adopted instead.

The verification result of hypothesis 6 (H6) is as Table 11. The annual wage was classified into 30 mil. Korean-won or less, 30–40 mil. Korean-won, 40–50 mil. Korean-won, 50–70 mil. Korean-won, and 70 mil. Korean-won or more. Significance probability ( $p$ -value) was 0.476 and as the difference in preference on

retirement pension system failed to satisfy the significance level, the alternative hypothesis (H6) was rejected and thus null hypothesis was adopted instead.

Summarizing the verification analysis result, no difference in preference on the type of retirement pension system depending on the type of business, the number of employees, type of duty and annual wage was seen but the difference depending on service term and age was seen and thus alternative hypothesis to replace hypothesis 3 (H3) and hypothesis 4 (H4), respectively, was adopted.

## 5. Conclusion

A seafarer who works in the sea far away from the family is considered a special job but as recruiting through shipping management agency is on the rise, a short-term employment contract becomes more common and severance payment is settled when quitting their jobs. The seafarer is not protected by the “Law of



employee retirement benefit security”, making it difficult to secure a stable later life even after a life-long service in Korea. Due to this harsh environment, skilled young seafarers are leaving the ship. In other words, the Korean government’s weakening of public functions and poor human resource practices of shipping companies do not guarantee the aging of seafarers who have worked in the sea for a long time.

The Korean government has reviewed the retirement pension system for the seafarers since 2014 and established the basic plan to grant the later life of the seafarers as well as attract the newcomers (Ministry of Oceans and Fisheries, 2014). The seafarers’ retirement pension system is expected to be introduced soon as the Korean National Assembly embodies the laws. When considering the local seafarers who are aging faster and the difficulties in recruiting the skilled seafarers, the retirement pension system which will grant stable later life for the seafarers needs to be introduced as soon as possible.

In this study, a verification examination was conducted to identify the type of retirement pension system preferred by the seafarers. Six hypotheses were established for analysis and as a result, preference on the retirement pension system varied depending on the type of business which the seafarer is engaged in and age.

Particularly, those whose service term was 30 years or longer preferred defined contribution (DC) but not the mixed type while those who have served less than 10 years preferred individual retirement pension (IRP) And concerning age, those in their twenty to forty preferred IRP and DC while those in their fifty to sixty preferred DB. That is, those whose service term is shorter and the age is younger preferred IRP which can be personally managed by themselves, but the aged person who has difficulties in personally managing the financial asset preferred DB which is more stable for them.

In this study, the preferred retirement pension system for seafarers is examined to analyze the differences depending on the type of business of the shipping company, the working period of seafarers, age, and rank.

The outcome of this study is expected to be useful for design when the retirement pension system introduces for seafarers in Korea, and ultimately attract talented crews of the shipping company. For example, a shipping company might be able to give seafarers a full account of the types considering with advantages and disadvantages of retirement pensions. The shipping company will operate various retirement pensions by age and position of the crew to ensure a stable life after retirement. Also, This is expected to contribute to strengthening the competitiveness of shipping and attractiveness for the job of seafarers.

Despite the efforts to obtain the answers from more seafarers, the survey of the employees on sea duty was limited. A further survey including those on ocean passenger ship and the deep-sea fishing vessel is required to enhance the completeness of the study. Also, another limitation of the research is that the preference for the seafarers’ retirement pension system was conducted only for the seafarers. In future research, the difference between the shipping company and the Korean government officials regarding the operation of the seafarers’ retirement pension system will be investigated and the differences will be analyzed.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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