



---

**KLI Working Paper**

September 30, 2019

---

**For Inquiry:** KLI International Cooperation &  
Information Office

**Address:** 370, Sicheong-daero, Sejong-si, 30147, Korea  
[www.kli.re.kr/kli\\_eng](http://www.kli.re.kr/kli_eng)

---

**Author(s):** Yoo, Dong-hoon

---

# Movements of Jobs in Industries of Employment Crisis Zones\*

---

**Yoo, Dong-hoon\*\***

## I. Employment Status and Job Reallocation Following Changes in Industrial Structure : Gunsan

Declining industries and subsequent industrial restructuring have a significant impact on a regional economy. For example, if a particular region depends on few highly specific industries with a heavy employment concentration, industrial restructuring could potentially deliver serious social and economic problems.

With staggering automotive and shipbuilding industries over the last decade, the employment situation in some regions of South Korea where a local economy heavily relies on these industries have worsened. Signifying employment turmoil, the South Korean government has designated regions such as Pyeongtaek, Tongyoung, Geoje, Godeong, Gunsan, Jinhae, and Mokpo/Youngam as “employment crisis zones” and the shipbuilding indus-

try as a “special employment support industry” aiming at improving job security and facilitating job creation since unemployment resulting from (involuntary) industrial restructuring adversely affects a regional economy and the society as a whole. Therefore, it is important to achieve regional economic revitalization and employment creation through properly managing an industrial structure of affected regions with a mid-to long-term vision by establishing comprehensive long term measures.

The city of Gunsan was designated as an “employment crisis zone” on April 5, 2018 by the Ministry of Employment and Labor (MOEL) due to a concern about the possibility of the regional economic crisis. The designation reflected the impact of the shipbuilding industry recession that has been underway since 2016 on the overall economy of the region where the shipbuilding industry is concentrated, as well as the possibility of additional

---

\* This paper is a summary of Chapter 4 of “A Study on Mapping Worker Turnover and Job Reallocation in Employment Crisis Areas” by Yoon, Yoon-Gyu et al.(2018).

\*\* Associate Fellow, Korea Labor Institute ([erojuli@kli.re.kr](mailto:erojuli@kli.re.kr)).

Table 1. Annual Changes in Maintaining Insured Status of Workers Employed in Shipbuilding and Automotive Industries of Gunsan, North Jeolla Province, as of June 2012

(Unit : %)

	2012	2013	2014	2015	2016	2017	2018
<b>Shipbuilding industry</b>							
Share of Building of Ships and Boats	100.0	90.3	82.7	79.0	77.1	42.9	30.2
Share of Gunsan, North Jeolla Province	100.0	85.5	76.5	67.8	63.7	33.9	27.8
<b>Automotive industry</b>							
Share of Automotive Industry	100.0	84.3	73.3	63.4	58.4	57.3	51.0
Share of Gunsan, North Jeolla Province	100.0	94.8	88.8	84.5	82.1	81.8	78.6

Note : The survey was conducted among the 2,826 workers in Gunsan's shipbuilding industry and the 6,847 workers in Gunsan's automotive industry who were insured under employment insurance as of June 30, 2012, and their insured status was tracked every year on June 30. Age is counted in full years as of June 30, 2012.

Source : Jan. 1997~Jun. 2018, Employment Insurance DB

restructuring following the announcement of GM Korea Company's decision to shut down the Gunsan plant. The industrial structure of Gunsan is specialized in automobiles, shipbuilding and related industries. In particular, the city relies heavily upon the automotive industry, with its location quotient (LQ) being 7.26 (KIET, 2018). According to the 2015 Census on Establishments, the shares of establishments in the automobile engine and automobile manufacturing and its establishments in ship and boat building were 30.2% and 2.11% respectively in Gunsan. Given such regional economic structure, it is necessary to examine how the employment shock in the automotive and shipbuilding industries transmitted to the entire regional economy.

Before going into a more detailed discussion, it would be helpful to examine annual changes in the insured status of workers in the automotive and shipbuilding industries (Table 1). According to a survey of workers employed in the automotive and shipbuilding industries in Gunsan as of June 30, 2012, the number of workers decreased by more than 65% in the shipbuilding industry between 2016 and 2017 when the industry had an employment crisis.<sup>1)</sup> Also, more than 70% of those employed in Gunsan's shipbuilding companies as of June 30, 2012 were no longer working

in Gunsan in 2018. On the other hand, the changes were not so drastic in the automotive industry. In the automotive industry, the decrease in the number of insured workers was relatively small and gradual. It was found that 78.6% of those employed in Gunsan's car manufacturing firms as of June 30, 2012 were still working in Gunsan in 2018. This confirms that Gunsan's employment crisis was more severe in the shipbuilding industry than in the automotive industry. Although it is not difficult to understand the employment crisis in the automotive and shipbuilding industries of Gunsan from <Table 1>, it is necessary to conduct a detailed analysis of job reallocation to bring about better employment services and policies that can contribute to effective movements of labor across sectors, occupations, and regions in response to industrial restructuring. With such goal in mind, this paper tracks and analyzes the insured workers in the automotive and shipbuilding industries of Gunsan to observe job reallocation

## II. Trends in Intersectoral Movement

The characteristics of the sectoral reallocation of the 2,826 insured workers in the shipbuilding industry are

1) Unless noted otherwise, a worker refers to the one registered in the employment insurance database

Table 2. Trends in the Movements of Workers Insured in Shipbuilding Industry as of June 2012

(Unit : person)

	Industry	2012	2013	2014	2015	2016	2017	2018
1	Building of Ships and Boats	2,826	1,914	1,636	1,489	1,437	480	376
2	Manufacture of Other Metal Products		38	50	32	33	55	65
3	Manufacture of General Purpose Machinery		22	34	41	40	61	72
4	Manufacture of Structural Metal Products, Tanks, Reservoirs and Steam Generators		17	37	36	38	46	70
5	Provision of Human Resources and Activities of Employment Placement Agencies		10	14	11	10	15	23
6	Manufacture of Parts and Accessories for Motor Vehicles and Engines		9	14	14	17	45	49
7	Activities of head offices for construction (group)		7	9	11	17	35	58
8	Other Industries		102	185	250	272	383	534
	Other Industries Total		205	343	395	427	640	871
	Not Insured		707	847	942	962	1,706	1,579

Note : The survey was conducted among the 2,826 workers in Gunsan's shipbuilding industry who were insured under employment insurance as of June 30, 2012, and their insured status was tracked every year on June 30.

Source : Jan. 1997~Jun. 2018, Employment Insurance DB.

shown in <Table 2>. The number of workers in the shipbuilding industry (Industrial Classification: building of ships and boats) declined steadily starting from 2012, and dropped sharply to 480 in 2016 and 2017 when the industrial crisis occurred, and we observe that an increasing number of them were working in other industries or lost their insurance status.<sup>2)</sup>

The proportion of workers employed in other industries increased. The number of workers confirmed to be employed in industries other than the shipbuilding industry, more than quadrupled from 205 in 2013 to 871 in 2018. However, this is not a big increase compared to the decrease in the number of workers in the shipbuilding industry, and we may plausibly argue that a significant number of workers in the shipbuilding industry lost their insured status between 2016 and 2017. Looking at the reallocation of workers to other industries, a relatively high proportion of them moved to the manufacturing sector (manufacture of metal products, manufacture of ma-

chinery, manufacture of structural metal products, tanks, reservoirs and steam generators, manufacture of parts and accessories for motor).

<Table 3> shows the trends in the age of workers in the shipbuilding industry. It is worthy to note that the proportion of those aged 15~29 in the shipbuilding industry (Industrial Classification: building of ships and boats) sharply declined starting from 2017. Among the 519 workers aged 15~29 working in the shipbuilding industry in Gunsan as of June 30, 2012, only 191 of them (60.3% of insured workers) were employed in the shipbuilding industry in 2016, followed by 75 in 2017, and 57 in 2018. While those aged 30~39 account for the largest share of workers in the shipbuilding industry, only 187 of them were still employed in the shipbuilding industry in 2018, which was 14.5% of workers in the shipbuilding industry in 2012. In particular, the number of workers in the shipbuilding industry declined by 533 between 2016 and 2017, which is substantially greater than what happened between the years 2016 and

2) Dropping out of the employment insurance database does not necessarily imply that one is unemployed

Table 3. Trends in the Age of Workers Insured in Shipbuilding Industry of Gunsan, North Jeolla Province, as of June 2012

(Unit : person)

	Age	2012	2013	2014	2015	2016	2017	2018
1	15~29	519	288	222	203	191	75	57
2	30~39	1,290	902	806	744	742	209	187
3	40~49	621	449	370	333	322	120	74
4	50 or above	396	275	238	209	182	76	58
	Total	2,826	1,914	1,636	1,489	1,437	480	376

Note : The survey was conducted among the 2,826 workers in Gunsan's shipbuilding industry who were insured under employment insurance as of June 30, 2012, and their insured status was tracked every year on June 30.

Source : Jan. 1997~Jun. 2018, Employment Insurance DB.

Table 4. Trends in the Movements of Workers Insured in Automotive Industry as of June 2012

(Unit : person)

	Industry	2012	2013	2014	2015	2016	2017	2018
1	Manufacture of Motor Vehicles and Engines for Motor Vehicles	4,487	4,169	3,957	3,589	3,401	3,407	3,307
2	Manufacture of parts and accessories for motor vehicles (new products)	2,300	1,706	1,358	1,153	1,026	918	614
3	Manufacture of Bodies for Motor Vehicles ; Manufacture of Trailers and Semitrailers	60	52	42	10	11	16	24
4	Manufacture of Other Transport Equipment		51	4	2	1	1	1
5	Manufacture of Other Metal Products		44	68	84	95	83	80
6	Support activities for transportation		35	27	21	18	22	31
7	Manufacture of General Purpose Machinery		21	36	47	66	78	70
8	Other Industries		257	508	732	1,055	1,111	1,108
	Other Industries Total		408	643	886	1,235	1,295	1,290
	Not Insured		512	847	1,209	1,174	1,211	1,612

Note : The survey was conducted among the 6,847 workers in Gunsan's automotive industry who were insured under employment insurance as of June 30, 2012, and their insured status was tracked every year on June 30.

Source : Jan. 1997~Jun. 2018, Employment Insurance DB.

2017 where the number of workers in the shipbuilding industry decreased from 744 to 742, reflecting the impact of a severe employment shock. A similar pattern is observed among insured workers aged 40~49, with only 74 workers being employed in the shipbuilding industry in 2018. On the other hand, as for those aged 50 or above that accounted for the smallest share of insured workers as of June 30, 2012, we observe that a relatively high proportion of them were still working in the shipbuilding industry both before and after the employment crisis.

Now can we detect a similar sectoral reallocation for those who were working in the automobile industry? As

shown in <Table 4>, the proportion of those employed in the automotive industry in Gunsan compared the total workers as of June 2012 declined gradually to 93.6% in 2013, 89.3% in 2014, 84.3% in 2015, 78.2% in 2016, 77.0% in 2017, and 75.4% in 2018, it wasn't as sharp a decline as in the shipbuilding industry. Looking at the movements of workers, among the 6,847 workers employed in automotive or related companies in Gunsan in 2012, only 408 of them were employed in other industries in 2013, but the number rose to 1,290 in 2018. The share increased significantly from 6.4% in 2013 to 24.7% in 2018. In particular, a high percentage of them moved to the manufacturing

Table 5. Trends in the Age of Workers Insured in Automotive Industry of Gunsan, North Jeolla Province, as of June 2012

(Unit : person)

	Age	2012	2013	2014	2015	2016	2017	2018
1	15~29	766	466	335	255	225	216	182
2	30~39	2,717	2,390	2,142	1,893	1,760	1,730	1,592
3	40~49	2,569	2,407	2,289	2,091	2,001	1,964	1,843
4	50 or above	795	664	591	513	452	431	328
	Total	6,847	5,927	5,357	4,752	4,438	4,341	3,945

Note : The survey was conducted among the 6,847 workers in Gunsan's automotive industry who were insured under employment insurance as of June 30, 2012, and their insured status was tracked every year on June 30.

Source: Jan. 1997~Jun. 2018, Employment Insurance DB.

sector (manufacture of other metal products, manufacture of general purpose machinery, manufacture of basic iron and steel, manufacture of structural metal products, tanks, reservoirs and steam generators).

Looking at the trends in the age of workers in the automotive industry, the number of workers aged 15~29 declined sharply (Table 5). Of the 766 workers aged 15~29 employed in the automotive industry in Gunsan as of June 30, 2012, only 182 of them remained in the same industry as of June 30, 2018. In particular, the number of workers engaged in the manufacturing of parts and accessories for motor vehicles (new products) dropped significantly from 419 to 58. Meanwhile, the decrease in the number of those engaged in the manufacturing of motor vehicles and engines for motor vehicles was relatively small. In the case of those aged 30~39, out of a total of 2,717 insured workers in the automotive industry as of June 30, 2012, the number of those remaining in the same industry in 2018 was 1,592. Compared with insured workers aged 15~29, we observe that a relatively large proportion of workers remained in the same industry. As for those aged 40~49, out of a total of 2,569 insured workers as of June 2012, there were 1,843 of them remaining in the same industry as of June 30, 2018. Meanwhile, a similar pattern to that of the shipbuilding industry was observed among those aged 50 or above. We find the proportion of those remaining in the automotive industry continued to be relatively high (328 remaining out of 795 insured workers).

A comparison of the results for the two industries shows that employment is maintained better in the automotive industry than in the shipbuilding industry. The proportion of employees aged 30~39 remaining in the automotive industry was quite high at 76.2% in 2017 and 75.6% in 2018, and those aged 40~49 was 85.84% in 2017 and 85.36% in 2018. On the other hand, the age group of 15~29 had a relatively large share of workers exiting the automotive industry; with about 50% remaining in the industry in 2015 and 37.8% in 2018. The results seem to reflect the fact that workers in that age group are more likely to move to other industries because of the relatively young age and low level of experience. Also, the proportion of those who have lost employment as of June 30, 2018 was 23.5% in the automotive industry, much lower than that in the shipbuilding industry (55.9%).

### III. Trends in Occupational Movement

<Table 6> shows the share of different occupations held by workers in the shipbuilding industry by year. In 2012, welders accounted for 36.3%, followed by production-related elementary workers (18.4%), metal processing plant operators and machine operators (8.6%), painting and electroplating machine operators (7.9%), and managers in construction and production (6.7%). Interestingly, welders continued to take up the largest proportion at around

Table 6. Trends in the Occupations held by Workers Insured in Shipbuilding Industry of Gunsan, North Jeolla Province, as of June 2012  
(in descending order)

(Unit : person)

	Occupation	2012	2013	2014	2015	2016	2017	2018
1	Welders	1,027	663	563	472	475	71	92
2	Production Related Elementary Workers	519	381	373	370	450	266	341
3	Metal Processing Plant Operators and Machine Operators	244	156	127	101	105	55	40
4	Painting and Electroplating Machine Operators	222	148	129	117	91	47	34
5	Managers in Construction and Production	189	81	70	69	80	64	68
6	Deliverers and Transport Related Elementary Workers	81	56	54	55	49	27	21
7	Pipe Fitters	66	47	38	44	46	12	0
8	Other	478	587	625	656	568	578	651
	Not Insured		707	847	942	962	1,706	1,579

Note : The survey was conducted among the 2,826 workers in Gunsan's shipbuilding industry who were insured under employment insurance as of June 30, 2010, and their insured status was tracked every year on June 30.

Source : Jan. 1997~Jun. 2018, Employment Insurance DB.

Table 7. Trends in the Occupations held by Workers Insured in Automotive Industry of Gunsan, North Jeolla Province, as of June 2012  
(in descending order)

(Unit : person)

	Occupation	2012	2013	2014	2015	2016	2017	2018
1	Production Related Elementary Workers	1,904	1,418	1,188	845	870	819	640
2	Craft and Related Trades Workers	1,869	1,810	1,737	1,699	1,671	1,664	1,531
3	Office Clerks	553	526	507	494	481	474	455
4	Transportation Vehicle and Machine Related Assemblers	503	452	409	360	323	315	308
5	Automobile and Automobile Parts Assemblers	169	199	233	290	342	370	331
6	Managers in Construction and Production	139	130	104	96	96	84	81
7	Administration and Business Support Related Clerks	133	115	109	115	127	135	122
8	Other	1,577	1,685	1,713	1,739	1,763	1,775	1,767
	Not Insured		512	847	1,209	1,174	1,211	1,612

Note : The survey was conducted among the 6,847 workers in Gunsan's automotive industry who were insured under employment insurance as of June 30, 2010, and their insured status was tracked every year on June 30.

Source : Jan. 1997~Jun. 2018, Employment Insurance DB.

25~36% from 2012 to 2016, but their proportion fell sharply in 2017 and 2018 to 6.3% and 7.4%, respectively, down by about 30% compared to 2012. This can be attributed to the employment crisis experienced by the number of shipbuilding industry, because the decline in the proportion of welders can be seen as synonymous with a reduction in shipbuilding projects. On the other hand, the share of production-related elementary workers increased steadily from 18.4% in 2012 to 27.3% in 2018. However, it should

be noted that their share did not rise sharply in 2017 but gradually increased from 2012. They had already accounted for a considerable proportion of all insured workers, with 19.6% in 2015 and 24.1% in 2016. The occupation that saw the largest increase between 2012 and 2018 was machinery equipment fitters and mechanics, and their number rose from 35 in 2012 (1.2% of insured workers) to 101 in 2018 (8.1% of insured workers). On the other hand, the number of metal processing plant operators and



machine operators and deliverers and transport-related elementary workers decreased continuously.

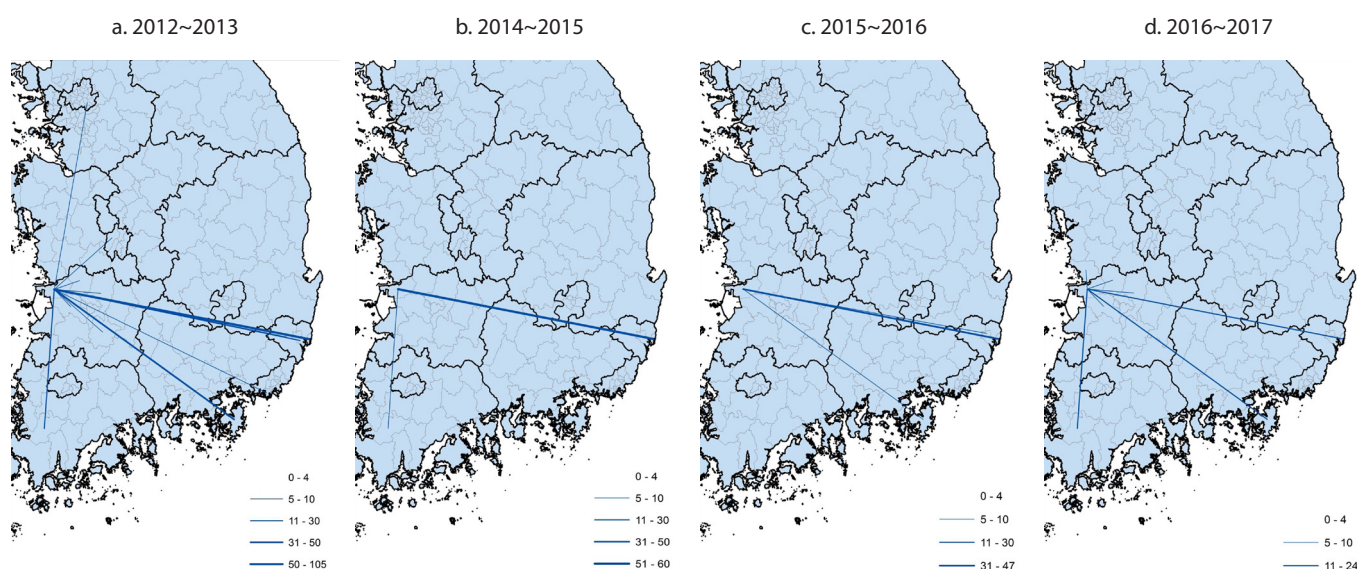
In the case of the automotive industry, <Table 7> shows that production-related elementary workers and craft and related trades workers accounted for 55.1% of all insured workers in 2012, followed by office clerks (8.1%), transportation vehicle and machine-related assemblers (7.3%), and automobile and automobile parts assemblers (2.5%). Among them, the number of production-related elementary workers decreased steadily, from 1,904 in 2012 to 845 in 2015, and to 640 in 2018. In contrast, the number of automobile and automobile parts assemblers increased from 169 in 2012 to 331 in 2018.

#### IV. Trends in Regional Movement

[Figure 1] shows the visualization of the results of the source-destination spatial analysis in order to examine the geographical scope of job movements of those employed in the shipbuilding industry of Gunsan in the North Jeolla Province (not shown in the case of less than 5 persons). [Figure 1-a] shows the movements of insured workers

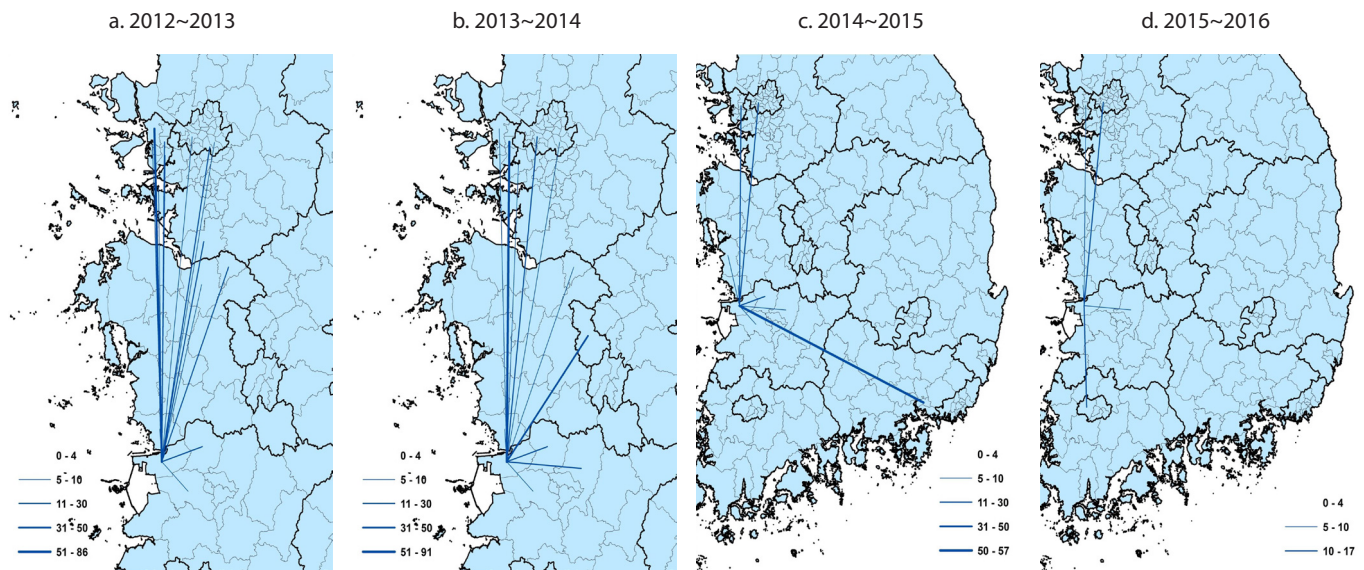
who moved to another region between July 1, 2012 and June 30, 2013 among those employed by the companies located in Gunsan as of June 30, 2012. During this period, a large number of workers moved to the Ulsan Metropolitan City, Youngam County in South Jeolla Province, Geoje in South Gyeongsang Province and the Seoul Special Metropolitan City. [Figure 1-b] shows the movements of insured workers who moved to another region between July 1, 2014 and June 30, 2015 among those employed by the companies located in Gunsan as of June 30, 2014. From 2014 to 2015, most of the insured workers moved to the Ulsan Metropolitan City. [Figure 1-c] shows the movements workers who moved to another region between July 1, 2015 and June 30, 2016 among those employed by the establishments located in Gunsan as of June 30, 2015. We observe from 2015 to 2016, most of the workers moved to the Ulsan Metropolitan City and Geoje in South Gyeongsang Province. Finally, [Figure 1-d] shows insured workers' movements between July 1, 2016 and June 30, 2017 among those employed by the companies located in Gunsan in North Jeolla Province as of June 30, 2016. From 2016 to 2017, most of the workers moved to the neighboring areas of Gunsan, the Ulsan Metropolitan City, Geoje

Figure 1. Movements from Gunsan in North Jeolla Province (shipbuilding industry) to Other Regions



Source : Drawn by the author based on Employment Insurance DB.

Figure 2. Movements from Gunsan in North Jeolla Province (automotive industry) to Other Regions



Source : Drawn by the author based on Employment Insurance DB.

in South Gyeongsang Province, and Youngam County in South Jeolla Province.

Starting from 2017 when the employment crisis hit the shipbuilding industry, the number of insured workers employed by the establishments located in Gunsan decreased sharply from 1,187 in 2016 to 380 in 2017, and most of them disappeared from the Employment Insurance database completely. Furthermore, we can safely infer from Figure 1 that there were signs of employment crisis well before the crisis actually hit the region. From 2012 to 2016, many of the insured workers were moving to the Ulsan Metropolitan City and Geoje in South Gyeongsang Province, likely because they were searching for a job in the shipbuilding industry. It is also noteworthy that, after the shipbuilding industry in Gunsan was hit by the employment crisis in 2017, a number of workers reallocated to other regions were significantly reduced.

We've already seen from <Table 1> that, in the case of the automotive industry, the number of insured workers exiting Gunsan was relatively smaller compared with the shipbuilding industry. As of June 30, 2018, the percentage of insured workers working at establishments located in regions other than Gunsan was 21.4% in the automotive

industry, lower than 72.2% in the shipbuilding industry. [Figure 2] shows the visualization of worker reallocation in the automotive industry moving to another region (not shown in the case of less than 5 persons). [Figure 2-a] shows the movements of workers who moved to another region between July 1, 2012 and June 30, 2013 among those employed by the companies located in Gunsan as of June 30, 2012. During this period, a large number of workers moved to the Incheon Metropolitan City, Pyeongtaek in Gyeonggi Province, the Seoul Special Metropolitan City, and Iksan in North Jeolla Province. [Figure 2-b] shows the movements of workers who moved to another region between July 1, 2013 and June 30, 2014 among those employed by the companies located in Gunsan as of June 30, 2013. The movements of workers from 2013 to 2014 are similar to those during the period from 2012 to 2013, and most of them moved to the Incheon Metropolitan City, Pyeongtaek in Gyeonggi Province, the Seoul Special Metropolitan City, and Iksan in North Jeolla Province and so on. Such trend continues until 2015. [Figure 2-c] which shows the movements of workers who moved to another region between July 1, 2014 and June 30, 2015 among those employed by the companies located in Gun-



san as of June 30, 2014, confirms that the proportion of workers moving to the Incheon Metropolitan City was still high. Lastly, [Figure 2-d] shows the movement of insured workers who moved to another region between July 1, 2015 and June 30, 2016 among those employed by the companies located in Gunsan in North Jeolla Province as of June 30, 2015. It can be seen that the number of insured workers exiting Gunsan sharply decreased, and that most of them moved to the Incheon Metropolitan City and Iksan in North Jeolla Province.

A detailed examination of the maps showing the movements of workers in Gunsan's automotive industry indicates that many moved to the Incheon Metropolitan City where GM Korea Company's production lines are located or Iksan in North Jeolla Province where there are a lot of GM Korea Company's partner firms. Also, it shows that the number of workers exiting Gunsan decreased significantly after 2016. The proportion of employees aged 30~39 in the automotive industry was 76.2% in 2017 and 75.6% in 2018, and that of employees aged 40~49 was 85.84% in 2017 and 85.36% in 2018. The group with a relatively large share of workers exiting the industry was those aged 15~29; with about 50% remaining in the industry in 2015 and 37.8% in 2018. The results seem to reflect the fact that workers aged 29 or less are more likely to move to other industries because of the relatively young age and low level of experience. Compared to the movement of jobs in the shipbuilding industry, it can be concluded that employment is maintained at a high level within the automobile industry.

## V. Limitations of the Analysis, and Summary

This study investigated the regional labor market movements before and after a regional employment crisis through analyzing worker reallocation across sectors, occupations, and regions using the method of tracking

insured workers employed in car manufacturing and shipbuilding firms in Gunsan. There are obvious limitations to the analysis given that our analysis is based on tracking the insured workers employed in the automotive and shipbuilding industries of Gunsan as of June 30, 2012. First, since it uses the employment insurance DB, the workforce of in-house subcontractors and the "Mullyang Team" (a group of temporary workers hired by subcontractors to perform a temporary task) that has a relatively high proportion of non-insured workers are excluded from the analysis. Given the recent drastic growth of in-house subcontractors and the "Mullyang Team" (Bae, Kyu-sik et al. 2016: 50~82), we must be careful in interpreting our results. Second, since the study tracks insured workers employed in the automotive and shipbuilding industries as of June 30, 2012, it may be necessary to question how representative they are of the industry workers before and after the employment crisis.

Despite these limitations, however, the study reveals some interesting results. The most prominent feature of employment change is that the number of insured workers decreased sharply from 1,864 on June 30, 2016 to 1,120 in 2017. In particular, if we limit the sample to the insured workers remaining in the shipbuilding industry, the number will be reduced by more than 65% from 1,437 on June 30, 2016 to 480 in 2017. Another interesting fact is that, except for 2017, the year in which the shipbuilding industry experienced the largest drop in the number of workers was 2013. As of June 30, 2012, Gunsan's shipbuilding industry had 2,826 workers, but this figure dropped by 912 to 1,914 on June 30, 2013. Given that the average annual decline was 159 persons from 2013 to 2016 in the shipbuilding industry, a decrease of 912 persons in a year is similar to a size of personnel reduction during an employment crisis situation. Of course, this analysis has a limitation in that it does not cover all shipbuilding employees of Gunsan for the year concerned, but those who were employed in Gunsan's shipbuilding industry as of June

30, 2012. However, the large scale job reallocation five years ago can be interpreted as a precursor to the employment crisis. In particular, of the 912 workers who exited the shipbuilding industry during this period, 707 people were identified as not insured, which means that most of those who exited the shipbuilding industry did not change jobs to other industries. Looking at the regional movements, the popular destinations for employees of Gunsan's shipbuilding industry were the Ulsan Metropolitan City (Donggu and Namgu) and Geoje in South Gyeongsang Province. Considering that both in Ulsan Metropolitan City and Geoje is specialized in the shipbuilding industry, although it is ambiguous whether the reallocation of workers to other regions is due to business restructuring or individual decisions, it is highly likely that this can be attributed to intra-industry job reallocation. In the case of 2017, there is a high probability of reallocation of personnel from Hyundai Heavy Industries to Ulsan shipbuilding industries, however this requires a more focused analysis. Finally, comparing the proportion of welders and manufacturing related elementary workers to the total number of workers within the shipbuilding industry, there were a higher proportion of these workers in Gunsan than Tongyoung. This could be seen as an indication of a structural difference between the shipbuilding industry in Gunsan and Tongyoung.

Looking at the employment status of the automotive industry, we observe that the characteristics of job reallocation are slightly different from those of the shipbuilding industry. The number of workers in the automotive industry decreased gradually from 2013 to 2018, starting with a

decrease of 512 workers, followed by a decrease of 335, a decrease of 362, an increase of 35, a decrease of 37, and a decrease of 401. In addition, the proportion of the workers in the automotive industry compared to the total workers was 51.0% as of June 30, 2018, which was relatively high compared to the 30.2% seen in the shipbuilding industry. This may be attributed to the fact that a certain minimum number of workers is required for operations in the automotive industry. The proportion of workers working in Gunsan differs between the automotive industry and the shipbuilding industry. Among those working in the automotive industry as of June 30, 2012, 78.6% of all workers insured under employment insurance as of June 30, 2018 were in working in companies located in Gunsan, which was 2.8 times higher than the 27.8% in the shipbuilding industry. We may conclude that in the automotive industry, the employment shock has not yet fully transferred to the regional economy. Looking at the regional movement of workers in the automotive industry, many of them moved to the Incheon Metropolitan City, Iksan in North Jeolla Province, and Pyeongtaek in Gyeonggi Province, where GM Korea Company's plants or partner companies are located. It should be noted that such regional movement may have taken place on a company-wide basis. This study confirms that the movements of jobs before and after the employment crisis among workers in the automotive industry and the shipbuilding industry may display different patterns depending on the characteristics of the employment crisis and of the industry; and its significance is found in showing the possibility of observing movements of jobs as a precursor to an employment crisis.

## References

- Bae, Kyu-sik, Lee, Jeong-Hee, Jung, Heung-jun, Park, Jong-sik, Sim, Sang-wan (2016), *Restructuring in the Shipbuilding Industry and Employment Measures*, Korea Labor Institute.
- KIET (2018), *Field Survey Report Related to Designation of Gunsan as a Special Region to Respond to Industrial Crisis*.
- Yoon, Yoon-Gyu, Kang, Dong-Woo, Yoo, Dong-hoon (2018), *A Basic Study on Building a Map of Movements of Jobs in Industries of Employment Crisis Zones*, Korea Labor Institute.