

The Potential Driving Forces of Wealth Accumulation by South Korea's Leading Shipbuilding Giants: Wage-Labor Nexus and Dual-channel Capital Accumulation

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Abstract. This study explores how institutional factors increase the possibility of Korea's three main shipbuilders' capital accumulation and what effect institutional factors have on their capital accumulation. By examining the structural features of these shipbuilders' labor and changes in their wage-labor nexus, the mechanisms of dual-channel capital accumulation are better understood. Ultimately, our findings show that dual-channel capital accumulation, which allows three shipbuilders to secure the practicality of overall loss minimization or overall profit maximization, has been created through the evolution of their labor structure.

Keywords. Dual-channel capital accumulation, Wage-labor nexus, Korean shipbuilders, Structural transformation, Shipbuilding and offshore industry.

JEL. D22, J21, J31, L62.

1. Introduction

Along with the automobile and IT industries, the shipbuilding and offshore industry is a major growth engine for the South Korean economy. This field focuses on the construction of various ships and floating vessels as well as the installation of giant offshore structures and facilities used for the purpose of drilling and extracting gas. It is a complex industry directly affected by upstream industries such as shipping, defense, fishing, and marine leisure; at the same time, it has a direct effect on downstream industries like steel, machinery, and electronics and electricity.

The shipbuilding and offshore industry has two distinct particularities: it is both labor-intensive and capital-intensive. In general, floating vessels and offshore plants are massive structures completed through variegated and complicated construction processes based customization, reflecting very few customers' discrete requirements. Thus, there is a strong possibility that automation of the critical technology skills required for their construction may be subject to significant limitations, and the shipbuilding and offshore industry can be regarded as a labor-intensive industry that needs to secure enough high-skilled labor. Further, a large amount of capital investment is required to construct the infrastructure and equipment needed to build larger ships and giant offshore structures. Moreover, as the long construction process for customized ships or offshore structures generally takes several years to complete, it is necessary to obtain adequate financing until payment is received from a customer. Thus, the shipbuilding and offshore industry is a capital-intensive industry.

Compared to first-movers in the shipbuilding industry such as the United Kingdom, Germany, and Sweden, South Korea has a relatively short history of

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shipbuilding and can be regarded as a latecomer to the industry. According to The Korea Offshore and Shipbuilding Association (2016), the modernized concept of the shipbuilding industry was introduced to Korea by Japanese shipbuilders who started businesses in Korea by the end of the 19th century, but, in reality, Korea's shipbuilding industry lacked the basic infrastructure and equipment to build larger ships, and the government of Korea was unable to provide enough capital for building this infrastructure and equipment before the 1960s. Further, Korea's shipbuilding technology stayed at an overall low level in comparison with first-movers. However, in 1967, the Korean government legislated the "*Shipbuilding Industry Promotion Act*" for the purposes of improving Korea's shipbuilding technology and encouraging its shipbuilding industry, and enacted the "*Promotion Act for the Machinery Industry*" not only to promote Korea's industry development but also to cultivate the machinery industry. Both Acts helped the Korean government to establish a legal basis upon which to foster continuous development of the shipbuilding industry. With this legal basis, the government of Korea has more aggressively pursued the heavy and chemical industry policy from the period of the "Third Five-Year Economic Development Plan" (1972–1976), which was a trigger of the establishment of conglomerate-oriented large shipyards;ⁱ as a result, the basis for Korea's shipbuilding industry to reach a world-class level was created gradually. Figure 1 shows that since the 1980s, Korea's shipbuilding industry has grown rapidly through its growth and maturation periods, and has firmly occupied a strong position as one of the leading shipbuilding nations since the 2000s. In particular, Hyundai Heavy Industries (HHI), Daewoo Shipbuilding and Marine Engineering (DSME), and Samsung Heavy Industries (SHI)—the so-called "Three Giants" that performed a pivotal role in Korea's becoming a leading shipbuilding nation—recorded an average of 15.8 percent and 22.4 percent global market share during the periods of 1980–1989 and 1990–1999, respectively, and new orders delivered by these three shipbuilders have greatly increased to 31.6 million GT as of 2007. Even though the shipbuilding industry in Korea is currently being led by about a dozen large- or medium-scale shipbuilding enterprises, the Three Giants' levels of influence on Korea's shipbuilding industry are likely to be much greater than those of other shipbuilders; this may safely be construed as meaning that Korea's shipbuilding industry is actually being led by HHI, DSME, and SHI.

It is not difficult to find research results in the previous literature and various data analyses that show that the shipbuilding industry as a driving force and backbone of Korean economic growth has been actively led by HHI, DSME, and SHI (hereafter, these three shipbuilders are defined as the Three Giants).ⁱⁱ These various research results show that the Three Giants have also been growing both internally and externally, coupled with the rapid growth of Korea's shipbuilding industry. However, previous researchers have not provided a careful analysis of questions about where the practical driving force that led to the explosive growth of the Three Giants originated and how greatly this driving force affects their growth. In the extension of such recognitions and questions, this study wholeheartedly accepts the argument that overall relations among the labor structures of the Three Giants, changes in their wage–labor nexus, explosive growth within a short period of time, and the possibility of capital accumulation should be magnified and discussed from various aspects. This paper notes that through their rapid growth process, the Three Giants have continued to take in a significant profit across a diverse range of channels, which led to various types of capital accumulation.

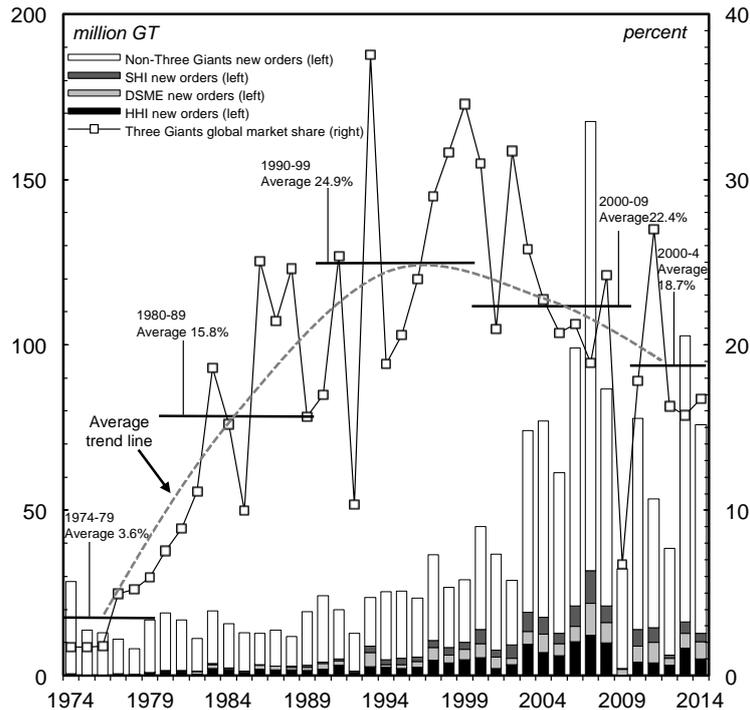


Figure 1. Market shares based on new orders

Note: Ship Size Coverage: 100 Gross Tonnage and over.

Source: Lloyd's World Shipbuilding Statistics; Korea Offshore and Shipbuilding Association, *Shipbuilding Yearbook*.

The main aim of this paper is to examine the structural features of the Three Giants' labor and changes in their wage-labor nexus, and to explore their dual-channel capital accumulation. To do so, we focus on uncovering the transformation of the Three Giants' labor structure and the factors that have either direct or indirect effects on their structural changes based on analyzing the production-related worker group. Further, in order to uncover the fundamental reason why the Three Giants continue to utilize various workforces in their production process that are not in direct employment relationships with them, we investigate the wage disparity that exists among workers from the same occupational groups, and devote our attention to examining the distinct groups of sub-contractors and bulk-hired program-specific workers for the Three Giants. In addition, to identify how the structural changes in the Three Giants' labor affect their capital accumulation, based on an argument about the Three Giants' labor structures and their wage-labor nexus, we attempt to examine the tendencies of their wealth expansion through various data analyses and calculations. Finally, this paper presents and highlights the mechanisms of dual-channel capital accumulation by classifying them as "Channel I" and "Channel II," which show how the Three Giants took advantage of the possibility to accumulate capital.

2. The transformation of labor structure

As mentioned, the shipbuilding and offshore industry, in which the automation of critical technology skills required in the construction process may be subject to significant limitations, is a labor-intensive industry. Thus, it is essential for the Three Giants to secure a sufficient and competent workforce; further, they must constantly consider various labor-related problems in order to carry on their business activities with strong competitiveness in the world market. In particular, how and at what scale the Three Giants will compose their required workforces, where these workforces can be secured, and how they can effectively utilize their

secured workforces in a business environment with diverse and unexpected factors can be regarded as the most important issues the Three Giants face for continued business operations.

In the 1990s, when Korea's shipbuilding industry entered its maturation period, the workforces of the Three Giants began to be divided into four different occupational groups: engineers (production management, design, and R&D); in-house production workers; management and administrative employees; and in-house subcontract workers.ⁱⁱⁱ As their business scale continues to expand gradually year after year, the scale of the four occupational groups also constantly expands. The Three Giants hired only 41,316 employees in these four occupational groups in 1990 (i.e., 24,723 workers at HHI, 12,968 workers at DSME, and 4,075 workers at SHI), but as of 2014, this number had substantially increased to 150,656 (i.e., 66,607 workers at HHI; 48,224 workers at DSME; and 35,825 workers at SHI), a nearly 265 percent increase.^{iv} Further, through the 1990–2014 period, trend analysis using data from the Korea Offshore and Shipbuilding Association identifies that the scale of overall employment at the Three Giants has shown a tendency to gradually increase over a period of 25 years. We do not disagree that such a tendency could be a key clue to understanding the changes in the Three Giants' labor structure, but the main point we would like to emphasize here is that above all things, analyzing where this gradual increase in employment scale mainly originates from, or whether the increase occurs across the four occupational groups evenly or in a specific occupational group is a very important task, and these questions should be clearly addressed.

As is generally known, the Three Giants' operational business competencies are largely concentrated in the construction of giant structures such as large ships, floating vessels, and offshore facilities. For this reason, it is common for the proportion of production-related workers involved directly in construction processes at the shipyard, or the proportion of in-house production workers and in-house subcontract workers, to be higher than the proportion of engineers and management and administrative employees. As of 2014, the proportion of in-house production workers and in-house subcontract workers at the Three Giants reached 83.4 percent of all employees in the four occupational groups (i.e., HHI: 84.2 percent, DSME: 86.8 percent, and SHI: 77.2 percent).^v Through these data, we can clearly see that the Three Giants have a labor structure depending on production-related workers at a high level. However, in order to understand more clearly the labor structure of the Three Giants, it is necessary to thoroughly examine their structural change process and the factors that have an effect on these changes, based on analyzing the production-related workers group.

First, to determine how the Three Giants' labor structures have evolved, why they have evolved into their current form, and how the newly evolved labor structure can be maintained, it is necessary to quantify changes in the labor structure so that they can be objectively understood; this can be done through the use of the Labor Structure Specialization Index (*LSSI*).^{vi} Use of *LSSI* scores can reveal what type of workforce the Three Giants' labor structures specialize in. In other words, the *LSSI* can be used to assess whether the Three Giants depend more on in-house production workers or in-house subcontract workers to carry on their business activities. An *LSSI* score that is closer to 1.00 indicates a stronger "in-house subcontract worker-oriented labor structure" (IS labor structure), while a score closer to -1.00 indicates a stronger "in-house production worker-oriented labor structure" (IP labor structure). Using the *LSSI* is a methodological necessity to satisfactorily describe the evolution of the Three Giants' labor structures from 1990 to 2014.

Our calculation of *LSSI* score, as shown in Figure 2, revealed that the labor structures of the Three Giants have common ground, which can be summarized as follows: First, there is a slight difference in the period of transformation in each shipbuilder's labor structure, but since the early and mid 2000s (i.e., HHI: 2007, DSME: 2004, and SHI: 2000), all three shipbuilders' labor structures have fully

transformed from IP labor structure to an IS labor structure; second, there is a clear trend that all three shipbuilders' levels of dependence on in-house subcontract workers for the construction process have gradually been increasing over a long period of time; and, third, as of 2014, the Three Giants have maintained a very high level of dependence on in-house subcontract workers (i.e., HHI: 0.46, DSME: 0.67, and SHI: 0.59), in comparison to 1990 (i.e., HHI: -0.79, DSME: -0.72, and SHI: -0.02).

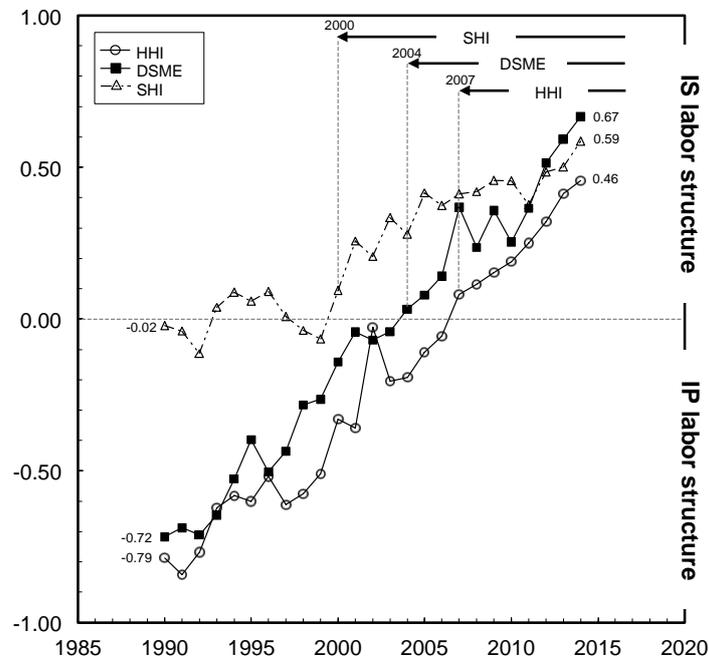


Figure 2. Direction of evolution in labor structure and LSSI.

Note: All data are based on their fiscal year.

Source: Computed by the author by using data from Korea Offshore and Shipbuilding Association; Repository of Korea's Corporate Filings Data Analysis, Retrieval and Transfer.

Then, the following questions arise: What lies beneath the rapid transformation in the Three Giants' labor structures? And what is the practical reason for the Three Giants to maintain a relatively higher level of dependence on in-house subcontract workers than that of other production-related workers groups? The purpose or the reason why firms depend on the input of diverse workforces for their production activities actually varies, and in general this is strongly related to their own corporate strategies such as labor cost reduction, cutting production costs, and flexible output adjustment. For instance, Hyundai Motor Company in Korea has found a way to escape the upward pressure on wage costs in its production system by alternatively utilizing low-paid workers within the Hyundai Motor Group (Kim, 2014a; Kim, 2014b). Further, Toyota Motor Corporation in Japan has expanded its hiring of non-regular workers as a vehicle for labor cost-cutting and the flexible adjustment of domestic output in response to economic fluctuations (Kim, 2013). However, if arguments related to either the legal subject that employs workers or the substantive subject that utilizes workers are considered, it is highly likely that the Three Giants show a different form of labor structure, which is distinguished from the labor structure of automobile manufacturers like the Hyundai Motor Group or the Toyota Group. Further, if we approach such an argument from the perspective of the diversity of corporate systems, it is expected that the reason behind the evolution of the Three Giants' labor structures into a specific type of labor structure and the reason for maintaining such a type of labor structure will be, obviously, different from the case of other companies in different industries;

therefore, an in-depth analysis of the labor structures of the Three Giants is inevitable. In addition, it is necessary to analyze how the IS labor structure functions in each shipbuilder's corporate system by extending the scope of the argument to the relationship between internal and external growth of the Three Giants and the evolution into an IS labor structure.

3. In-house subcontract worker-oriented labor structure

3.1. Business expansion towards the offshore plant industry and an increase in in-house subcontract workers

For the past half-century, the dominant power and the initiative in the global shipbuilding industry has shifted from Europe to Japan, and devolved to Korea. At this point in time, there are signs of gradual shifting of hegemony from Korea to a third power. European countries such as the United Kingdom, Germany, and Sweden—which had advanced shipbuilding skills and technologies originating from highly sophisticated techniques in their machine industries and had strengthened their positions in the shipping industry over a long time—firmly maintained their positions as the dominant powers in the global shipbuilding industry until the middle of the 20th century. However, since the early 1960s, the initiative in the global shipbuilding industry has gone to the second-mover, Japan, which was steadily strengthening its international competitive power on the basis of enormous support from the Japanese government and of its low labor costs in comparison with European countries. Since then, Japan has taken the lead in the shipbuilding industry by gaining a competitive advantage as a leading shipbuilding country. However, in the early 2000s, Japan had no choice but to surrender its reputation as the number 1 shipbuilding country to Korea, which started to increase its market share and to secure its competitive edge through the steady accumulation of shipbuilding skills, technologies, and experience in the 1980s.^{vii}

Figure 1 shows that the Three Giants have experienced an unprecedented golden age of the shipbuilding industry since the early 2000s. An explosive increase in new orders delivered by these three shipbuilders provides compelling evidence that they have proven themselves as the leading companies in the global shipbuilding industry. In particular, the Three Giants have attempted to improve and expand their capability with a focus on building midsize to large ships and floating vessels for a long time and were able to grow in response to international demand for various vessels, which has rapidly increased since the early 2000s. It can be considered that the core driving force behind the Three Giants' rapid growth in the early and mid 2000s has mainly proceeded from the shipbuilding business sector, but since the late 2000s, their growth has been led by both the shipbuilding business and the offshore plant business. In particular, for the Three Giants, the financial crisis of 2008 can be considered a key factor promoting rapid expansion of their business towards the offshore plant industry.

The immediate and devastating aftermath of the 2008 financial crisis provided the growing Three Giants with an experience of tremendous crisis, but this crisis provided momentum for the Three Giants to expand their business area to the offshore plant business. Immediately after the global financial crisis, its considerable effect caused a rapid contraction of the global shipbuilding market, and a declining shipbuilding market was sufficient to change the overall behavior of financial institutions and their lending practices (Oh, 2016). Financial institutions were in a conservative mood, as the shipping companies frequently postponed or delayed payment or cancelled orders overall. Based on such an environmental change, the shipbuilding giants (i.e., the Three Giants) had no choice but to concentrate their capability on the offshore plant business, and they could not help but carry out business diversification as a specific action plan not only to overcome a rapid decrease in new orders, but also to cultivate a new market (Park, 2015a). In addition, international oil price, which displayed an upward tendency during the global economic slump, soared to more than 100 US dollars a

barrel, and remained at a high level after 2010, which made major oil corporations jump into the development of submarine oilfields more aggressively than before; in the end, the oil corporations could not help but ask the Three Giants—which had enough capabilities in building giant offshore structures and facilities—to carry out the construction work (Park, 2015b). Ultimately, it can be concluded that internal and external changes in the economic climate originating from the 2008 financial crisis were a trigger for the Three Giants—which had focused mainly on their shipbuilding business—to turn their attention to the offshore plant business, and they also served as a catalyst for explosive expansion of their offshore plant business.

In addition, business diversification of the Three Giants brought many changes in their labor structure. One of the most notable structural changes is that the inflow of in-house subcontract workers has increased at an extremely fast rate. The Three Giants attempted to actively seek a solution to allow their offshore plant business to overcome the crisis caused by a contraction of the shipbuilding market; therefore, they actually needed more workers for this business, and a significant portion of their required workforce was filled by dislocated workers who had worked for small and medium-sized insolvent shipbuilders that were unable to withstand the crisis; as a result, there has been a massive increase in the proportion of in-house subcontract workers within the Three Giants (Park, 2015b). Furthermore, bulk-hired program-specific workers^{viii}—who are not subcontractors and are considered a unique type of temporary contract-based worker, but carry out various tasks—is utilized in various ways to build offshore plants and facilities in the Three Giants' shipyards. In particular, when subcontractors whose main business area is focused on building offshore plants are confronted with a heavy workload or high workload increments, they temporarily add such temporary contract-based workers and flexibly utilize their workforce, which is very common (Park, 2015a).

3.2 Various subjects of employment, and the substantive subject of usage

The labor structure of the Three Giants, whose workforces include various worker groups, is illustrated in Figure 3. A closer look at their structural composition reveals that the workforces of the Three Giants are composed of three big worker groups: workers belonging to a prime contractor, namely a shipbuilder (i.e., HHI, DSME, or SHI), workers belonging to subcontractors that have a subcontracting relationship with a shipbuilder, and workers who are temporarily hired for a specified contract period based on subcontractors' need for a temporary workforce. In general, the labor structure of a firm can be construed from a variety of perspectives according to what kind of standard is used as criteria for labor classification, but it is much easier to clearly analyze the labor structure with a realistic eye if we approach it based on the following two classification criteria, above all else: a legal subject that employs workers (i.e., employment relationships), and a substantive subject that utilizes workers (i.e., labor-use relationships).

Based on these classification criteria, we attempted to undertake an in-depth analysis of various worker groups that are directly or indirectly involved in some aspects of the Three Giants' construction projects of building ships and offshore plants, and were able to identify two different types of workers. There are workers whose legal subject of employment is matched with a substantive subject that utilizes them, but there are also workers whose legal subject of employment is not matched with a substantive subject that utilizes them. The workers belonging to the three shipbuilder occupational groups (i.e., engineers, in-house production workers, and management and administrative employees) hold long-term employment contracts with the shipbuilder that offer them job security, and they are engaged with the shipbuilder in both employment relationships and labor-use relationships. On the other hand, workers who make direct employment contracts with a subcontractor that has a subcontracting relationship with a shipbuilder, who take orders from both the subcontractor and the shipbuilder, and who are involved in

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some aspects of the shipbuilder's construction activities are in employment relationships with the subcontractor, but they are in practical labor-use relationships with the shipbuilder, which means the shipbuilder can be regarded as their substantive subject of usage. In addition, bulk-hired program-specific workers and short-term project-specific workers—both of which can be classified as a temporary contract-based workers—are not formally employed by a subcontractor, but are temporarily hired by temporary work agencies that are commissioned by subcontractors to organize required workforces; therefore, subcontractors can be regarded as their tacit subject of employment,^{ix} and it is appropriate to consider a shipbuilder that either directly or indirectly utilizes this workforce in many ways as a substantive subject of usage.

Of course, it is obvious that various worker groups are in charge of the Three Giants' construction projects and are involved in some aspects of their construction activities for large ships, floating vessels, and offshore plants and facilities, regardless of how workers are classified and what kinds of standards are used. However, classifying the Three Giants' workforces based on employment relationships and labor-use relationships reveals the very interesting fact that the subject of employment of each type of Three Giants worker can be the same or different, depending on the circumstances, but the subject of usage for all is the prime contractor, or the shipbuilder. In other words, each worker is involved in some aspects of the Three Giants' construction activities, but regardless of the subject who hires them, all of them ultimately are involved in the Three Giants' various construction projects within their shipyards and in substance take orders from the Three Giants, or the prime contractors. The entire construction process of ships and offshore plants is interconnected through several independent processes (i.e., P_A , P_B , ..., P_F) and is actually organized using several production-related worker groups. A closer look at each construction process reveals that one shipbuilder and several subcontractors supply various workforces for the purpose of building ships and offshore plants (see Figure 3). The number of subcontractors in charge of each construction process differs, depending on the construction process and scale, but there is a feature in common: the proportion of workers in employment relationships with a subcontractor is far larger than the proportion of workers engaged with the shipbuilder in employment relationships, and both worker groups are in practical labor-use relationships with the shipbuilder. To put it simply, the Three Giants' construction process for building ships and offshore plants is organized using both a large number of external workers (e.g., in-house subcontract workers, bulk-hired program-specific workers) who are in labor-use relationships with the Three Giants and a small number of internal workers (e.g., in-house production workers), and each construction process uses the appropriate mix of these workers to form the entire construction process as a single construction activity.

Then, the following question arises: What is the fundamental reason that the Three Giants utilize more labor forces that are not in direct employment relationships with them, rather than the workforces in employment relationships with them, for their construction activities? Further, it is also necessary to consider questions about what causes the Three Giants to adopt such a labor use pattern and how their use of labor affects their corporate systems.

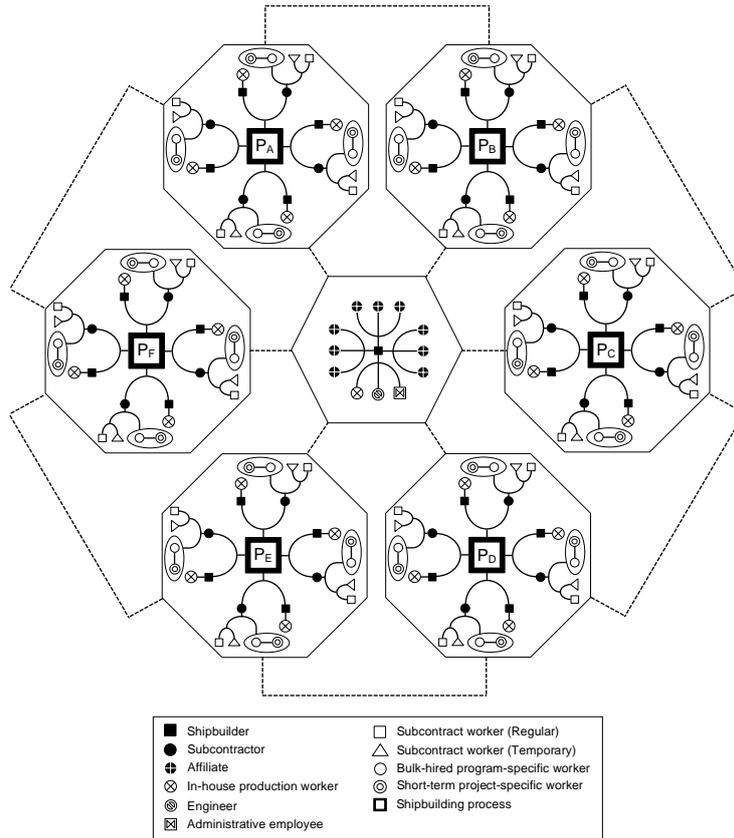


Figure 3. Workforce composition in the Three Giants

Source: Reconstructed by the author using sources from Korean Confederation of Trade Unions *et al.* (2016) and Korean Metal Workers' Union (2013).

4. Wage disparity

4.1. Regular unionist vs. subcontract worker

The discussion of the wage–labor nexus of the Three Giants can be the starting point for determining why the Three Giants’ labor structures have fully transformed to the IS labor structure and how this newly evolved labor structure can be maintained, or why the Three Giants are actively utilizing labor forces that are not in direct employment relationships with them for building ships and offshore plants.

In the case of Korea’s shipbuilding industry, where the influence of labor unions is likely to be strong, the general level of a worker’s wage depends on wage negotiations and collective agreements, but not all workers are subject to the same wage system; therefore, a certain amount of wage disparity exists in general among different worker groups, for which the reasons vary. For instance, the wage system, in which wages, a wage class, and basic pay increase in stages according to duration of employment, is applied to regular employees who are in direct employment relationships with a prime contractor, or one of the Three Giants.^x Therefore, the wage differential among regular employees of a prime contractor mostly reflects their duration of employment. However, a slightly different wage system applies to in-house subcontract workers, in which the most general channels of adjustment to wage increases, such as an annual wage class raise, base pay, and so on, have no standard, and there is also wage ceiling depending on the circumstances (Park, 2015a). In addition, differences are found in the number of wage composition items and each of the compensation levels between the regular employees of a prime contractor and subcontract workers; therefore, it is highly likely that wage disparity exists between these two worker groups.

The data in Table 1 show wage disparity between regular unionists within the Three Giants and subcontract workers in the shipbuilding and offshore industry, which reveals how much wage disparity between the two worker groups actually existed as of 2013. First, looking at regular wage, which is a combination of basic pay and sundry allowances, it is identified that the regular wage of the Three Giants' regular unionists was 2,319,221 KRW per month on average, while subcontract workers in the shipbuilding and offshore industry received 2,295,000 KRW per month on average, which is 99.0 percent of the Three Giants' regular unionists' regular wage. Based on a comparison of regular wage level, it seems that wage disparity between these two worker groups is practically nil. However, the clear disparity can be verified by undertaking comparisons between these two worker groups in terms of monthly wage level. The disparity in monthly wage is higher than that found in regular wage. The monthly wage of subcontract workers was 2,594,000 KRW, which equates to 89.4 percent of the monthly wage for the Three Giants' regular unionists, which was 2,900,088 KRW. This shows a significant wage disparity between these two worker groups, providing evidence of wage disparity. Moreover, a wider disparity of wage levels is found in their average wage, which is a combination of monthly wage and other wage composition items such as bonus and performance-based pay: The Three Giants' regular unionists received 4,779,171 KRW, while subcontract workers received 2,999,000 KRW. The wage disparity between these two amounts to 1,780,171 KRW per month, and the average wage of subcontract workers equates to only 62.8 percent of that of the Three Giants' regular unionists.

It may be possible to conclude that the wage disparities that exist between the Three Giants' regular unionists and subcontract workers in the shipbuilding and offshore industry have been caused by two large factors. The first is a difference in the number of wage composition items applied to each worker group, that is, the wage composition items for the Three Giants' regular unionists are much more diverse than those for subcontract workers. The second factor originates from a difference in compensation levels of each wage item applied to each workers group: The compensation levels for each wage item for the Three Giants' regular unionists are much higher than those for subcontract workers. Thus, the general level of subcontract workers' wage is lower than that of the Three Giants' regular unionists, and this ultimately causes wage disparity between these two worker groups. In addition to the aforementioned two factors, expecting subcontract workers to receive an increase of wage class and of basic pay is quite difficult, without regard for duration of employment, which can be another factor that fosters wage disparity between them and workers belonging to the Three Giants.

Table 1. Wage comparison between regular unionists and subcontract workers

(Unit: KRW; %)	Absolute level			Relative level		
	Regular wage*	Monthly wage**	Average wage***	Regular wage	Monthly wage	Average wage
Regular unionist						
HHI	2,112,233	2,793,338	4,659,817	91.1	96.3	97.5
DSME	2,279,331	2,982,828	5,057,485	98.3	102.9	105.8
SHI	2,566,100	2,924,100	4,620,212	110.6	100.8	96.7
Average	2,319,221	2,900,088	4,779,171	100.0	100.0	100.0
Subcontract worker						
Primary	2,292,000	2,618,000	3,083,000	98.8	90.3	64.5
Secondary	2,332,000	2,532,999	2,712,000	100.6	87.3	56.7
Tertiary	2,227,000	2,478,000	2,794,000	96.0	85.4	58.5
Average	2,295,000	2,594,000	2,999,000	99.0	89.4	62.8

Note: The average figure for the Three Giants' regular unionists = 100. Regular wage* = Basic pay + Sundry allowances. Monthly wage** = Regular wage + Overtime pay. Average wage*** = Monthly wage + Bonus + Performance-based pay.

Source: Anne (2015); Korean Metal Workers' Union (2014; 2015).

4.2. Subcontract worker vs. bulk-hired program-specific worker

If there is wage disparity between subcontract workers and bulk-hired program-specific workers like that between the Three Giants' regular unionists and subcontract workers, analyzing its level could be a stepping stone to finding out the Three Giants' ultimate purpose for utilizing workers who are not in direct employment relationships with them for building ships and offshore plants.

Unlike subcontract workers, who consistently work within a specific shipbuilder's shipyard, bulk-hired program-specific workers are temporary workers working at different shipyards in various regions based on short-term contracts in response to irregular labor demand; therefore, it is expected that their average wage level will be relatively lower than subcontract workers' average wage level. However, Figure 4 reveals an interesting fact: The wage disparity between subcontract workers and bulk-hired program-specific workers is against the odds. As of 2013, subcontract workers in the shipbuilding and offshore industry received 35,988,000 KRW per year on average. A closer look at wage levels by subcontractor group reveals that primary subcontractors, secondary subcontractors, and tertiary subcontractors received 36,996,000 KRW, 32,544,000 KRW, and 33,528,000 KRW per year on average, respectively. There is, of course, wage disparity among these subcontract workers; however, it is at a very low level. A slight difference in the wage level of bulk-hired program-specific workers is identified according to region, but taken as a whole, their wage level is higher than the wage level of subcontract workers. In the case of the Geoje area, bulk-hired program-specific workers receive 45,110,000 KRW per year, which is higher than the wage level for bulk-hired program-specific workers in the other four regions, reflecting 125.3 percent of subcontract workers' average yearly wage, which is quite a high level of disparity. In addition, it is identified that the wage level of bulk-hired program-specific workers is rather higher than that of workers belonging to secondary subcontractors or tertiary subcontractors, except in the Changwon area. To summarize, bulk-hired program-specific workers in five regions (i.e., Geoje, Tongyeong, Changwon, Ulsan, and Mokpo) receive 37,989,000 KRW per year on average, which is 103.3 percent of a subcontract worker's average yearly wage.

The existence of a significant wage disparity between subcontract workers and bulk-hired program-specific workers was identified, but the fact that the level of this wage disparity is rather small compared to wage disparity between regular unionists within the Three Giants and subcontract workers in the shipbuilding and offshore industry should be considered significant. Moreover, in the case of bulk-hired program-specific workers, who can generally be regarded as workers lower in the labor hierarchy than subcontract workers, it is extraordinary that their wage level is higher than the wage level of subcontract workers in spite of the small number of wage composition items. Thus, it is necessary to consider questions about the Three Giants' tacit aim in utilizing bulk-hired program-specific workers whose wage level is relatively high; that is, what do the Three Giants expect from the utilization of these workforces for their construction activities?

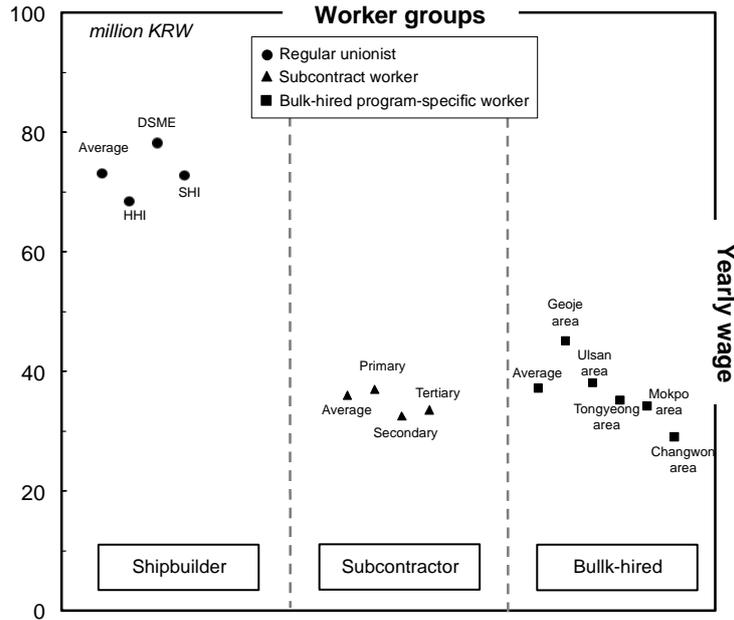


Figure 4. Wage disparity by worker group

Note: The subcontract workers' yearly wage is computed by using data from Table 1.

Source: Anne (2015); Korean Metal Workers' Union (2014; 2015).

5. Dual-channel capital accumulation (I)

5.1. Corporate growth and capital accumulation

The growth of a company can be defined from various perspectives. An external expansion of business scale proceeding from enlargement of the company's business activities can be one way to define the growth of the company; an internal expansion of business scale led by sales increase or profit increase can be another (Kim, 2016). In general, a firm as an organization gradually and spontaneously increases its wealth through internal and external growth processes. If corporate practices for a gradual expansion of the absolute or relative scale of a firm's wealth are defined as a firm's capital accumulation activity, it may safely be construed to mean that the firm is able to increase the likelihood of corporate subsistence or long-term sustainability by managing its capital accumulation activities. Although there is no clear consensus on the optimum scale or appropriate line for a firm's capital accumulation, it is obvious that firms, at least, deal with various strategies for attainable capital accumulation to maximize their wealth. Not only are there various ways for firms to accumulate wealth, but the ways and means of doing so are complex and wide-ranging. The representative and widely used objective measures to estimate the scale or size of firms' accumulated wealth are internal reserves, retained earnings, and cashable assets. By undertaking an analysis of trend changes in these factors, patterns of sales figures, and net profit changes, it is possible to approach a more accurate scale of a firm's capital accumulation. In the case of Korea, it is difficult to conclude that there is a gradual growing trend for all companies accumulating wealth, but consistent behavior for scale expansion of their capital accumulation is identified in large business groups after the 1997 Asian Financial Crisis, which greatly affected Korea's economic structure. It is of course expected that the ways of accumulating capital and their scale will be relatively diverse. However, as revealed in Lee & Heo (2009), there are a few common aspects: Korea's large business groups have accumulated a huge scale of internal reserves since the early 2000s; in particular, the top 10 largest business groups' internal reserves are growing continuously, and their reserve ratios^{xii} have also remained at a high level in comparison with other companies in Korea.^{xiii} Of

course, such aspects of capital accumulation have been clearly seen in the Three Giants.

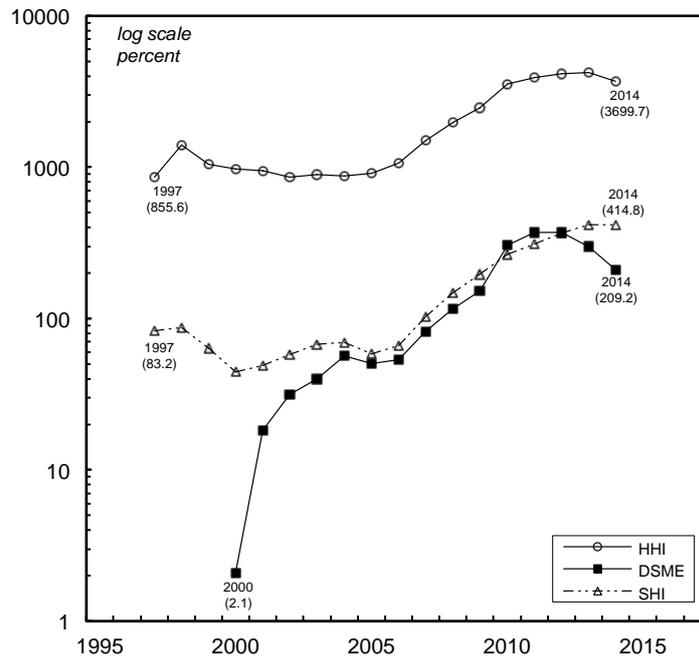


Figure 5. Path of changes in R_t

Note: $R_t = (CS_t + RE_t) / C_t$ where R_t represents reserve ratio in the year t , CS_t is capital surplus in the year t , RE_t is retained earnings in the year t , and C_t represents capital in the year t . All data are based on their fiscal year.

Source: Computed by the author by using data from Repository of Korea's Corporate Filings Data Analysis, Retrieval and Transfer.

Figure 5 shows the path of changes in the Three Giants' reserve ratio (R_t), which is computed using data (i.e., capital surplus, retained earnings, and capital) from the Repository of Korea's Corporate Filings Data Analysis, Retrieval, and Transfer (DART). Our analysis clearly illustrates two features: First, the Three Giants' R_t has shown a steady increasing tendency each year since the 2000s; second, while the scale varies, the Three Giants' internal reserves have remained at a high level over the long term. In the case of HHI, R_t has drastically increased from 855.6 percent (R_{1997}) to 3699.7 percent (R_{2014}), and there has been a marked increase in internal reserves from 1,846,799 million KRW to 14,058,976 million KRW during the same period. SHI—whose R_t was recorded at 83.2 percent in 1997—also showed a significant increase in its reserve ratio, with a record of 414.8 percent (R_{2014}); the scale of its internal reserves increased explosively from 307,771 million KRW in 1997 to 4,790,558 million KRW in 2014. Such a tendency is also shown in DSME. In its case, R_t has increased from 2.1 percent (R_{2000}) to 209.2 percent (R_{2014}), and its internal reserves showed a rapid rise from 20,710 million KRW to 2,012,400 million KRW.

The increases in both reserve ratio and scale of internal reserves, which the Three Giants have in common, directly show that the Three Giants themselves have gradually increased their own wealth, which can be construed as meaning that their capital accumulation activities have been aggressively and actively implemented. Of course, it is difficult to make an absolute value judgment about the Three Giants' capital accumulation activities through an expansion of their wealth; moreover, the ways to approach this issue and the ways to handle it are also very diverse. In this sense, the issue of absolute value judgment is magnified in importance, but analyzing and understanding what factors play a large role as

capital accumulation channels for the Three Giants must be made a priority, in order to comprehend the corporate systems of the Three Giants.

5.2. Channel I: Capital accumulation led by labor cost reduction

We define one axis of dual-channel capital accumulation as Channel I, which proceeds from labor cost reduction, and present its impact on the Three Giants' capital accumulation. As mentioned, the Three Giants' labor structures have fully transformed from the IP labor structure to the IS labor structure since the early and mid 2000s; the Three Giants have maintained a very high level of dependence on in-house subcontract workers. The previous sections emphasized that an in-house subcontract worker has an employment relationship with a subcontractor that has a subcontracting relationship with a shipbuilder, but this worker is in a practical labor-use relationship with the shipbuilder. Additionally, this study accepts the argument that various economic climate changes promote rapid expansion of the Three Giants' business towards the offshore plant industry; therefore, a significant portion of their required workforce is made up of dislocated workers who worked for small and medium-sized insolvent shipbuilders that were unable to withstand the crisis.^{xiii}

On the basis of the aforementioned arguments, it can be concluded that the Three Giants have strongly maintained their corporate systems based on a growth pattern led by in-house subcontract workers. It is no exaggeration to say that such a growth pattern embeds the possibility of capital accumulation in that the more the Three Giants concentrate on internal or external growth, the more their wealth increases. We consider this argument to be an important point, and give it heavy weight. Because the large amount of labor supplied by in-house subcontract workers is one of the key factor that allows the Three Giants to accumulate practical capital, these workers represent one axis among the various channels for capital accumulation. The most important reason that we can unwaveringly develop such an argument is the strong possibility that the significant wage disparity between in-house subcontract workers and in-house production workers has eventually led to an overall labor cost reduction for prime contractors. As Park (2015a) argued, the general channels of adjustment to wage increases, such as an annual wage class raise and base pay, have no place in the wage system applied to in-house subcontract workers, and there is also a wage ceiling. In addition, as revealed in Table 1, the average wage of subcontract workers equates to only 62.8 percent of that of the Three Giants' regular unionists, and this figure adds persuasive power to the argument that the Three Giants are more likely to partially reduce their labor costs through the significant wage disparity between these two worker groups.

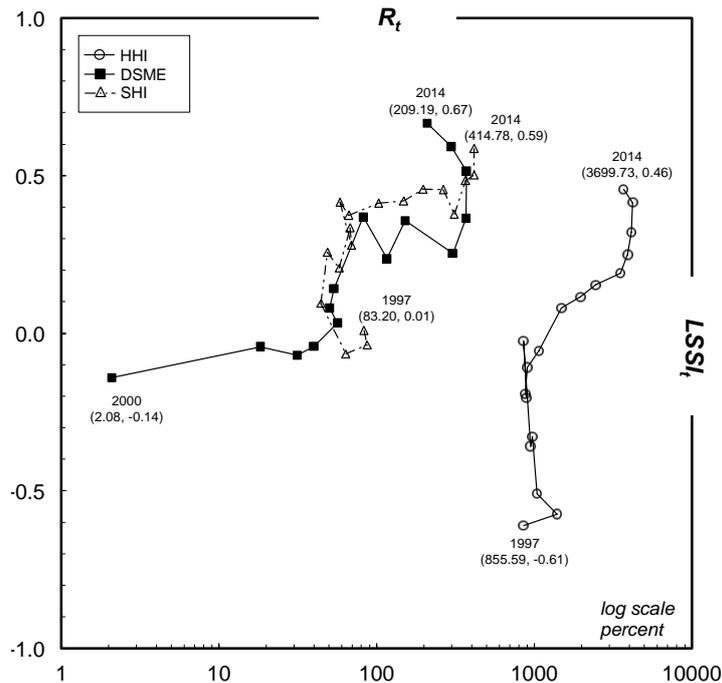


Figure 6. Direction of movement for R_t and $LSSI_t$

Note: All data are based on their fiscal year.

Source: Computed by the author by using data from Korea Offshore & Shipbuilding Association; Repository of Korea's Corporate Filings Data Analysis, Retrieval and Transfer.

Figure 6 shows the changes in both the R_t and the $LSSI_t$ of the Three Giants. One remarkable aspect of an analysis of the data is that R_t increases gradually when the $LSSI_t$ score shows a positive value as time passes. In other words, the changes in these two data points mean that the scale of internal reserves (i.e., the sum of capital surplus and retained earnings) increases as the Three Giants' level of dependence on in-house subcontract workers increases. What we can assume through path changes in the $LSSI_t$ of the Three Giants is a possibility of their labor cost reduction. The in-house subcontract workers whose overall wage level is relatively low compared to workers belonging to a shipbuilder is freely utilized in various ways for the purpose of construction activities while taking orders from a shipbuilder; therefore, we can infer that the Three Giants are utilizing a workforce with relatively less labor cost compared to when they depend strongly on the input of workers who are in direct employment relationships with them. Looking at the issue of labor cost reduction from a wider perspective, it may be possible to conclude that the Three Giants are likely reducing absolute production cost through the utilization of in-house subcontract workers, so that the benefit from their utilization continues to be a factor that increases the possibility of the Three Giants' capital accumulation. Thus, the overall cost savings that have been realized through the wage disparity between the two worker groups are steadily accumulated into the practical wealth of the Three Giants in various forms. This becomes Channel I for the Three Giants' capital accumulation, which we define as one axis of dual-channel capital accumulation in this study (see Figure 7).

6. Dual-channel capital accumulation (II)

6.1. Flexible utilization of workforces led by bulk-hired program-specific workers and the channel of output adjustment

The Three Giants, in common with other companies, are always exposed to the possibility of uncertain and varied circumstances in their business activities. Diverse circumstances might bring them to crisis, or could be a significant growth opportunity for them. Thus, how quickly the Three Giants overcome a crisis or how

efficiently they cope with a growth opportunity is an important issue that cannot be ignored. In fact, the result of such a crisis or opportunity is directly connected to a company's output; therefore, from a company standpoint, it is necessary to create and maintain a business environment that allows the company to adjust its output as swiftly and flexibly as possible when faced with abrupt and uncertain circumstances. If during an unexpected recession, the Three Giants are able to curtail their output within a short period of time for a minimal loss of production, or if the Three Giants in an abruptly booming economy are able to increase their production volume within the short term at minimal cost, the practicality of loss minimization and profit maximization will be much greater. Of course, the profits and losses of a company are not determined by only the one factor of output, but the scale of overall profits and losses resulting in flexible output adjustment is not small; therefore, the relation between output adjustment and profits and losses cannot be ignored. From this perspective, the fact that the Three Giants are able to flexibly adjust their output implies that a business environment that allows them to flexibly adjust various factors affecting their output as planned has been created. Owing to the distinct particularities of the shipbuilding and offshore industry, which has features of both a labor-intensive industry and a capital-intensive industry, the factors can be related to either capital or labor. However, in the case of the Three Giants, whose labor structures are evolving to depend on external workers at a high level, it is strongly expected that a labor-related factor will be key to the flexible adjustment of their output. Further, this is ultimately concluded based on how flexibly the Three Giants can utilize their required workforces.

The bulk-hired program-specific workers—who work at different shipyard in various regions for short periods of time in response to shipbuilders' work needs or irregular labor demand—are a direct example of how flexibly the Three Giants are utilizing required workforces for their construction activities. The bulk-hired program-specific workers, who are temporary workers with short-term contracts, represent a form of flexible employment; therefore, the Three Giants are likely to minimize overall loss when faced with an abrupt reduction of output based on an unexpected business depression by promptly reducing the employment of bulk-hired program-specific workers. Conversely, when the Three Giants need to actively respond to unexpected and explosive demand for various vessels in a booming economic cycle, they are likely to expect overall profit maximization and to achieve increased output without a labor shortage by promptly bulk hiring program-specific workers. In sum, for the Three Giants, which are exposed to uncertain and varied circumstances, bulk hiring program-specific workers can be a strategic means to quickly overcome a crisis or efficiently cope with a growth opportunity. In other words, bulk hiring program-specific workers plays an important role as a channel of output adjustment for the Three Giants.

6.2. Channel II: Capital accumulation through flexible output adjustment

In order to add persuasive power to the argument regarding the role of bulk hiring program-specific workers as a channel of output adjustment, it is necessary to consider the following question: Why do the Three Giants utilize bulk-hired program-specific workers for their construction activities even though their wage level is not remarkably lower than that of in-house subcontract workers? To address this question, we attempt to present the possibility of the Three Giants' capital accumulation through Channel II, which is the other axis of their dual-channel capital accumulation. The capital accumulation channel proceeding from flexible output adjustment is defined as Channel II in this study, and the Three Giants are highly likely to secure the practicality of overall loss minimization or overall profit maximization through this channel.

As of 2013, subcontract workers in the shipbuilding and offshore industry received 35,988,000 KRW per year on average, while bulk-hired program-specific workers in the aforementioned five regions received 37,989,000 KRW, which is

rather higher (see Figure 4). Though these two wage data points show the average wage level of the two worker groups, from such a wage disparity, we can raise the question of why the Three Giants are separately utilizing in-house subcontract workers and bulk-hired program-specific workers. If the Three Giants put strong emphasis on labor cost reduction, they should only increase the scale of in-house subcontract workers when an additional increase in workforce is required owing to increased production volume. However, in-house subcontract workers' contract terms to consistently provide their manpower to a shipbuilder are relatively longer than those of bulk-hired program-specific workers' duration of employment, so that from the Three Giants' standpoint, they have no choice but to consider that it is very difficult to change the employment scale of in-house subcontract workers immediately in response to various business fluctuations. Therefore, although there is no big expectation of labor cost reduction, bulk-hired program-specific workers—whose employment scale is easily adjustable in response to output fluctuations, or who have super-flexible employment—are appropriately utilized in the Three Giants' construction process for building ships and offshore plants.

From the Three Giants' standpoint, it might seem that bulk hiring program-specific workers does not result in a direct reduction of labor cost. However, from a holistic point of view, the Three Giants are highly likely to secure the practicality of a potential cost reduction that is linked to output by using the bulk hiring of program-specific workers as a channel of output adjustment. In other words, if bulk hiring program-specific workers plays a role as the Three Giants' channel of output adjustment, the Three Giants are able to flexibly adjust the range and scale of workforce utilization based on changes in their target level of output in response to business fluctuations. Finally, the possibility of overall loss reduction proceeding from this flexible adjustment is highly likely to lead to overall cost savings. In simple terms, if the Three Giants have difficulty reducing unnecessary workforces within a short period of time as their output decreases when faced with abrupt output reduction, they cannot avoid labor cost loss caused by a redundant labor force. Conversely, if the Three Giants have difficulty securing additional required workforces and utilizing these workforces when faced with an abrupt increase in production scale, this is also highly likely to lead to overall losses for the Three Giants. If an environment is created that allows a firm to immediately reduce workforce scale when its output scale is reduced, labor cost loss will be reduced as much as its workforce scale. Further, labor cost savings will accumulate into a firm's wealth; therefore, they may safely be regarded as capital accumulation in a broad sense. In sum, a high level of employment flexibility, which bulk hiring of program-specific workers provides, serves as a leading factor that reduces the likelihood of wasting the latent cost of labor for the Three Giants; therefore, the Three Giants hire bulk-hired program-specific workers for their construction activities even though their wage level is not relatively low because, in the long run, overall cost savings that are realized spontaneously through the utilization of bulk-hired program-specific workers are steadily accumulated into the practical wealth of the Three Giants in various forms. This is Channel II for the Three Giants' capital accumulation, which we define as the other axis of dual-channel capital accumulation in this study (see Figure 7).

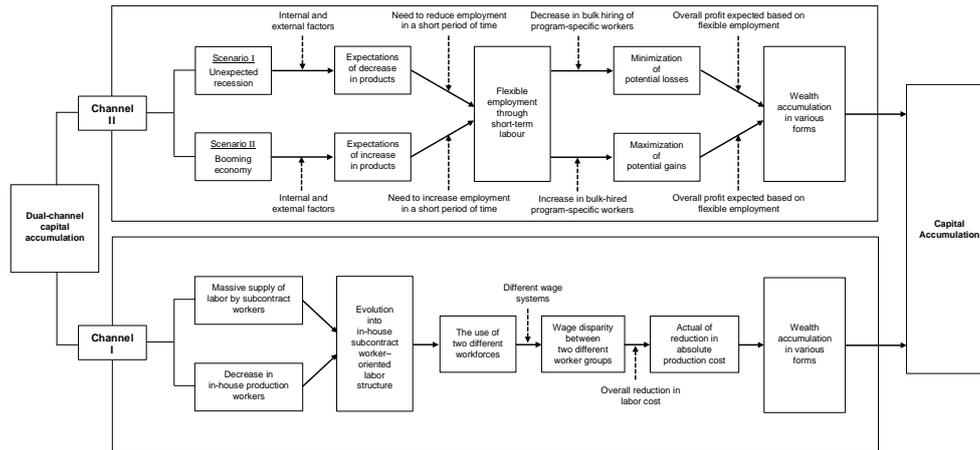


Figure 7. The mechanism of dual-channel capital accumulation
 Source: Constructed by the author.

7. Conclusion

Corporate systems come in many forms, depending on the relationships among diverse corporate system composition elements and their structural features. They consist of combinations of various structures; ^{xiv} labor structure, which is highlighted in this study, is one of them. A corporate system typically shows spatial diversity and also evolves gradually or rapidly, thus showing temporal diversity. The evolution of corporate systems is caused by various factors; these various factors ultimately have either direct or indirect effects on the diverse structures that comprise a corporate system. For this reason, the corporate system of a firm is not continuously maintained in a standardized form. The corporate system inevitably undergoes evolutionary processes as time passes, and as a result, it transforms into another and substantially different form of corporate system.

The authors of this study wholeheartedly accept the evolutionary perspective on firms and the argument regarding the diversity of corporate systems. Based on this framework, we attempted to examine the common labor structure features of the leading shipbuilding giants in South Korea and the changes in their wage-labor nexus, and devoted our attention to uncovering their dual-channel capital accumulation. Further, in order to explore the following questions, this study mostly focused on undertaking an overall analysis of the Three Giants (i.e., HHI, DSME, and SHI) from a variety of perspectives:

- What are the key factors that accelerate the gradual evolution of the Three Giants' labor structure, and how can the newly evolved labor structure be maintained?
- What are the practical reasons that the Three Giants depend strongly on the input of in-house subcontract workers for their construction activities?
- How does the change in the Three Giants' labor use pattern affect their corporate systems?
- Can we conclude that the only purpose of bulk hiring program-specific workers for the Three Giants is to reduce labor cost?
- How do the consequences that flow from a separation of labor use relate to the possibility of capital accumulation for the Three Giants?

Through the process of answering the above questions, we have found that dual-channel capital accumulation, which allows the Three Giants to secure a strong element of capital accumulation, has been created through the evolution of their labor structure. Our findings and discussion can be summarized as follows: First, our calculation of the Labor Structure Specialization Index (*LSSI*) and its changing pattern shows that since the early and mid 2000s, the Three Giants' labor structures

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have fully transformed to the IS labor structure; the Three Giants have maintained a very high level of dependence on in-house subcontract workers in terms of construction processes for building ships and offshore plants. Second, both the business diversification as a strategic decision to overcome a crisis and the influence of external factors caused by gradual rise of international oil prices have resulted in an explosive increase in the Three Giants' level of dependence on external workers for construction activities, which causes the Three Giants to maintain an IS labor structure. Third, owing to the wage disparity that clearly exists between workers employed by subcontractors and the workers employed by prime contractors (i.e., shipbuilders), the Three Giants have a better chance of reducing labor costs through the use of in-house subcontract workers whose employment is linked to a prime contractor's output goals. Fourth, as bulk hiring program-specific workers for the Three Giants' construction activities creates a flexible and strategic input, the Three Giants are more likely to be able to be flexible in responding to unexpected and abrupt fluctuations in output within a short period of time. Fifth, as overall cost savings realized through utilizing relatively low-paid in-house subcontract workers are steadily accumulated into the practical wealth of the Three Giants in various forms, Channel I of their capital accumulation has been established and is being maintained. Sixth, the high level of employment flexibility provided by bulk hiring program-specific serves as a leading factor reducing the likelihood of wasting the latent cost of labor for the Three Giants in the long run; therefore Channel II of capital accumulation—where overall cost savings expected from utilizing bulk-hired program-specific workers are accumulated into the Three Giants' practical wealth in a variety of forms—has been established and is being maintained.

The aim of this study, in fact, is divided into two parts: to examine the structural features of the Three Giants' labor and changes in their wage-labor nexus, and to uncover the Three Giants' dual-channel capital accumulation. However, taken as a whole, this study comes down to one goal, which is to investigate how institutional factors (i.e., the Three Giants' labor structures and their wages) increase the possibility of the Three Giants' capital accumulation and what effect institutional factors have on their capital accumulation. The Three Giants attempt to appropriately combine the practical utilization of relatively low-paid workers and the strategic use of workers with a high level of employment flexibility, considering various business environments, and they utilize these workforces for their construction activities. This helps the Three Giants to minimize the potential loss based on overall expenses and to maximize the possibility of making a profit; therefore, this mechanism greatly boosts the possibility of capital accumulation. From the company's point of view, this may safely be construed as meaning that securing channels to support the steady increase of its wealth and lead to large-scale capital accumulation through such a mechanism is in some ways analogous to a securing a virtuous circle that promotes the stability and sustainability of its growth. However, we need to consider the argument about whether the mechanism, which is regarded as a virtuous circle from the company's perspective, can be accepted as a virtuous circle from a societal perspective. In other words, there is a greater need to deliberate the issue of value judgment as to whether the Three Giants' assertive behavior for capital accumulation itself can maintain the overall structural stability and sustainability of Korea's shipbuilding and offshore industry. The Three Giants have created a business climate that helps to gradually boost the possibility of their capital accumulation through dual-channel capital accumulation, but the hidden side of such a business climate is the potential not only to expand the structural instability of labor when a prime contractor is operated by a large number of external workers, such as in-house subcontract workers, but also to cause various social issues resulting from an explosive increase in shorter-term contract-based nonregular workers such as bulk-hired program-specific workers, and short-term project-specific workers. Thus, in seriously considering such issues, future research will need to come up with answers to the following questions: Does

an optimum level of firm capital accumulation exist? If it exists, where is the appropriate line when it comes to a firm's capital accumulation activity? Seeking the answers to these questions will strengthen the arguments made here.

Notes

- ⁱ In the 1970s, the Park Chung-Hee regime in South Korea forced the strong *chaebols* to achieve economies of scale and to be involved in the shipbuilding industry, pressed for the industry's enlargement (Korean Metal Workers' Union, 2013). As a result of his strong action, three main shipbuilders (i.e., Hyundai Heavy Industries in 1973, Daewoo Shipbuilding and Heavy Machinery in 1973, and Samsung Heavy Industries in 1974) were established at that time.
- ⁱⁱ See OECD (2014)
- ⁱⁱⁱ "In-house subcontracting refers to the business practice whereby the prime contractor contracts out part of his/her production activities to a subcontractor, whose employees are to work within the prime contractor's premise while being supervised by the subcontractor" (OECD, 2013; p.137).
- ^{iv} The data are provided by Korea Offshore and Shipbuilding Association.
- ^v The data are provided by Korea Offshore and Shipbuilding Association.
- ^{vi} Labor Structure Specialization Index ($LSSI_t$) = $(\sum S_t - \sum P_t) / (\sum S_t + \sum P_t)$ ($t = 1990, \dots, 2014$) where S_t is in-house subcontract workers in the year t and P_t is in-house production workers in the year t . $0 < LSSI_t \leq 1.00$: IS labor structure; $-1.00 \leq LSSI_t < 0$: IP labor structure.
- ^{vii} One of the probable reason that Japan's shipbuilding industry was deprived of its initiative by Korea is that Korea's shipbuilders, facing the bleak prospect of shrinkage of the global shipbuilding industry in the late 1990s, tried to extend their production equipment and facilities through bold investments— unlike Japan's shipbuilders, which attempted to reduce the size of their market by carrying out large-scale restructuring. However, contrary to expectations, the global shipbuilding industry was booming at that time so that the global situation turned in Korea's favor (Metal Network Korea, 2008).
- ^{viii} Park (2105a) describes a temporary contract-based worker who works at different shipyards in various regions for a few weeks or several months according to work needs and who is not classified as an in-house subcontract worker working within a specific shipyard as a bulk-hired program-specific worker.
- ^{ix} See Korean Metal Workers' Union (2015).
- ^x See Gang (1998).
- ^{xi} Reserve ratio can be an indicator of how well a firm's internal reserves prepare it to maintain the stability of its financial structure or to extend its equipment and facilities.
- ^{xii} According to Lee & Heo (2009), the sum total of internal reserves of listed companies belonging to the top 10 largest business groups was only 6,767,255 million KRW in 2000, but it had increased to 17,238,981 million KRW by 2008. The Socialist Revolutionary Workers' Party uncovered that this figure had increased to 644,820,700 million KRW at the end of December 2015. [Retrieved from].
- ^{xiii} See Park (2015b).
- ^{xiv} In simple terms, structure S_i (e.g., labour structure), as one of the structures that comprises a corporate system, exists in firm A in the form S_i^A ; in firm B , in the form S_i^B ; and in firm C , in the form S_i^C . Moreover, the other structures (i.e., $S_2, S_3, \dots, S_6, S_7, \dots$) that also comprise each corporate system exist in firms A, B , and C as different types of structures—which is to say, as $(S_2^A, S_3^A, \dots, S_6^A, S_7^A, \dots)$, $(S_2^B, S_3^B, \dots, S_6^B, S_7^B, \dots)$, and $(S_2^C, S_3^C, \dots, S_6^C, S_7^C, \dots)$, respectively. In more concrete terms, the structure S_i that exists in firm A in the form S_i^A cannot be identical to the form S_i^A in firms B or C . This is because the factors that affect (or affected) each firm's structure S_i are completely different, and so the level of their influence will also be very different.

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