Do unions provide employment protection in times of economic crisis? A natural experiment of COVID-19

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Abstract. *Considering the COVID-19 pandemic as an exogenous shock, this article attempts to determine whether unions adjusted wages and working hours to protect their members during the economic crisis that it triggered. Based on 2018–20 Korean panel data, the author finds that, during the pandemic, union members were 1.9 times more likely to keep their jobs than non-union members. However, no significant difference is found between the wage growth in the two sectors, although union members decreased their working hours more than non-union members. The results therefore suggest that unions provided employment protection during this period by reducing working hours, not wages.*

Keywords: *trade union, COVID-19, employment protection, wages, working hours, panel analysis.*

1. Introduction

A considerable amount of research has examined the impact of the COVID-19 pandemic on the labour market since 2020. Although findings vary from country to country, one of the points of consensus is that vulnerable and low-income individuals have borne the brunt of that impact. For example, Adams-Prassl et al. (2020), who examine the effects of the pandemic in Germany, the United Kingdom and the United States, find that those who had difficulty working from home, those with lower educational attainment and women were more likely to lose their jobs as a result of the health crisis. Apouey et al. (2020) investigate precarious workers in France in the early stages of the pandemic and find that gig economy drivers reported a larger income loss than regular

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workers. Béland, Brodeur and Wright (2020) also find that, in the United States, the COVID-19 pandemic had a negative impact on the employment of young people, Hispanics and people with low educational attainment. For their part, Caselli et al. (2020) report that lockdowns in Italy, Portugal and Spain increased gender and intergenerational inequality, mainly by decreasing mobility among women and young people. Some studies have also dealt with the COVID-19 impact on labour markets in developing countries (Koczan 2020; Gerard, Imbert and Orkin 2020).

Even though many studies have considered the pandemic's effects on labour markets, only a few have examined the role of unions during the economic crisis provoked by the pandemic. Although they do not focus on the role of unions either, Lemieux et al. (2020) find that, in the early stages of the pandemic, job losses in Canada were much greater in the non-unionized sector than in the unionized sector. McNicholas, Shierholz and Poydock (2021) report that the unionization rate in the United States rose during the pandemic because workers in unionized establishments enjoyed greater job security than those with no union. They present evidence to show that the increase in the unionization rate in 2020 was due to a pandemic composition effect (46.5 per cent) – referring to differences in job losses attributable to the variation in unionization rates across industries[1] and an intensity effect (53.5 per cent) – referring to unionized workers experiencing fewer job losses than non-unionized workers in the same industry. In a similar vein, Béland, Brodeur and Wright (2020) find that the unemployment rate of union members, again in the United States, was lower than that of non-union members during the early stages of the COVID-19 pandemic. This suggests either that union members were able to avoid job loss thanks to greater bargaining power or that they were more likely to be employed in essential industries such as health and welfare. For their part, Firouzi-Naeim and Rahimzadeh (2020) examine whether unions were more successful in containing the spread of COVID-19 through the "voice" mechanism (Freeman and Medoff 1984). Drawing on state-level data for the United States, they indicate that an increase in the unionization rate in a local area led to a decrease in total cases of COVID-19. More recently, Tan et al. (2022) report that unions played a positive role in reducing perceived job insecurity among hotel employees who were more vulnerable to COVID-19.

Although these studies have examined the effects of unions on labour market outcomes during the pandemic, their results are mainly obtained by analysing national or state-level *aggregate* data, finding correlation rather than causality between unionization and labour market outcomes. In other words, previous studies do not directly observe whether particular workers, regardless of union membership, lost their job or experienced a reduction in wages or working hours after the outbreak of COVID-19. They simply compare employment sizes before and after the outbreak of the pandemic and do not, therefore, allow inferences about the role of unions in providing job security.

[1] For example, industries with lower unionization rates, like travel and hospitality, have suffered the greatest job losses during the pandemic, while industries with higher unionization rates, like health and public services, have lost fewer jobs.

Such inferences would require the use of panel data in order to observe changes in the labour market status of workers at these two points in time and, in particular, whether workers held on to their jobs at the same company. To that end, this study uses the Korean Labor and Income Panel Study (KLIPS), which is a longitudinal survey of a representative sample of Korean individuals and households, to examine the effects of unions on employment, wages and working hours.

It is widely known that unions can use concession bargaining, in which they give up wage increases or reduce hours of work, in order to protect their members against lay-offs when companies are under financial pressure (Craft, Labovitz and Abboushi 1985; Roche, Teague and Coughlan 2015; Ivlevs and Veliziotis 2017). However, one of the difficulties in identifying the use of this kind of bargaining is that companies' financial situations may not be exogenous. In other words, where unions have monopolistic bargaining power they may lower the productivity and profits of companies, putting them under financial pressure (Clark 1984; Warren 1985). Ebell and Ritschl (2008) even argue that the Great Depression of the 1930s in the United States was the result of the stronger collective bargaining power of monopolistic unions. In such cases, it can be difficult to determine whether changes in a company's finances (and therefore changes in the labour market outcomes of workers) are the result of economic shocks or union influence.

However, from the point of view of a company or a union, the COVID-19 pandemic and the economic crisis that it triggered constitute purely exogenous shocks. Therefore, analysing how unions respond to this shock offers a good opportunity to understand what role they play when companies find themselves in financial difficulties that are not endogenous. In particular, since most unions in the Republic of Korea are company unions, comparing the labour market outcomes of workers in the unionized sector with those of the non-unionized sector will allow us to see how unions act in times of economic crisis to protect the employment of their members *within a company*.

Drawing on data from the 2018–20 KLIPS, this study examines the effects of unions on employment, wages and working hours during the COVID-19 pandemic in the Republic of Korea. As well as providing panel data, the 2018–20 KLIPS offers detailed information on the labour market status of individuals and the union membership of employees for the period 2018–20. To see how unions affected the employment, wages and working hours of their members during the pandemic, in the second section of this article I compare those labour market outcomes by union membership before (2018–19) and after (2020) the outbreak of COVID-19. In the third section, I also estimate equations for job retention and changes in wages and working hours using fixed and random effects models. In the discussion in the fourth section, I consider how the results of these first estimations compare to estimations using coverage by collective agreements rather than trade union membership, and to analogous estimations using data for the period of the global financial crisis of 2007–09. Lastly, I also control for the effect of government COVID-19 relief subsidies on job retention, wages and working hours. The fifth section presents some conclusions and suggests avenues for further research.

2. Changes in employment, wages and working hours between 2018 and 2020

2.1. All workers

In 2020, the COVID-19 pandemic had a profound impact on the Korean labour market. This section examines the impact on employment, wages and working hours in the unionized and non-unionized sectors using the 2018–20 KLIPS data.[2] Table 1 shows the number of employees, weekly working hours and hourly wages by union membership from 2018 to 2020. As expected, between 2019 and 2020, the total number of employees in the Republic of Korea decreased by 0.6 per cent in contrast to the 2.1 per cent increase between 2018 and 2019. The decrease in the number of employees in 2020 is observed for both the unionized and non-unionized sectors, although the decrease in the unionized sector is somewhat larger than that in the non-unionized sector. However, since this change can arise from differences in workers' personal characteristics and in the industries and occupations of employment, it would be hasty to say that more workers lost their jobs in the unionized sector than in the non-unionized sector over this period.

Weekly working hours also decreased between 2019 and 2020, suggesting that the total labour input (the number of employees × working hours) decreased as a result of the pandemic. The rate of change in working hours is higher than the rate of change in the number of employees. A similar phenomenon was observed in the Canadian labour market in the early stages of the COVID-19 pandemic (Lemieux et al. 2020), indicating that firms adjusted working hours more than employment in response to a decline in the demand for their products. The KLIPS data indicate that between 2019 and 2020, both the working hours of union members and non-union members decreased by approximately 1 per cent. Therefore, there is no evidence of a greater reliance on working-hour

Table 1. Number of employees, working hours and wages by union membership (2018–20)

Year	No. of employees (1 000)			Weekly working hours			Hourly wage (KRW1 000)			Union density (%)
	Union	Non-union	Total	Union	Non-union	Total	Union	Non-union	Total	
2018	1 786	17 495	19 281	41.5	41.0	41.0	22.0	14.7	15.5	11.8
2019	2 000	17 685	19 686	41.6	40.2	40.3	21.8	15.1	15.9	12.5
2020	1 984	17 579	19 563	41.2	39.8	39.9	22.1	15.9	16.6	14.2
2018–19 (%)	12.0	1.1	2.1	0.2	–2.0	–1.7	–0.9	2.7	2.6	5.9
2019–20 (%)	–0.8	–0.6	–0.6	–1.0	–1.0	–1.0	1.4	5.3	4.4	13.6

Notes: KLIPS data are weighted for the 2018 sample. "Union" and "Non-union" indicate union membership or lack thereof. Hourly wages are calculated by dividing monthly wages by hours worked per week × 4.33.
Source: KLIPS 2018–20 data and union density data from the Korean Ministry of Employment and Labor.

[2] Alternatively, the Korean Economically Active Population Survey (EAPS) could have been used to measure changes in employment. However, the EAPS contains cross-sectional data and does not provide information on union status, hence the decision to use the KLIPS instead. The KLIPS data indicate a paid-employment growth rate of –0.6 per cent between 2019 and 2020 (see table 1), which is similar to the EAPS estimate (–0.5 per cent).

reductions in the unionized sector compared with the non-unionized sector in order to avoid lay-offs.

From 2019 to 2020, the hourly wage in the unionized sector increased by about 1.4 per cent compared with 5.3 per cent in the non-unionized sector. Given that there was a greater decrease in the number of workers in the unionized sector than in the non-unionized sector during this period, there is no evidence that the unionized sector restrained wage increases in order to secure the employment of its members. However, if the unionized sector had raised the hourly wage as high as the non-unionized sector, its employment loss would have been greater. Accordingly, the use of concession bargaining between unions and employers cannot be ruled out completely.

Lastly, the data indicate that union density in the Republic of Korea increased by 13.6 per cent between 2019 and 2020. This development is similar to the increase in union density in the United States over the same period (McNicholas, Shierholz and Poydock 2021). Union density in the Republic of Korea had increased by 5.9 per cent over the 2018–19 period, so the greater increase in 2019–20 suggests that there was a greater need for union protection among employees during the pandemic.

2.2. Workers by demography, industry and occupation

Table 2 presents changes in the number of employees, weekly working hours and hourly wages for various demographic, industry and occupation groups and by union membership between 2019 and 2020. Overall, more women than men lost jobs during the pandemic. However, the job loss among women was mainly concentrated in the non-unionized sector, whereas for men it was concentrated in the unionized sector. There are two possible explanations for this outcome: first, women may have received more union protection than men during the pandemic and, second, it may reflect the fact that women worked in industries such as health and welfare, where employment expanded as a result of the pandemic. Indeed, table 2 shows that the number of unionized workers in the health and welfare industry increased by 25.6 per cent. I will return to this issue when I estimate the job retention rates for men and women, controlling for individual and job characteristics.

As for working hours, between 2019 and 2020, men in the unionized sector experienced a 1.6 per cent decrease in weekly working hours compared with the 0.4 per cent increase for women in the same sector. On the other hand, the pattern for male and female workers is reversed in the non-unionized sector. The overall employment adjustment[3] for men was greater in the unionized sector, whereas for women it was greater in the non-unionized sector. Meanwhile, between 2019 and 2020, hourly wages increased by 1.8 per cent for both male and female union members, and by 5.0 and 4.3 per cent for male and female non-union members, respectively, suggesting that unions may have bargained to keep wages down in order to avoid lay-offs.

[3] Changes in overall employment can be measured by the sum of the changes in number of workers and the changes in working hours.

Table 2. Changes in the number of employees, weekly working hours and wages by various groups and union membership (2019–20)

	Change in employment (%)			Change in weekly working hours (%)			Change in hourly wage (%)			Union density (%)
	Union	Non-union	Total	Union	Non-union	Total	Union	Non-union	Total	
Men	–2.3	0.1	–0.2	–1.6	–0.9	–1.0	1.8	5.0	4.3	12.2
Women	2.9	–1.5	–1.2	0.4	–1.1	–1.0	1.8	4.3	4.1	7.2
Age 15–29	19.3	–4.8	–3.3	–1.9	–0.9	–0.9	5.2	5.1	5.5	8.0
Age 30–54	–3.8	–0.9	–1.3	–0.5	–1.2	–1.1	0.7	3.8	3.1	12.1
Age 55+	0.2	3.1	2.9	–3.1	0.0	–0.3	7.9	8.3	8.0	6.7
Regular workers	–0.4	0.2	0.1	–1.3	–1.1	–1.1	0.9	5.6	4.7	13.1
Irregular workers	–18.2	–2.7	–2.9	5.4	–1.0	–1.0	18.9	–1.0	–0.9	0.9
Agriculture	12.6	–15.1	–13.0	0.0	0.0	0.1	6.7	34.5	30.2	9.7
Manufacturing	1.1	–1.3	–0.9	–1.0	–1.1	–1.1	4.5	6.2	5.9	16.6
Public utilities	13.1	8.1	10.1	–0.7	–3.5	–2.3	0.2	6.9	3.7	41.6
Construction	–37.6	0.6	–0.6	1.5	–1.1	–1.0	4.5	5.6	5.1	2.0
Wholesale and retail	16.2	–4.2	–3.5	–3.0	–2.2	–2.2	–10.4	8.0	7.3	3.7
Food and accommodation	–24.9	–10.6	–10.9	–9.2	–0.9	–1.1	4.3	5.2	4.9	1.5
Transport and telecommunications	–6.4	–3.5	–4.3	–2.5	0.3	–0.6	2.9	4.7	3.8	26.5
Finance and realty	–4.6	–3.4	–3.5	–1.0	–0.4	–0.5	–9.5	7.7	4.2	12.0
Business service	–6.2	2.9	2.5	–1.8	–0.8	–0.9	0.9	–0.5	–0.4	4.1
Public administration	–2.6	4.2	3.1	–0.1	–0.2	–0.3	2.3	4.6	4.1	15.5
Education	–19.7	3.0	0.0	1.2	–0.7	–0.7	3.1	1.9	1.5	10.7
Health and welfare	25.6	2.2	3.6	–0.1	–0.7	–0.5	2.2	5.9	6.3	7.5
Arts	23.7	–11.0	–8.5	–1.0	1.8	1.6	–4.3	4.8	4.9	9.5
Other service	28.2	7.0	8.3	–2.8	2.6	2.2	11.5	–0.1	1.2	7.1
Managers	55.9	–11.0	–8.1	–2.1	–3.6	–3.4	–14.2	7.7	6.1	7.3
Professionals	–6.0	1.5	0.8	1.1	–0.7	–0.6	–0.5	4.0	3.2	8.2
Clerical	0.2	–2.3	–2.0	0.0	–0.5	–0.4	1.4	3.4	3.1	15.0
Service	7.1	–1.2	–0.8	–1.9	0.2	0.0	1.4	5.8	5.5	5.4
Sales	29.4	–7.3	–6.6	–3.4	–2.8	–2.8	–17.7	5.2	4.7	2.6
Skilled workers	–3.7	2.1	1.2	–2.9	–0.2	–0.7	4.9	6.9	6.1	15.2
Unskilled workers	9.0	–2.1	–1.7	–3.0	–2.8	–2.7	7.9	4.8	5.2	4.5

Notes: Union sector is based on union membership in 2020. Hourly wage is calculated by monthly wage/(weekly hours x 4.33). All figures are obtained using weights given by the KLIPS.
Source: Author's calculations based on KLIPS 2018–20 data.

As in many other countries, in the Republic of Korea, younger workers aged 15–29 bore the brunt of the negative impacts of COVID-19. Their employment fell by 3.3 per cent but job losses were mainly concentrated in the non-unionized sector. In fact, in the unionized sector, this group's employment increased by 19.3 per cent. For workers aged 30–54, the decrease in employment was greater in the unionized than in the non-unionized sector, but the decrease in working hours was smaller. For workers aged 55 or older, employment in fact increased between 2019 and 2020. This has been a widely recognized phenomenon in the Republic of Korea since the Government created publicly financed jobs for older people during the pandemic. However, it is worth noting that this group's working hours decreased while their hourly wages increased.

The changes in the employment and hourly wages of regular and irregular workers are consistent with general predictions. Regular workers with a high unionization rate present a smaller decrease in employment and in wage growth rate and a greater decrease in working hours compared with irregular workers. These results can be interpreted to indicate that unions bargained to reduce working hours and wages in order to protect regular workers.

As regards industry, the unionized sector in manufacturing lost fewer jobs but experienced a lower wage growth rate than the non-unionized sector, and a similar pattern is observed for the public utility industry (electricity, gas and water industries). In contrast, in most service industries (except for health and welfare, arts and other services), the decrease in the number of workers and working hours is greater in the unionized than in the non-unionized sector. In short, the results indicate that the COVID-19 pandemic had a worse effect on employment in services than in manufacturing.

Lastly, considering occupation, the jobs that appear to have been most affected by the pandemic are found in management (–8.1 per cent) and sales (–6.6 per cent). However, employment in the unionized sectors of these occupations increased between 2019 and 2020, while non-unionized employment decreased significantly. There is no significant difference in the change in working hours between unionized and non-unionized sectors, whereas hourly wages in these occupations decreased significantly in the unionized sector.

3. Job retention, wages and working hours during the COVID-19 pandemic

3.1. Changes in job retention rates by union membership

This section examines changes in job retention rates between 2018 and 2020. I used the 2018 KLIPS cohort to construct two adjacent periods as a panel and, based on this sample, analysed changes in the probability of job loss (or job retention). Table 3 shows the job and employment retention rates for 2018–19 and 2019–20 by the union status of paid workers.[4]

[4] The job retention rate is the probability of staying in the same job, whereas the employment retention rate is the probability of staying in employment, not necessarily in the same job. By definition, the employment retention rates are always greater than the job retention rates.

Table 3. Job and employment retention rates by union membership (2018–20)

		2018–19 (A) %	2019–20 (B) %	B–A Percentage points
Job retention rate	Total	85.0	82.0	–3.0
	Union	94.5	95.9	1.4
	Non-union	84.1	80.6	–3.5
Employment retention rate	Total	92.0	89.8	–2.2
	Union	96.3	97.3	1.0
	Non-union	91.6	89.1	–2.5

Source: Author's calculations based on KLIPS 2018–20 data.

The top half of table 3 indicates an 85 per cent probability of workers keeping their jobs in 2018–19, dropping to 82 per cent in 2019–20. This means that the job retention rate for all wage earners falls by 3 percentage points for this period of the pandemic. Interestingly, for union members, the job retention rate in 2019–20 increases by 1.4 percentage points, whereas for non-union members it decreases by 3.5 percentage points. The bottom half of table 3 also shows the employment retention rate of union members increasing by 1.0 percentage point in 2019–20, while that of non-union members decreases by 2.5 percentage points.

Next, I estimate the job retention probability using a logit model. If a worker who had a job in the year t–1 and who keeps the same job in the year t gets a net utility of $y^*_{it\,|\,job_{t-1}=1}$ the job retention status can be written as:

$$job_{it} = 1 \text{ if } y^*_{it\,|\,job_{t-1}=1} = \beta_t U_{it-1} + X_{it-1}\Gamma_t + \varepsilon_{it} > 0, \quad t = 2019, 2020 \qquad (1)$$
$$= 0 \text{ otherwise}$$

where U_{it-1} denotes union membership of individual i at year t–1 and X_{it-1} includes sex, age, educational attainment, marital status, regular/temporary employment, industry and occupational dummies. If the error term (ε_{it}) in equation (1) has an extreme value distribution, the logit model can be used to estimate equation (1). However, estimating this equation can be problematic when the union membership dummy is likely to correlate with workers' unobserved heterogeneity. In other words, a problem of self-selection may occur – an issue that I return to when estimating the job retention probability using a random effects logit model.

The estimates of equation (1) are presented in table 4. The coefficients in the table represent the odds ratio of the probability of retaining the same job. They indicate that in 2018–19 union members were 2.2 times more likely to retain their jobs than non-union members, and that this probability increased significantly (3.7) in 2019–20. Therefore, unions seem to have had a positive effect on retaining their members' jobs during the COVID-19 pandemic. The signs of other covariates do not vary from general predictions. Compared with men, women were 0.8 times less likely to keep the same job in 2018–19. This is slightly lower (0.7) during the pandemic, but the difference is not significant.

Table 4. Logit estimation results for job retention rates (2018–20)

Variables	2018–19		2019–20	
	Coefficient	Standard error	Coefficient	Standard error
Union	2.187**	(0.356)	3.687**	(0.672)
Woman	0.790**	(0.059)	0.740**	(0.052)
Age 30–44	1.607**	(0.186)	1.460**	(0.166)
Age 45–54	2.103**	(0.297)	1.836**	(0.247)
Age 55+	1.488**	(0.224)	1.407**	(0.200)
Secondary education	0.972	(0.099)	1.088	(0.106)
Non-university higher education (2–3 years)	1.145	(0.158)	1.099	(0.139)
University education (4 years)	1.256*	(0.170)	1.203	(0.150)
Married	1.402**	(0.141)	1.261**	(0.123)
Other marital status	1.114	(0.150)	0.982	(0.126)
Regular	2.006**	(0.160)	1.832**	(0.135)
Constant	1.438	(0.611)	2.875**	(1.308)
Industry	included		included	
Occupation	included		included	
Log-pseudolikelihood	–3 471.8575		–3 783.9334	
Observations	8 710		8 671	

* and ** indicate statistical significance at the 10 and 5 per cent levels, respectively.

Notes: Coefficients indicate odds ratios. Thirteen industry dummies and six occupation dummies are included in the estimations.

Source: Author's calculations based on KLIPS 2018–20 data.

The coefficients on the age variables indicate that there is an inverted U-shaped relationship between the probability of job retention and age. Differences in educational attainment do not appear to have a significant effect on the probability of job retention, except in the case of university graduates, whose probability of job retention in 2018–19 is 1.3 times higher than that of the reference group (less than secondary education). However, there is no statistically significant difference in 2019–20. Married people and regular workers are more likely to keep their jobs than single and non-regular workers, respectively. However, the coefficients on these variables decrease in 2019–20.

As mentioned above, equation (1) has a limitation in that it does not take into account the fact that the decision to join a union may vary according to an individual's unobserved heterogeneity. To address this problem, the 2018–19 and 2019–20 data are combined for the estimation of the random effects logit model. In order to include the unobserved heterogeneity of individuals and to test the additional union effect in 2020, equation (1) is transformed as follows:

$$job_{it} = 1 \text{ if } y^*_{it\,|\,job_{t-1}=1} = \alpha U_{it-1} + \beta U_{it-1} y_{2020} + \gamma y_{2020} + X_{it-1}\Gamma + v_i + \eta_{it} > 0 \quad (2)$$
$$= 0 \text{ otherwise}$$

where y_{2020} denotes a year dummy that is equal to 1 if there is a job change in 2019–20, and 0 otherwise, and v_i represents the individual's unobserved heterogeneity. The interaction term $U_{it-1}y_{2020}$ is included in order to test if unions provided additional protection in 2019–20. There are two methods to estimate equation (2), using either a fixed or a random effects logit model. However, a large number of observations are lost when using a fixed effects logit model, since it allows only for observations that change status (Chamberlain 1980). In this case, as shown in table 3, more than 80 per cent of workers keep their jobs, which means that estimating a fixed effects logit model leads to a large sample loss. Moreover, as the aim is to show the workers' probability of keeping their jobs, the random effects logit model is used to estimate equation (2) in which v_i is assumed to be distributed normally.

Table 5 shows the probability of job retention estimated with a random effects logit model. In addition, in order to see the gender effect of unionization, the sample is divided into men and women. First, considering the results for all wage earners, union members are 2.2 times more likely to keep their jobs than non-union members and, in 2019–20, the probability of keeping the same job is 0.7 times lower than in 2018–19, which is consistent with expectations. Furthermore, in 2019–20, union members are 1.9 times more likely to keep their jobs than non-union members. This finding implies that unions provided more job security for their members during the pandemic.

Although the results of separate estimates for men and women do not differ qualitatively from those for all wage earners, the employment protection effect of unions turns out to be stronger for women than for men. The economic downturn in 2020 lowers the probability of job retention for men by 0.72 times and by 0.65 times for women, but when women are union members, their probability of keeping the same job is 2.2 times higher than that of non-union members, whereas it is only 1.7 times higher for male union members. This suggests that female union members received greater employment protection than their male counterparts during the pandemic.[5]

Figure 1 presents the probability of job retention by union membership and year. The graphs clearly show the positive effect of unions on the job retention of their members. In 2019–20, union members appear to have been significantly more likely to retain their jobs than non-union members, the gap reaching 12.9 percentage points for all workers. Furthermore, if men and women are considered separately, the gap widens. For 2019–20, the job retention rate of male union members is 9.75 percentage points higher than that of male non-union members, whereas among women this gap is 17.8 percentage points.

[5] Another possibility is that there was a higher concentration of women than men in essential industries such as health and welfare during the pandemic. However, union density in these industries is not very high, as seen in table 2. Therefore, a tentative conclusion is that women benefited more from union protection than men during this period.

Table 5. Random effects logit estimation results for job retention rates (2018–20)

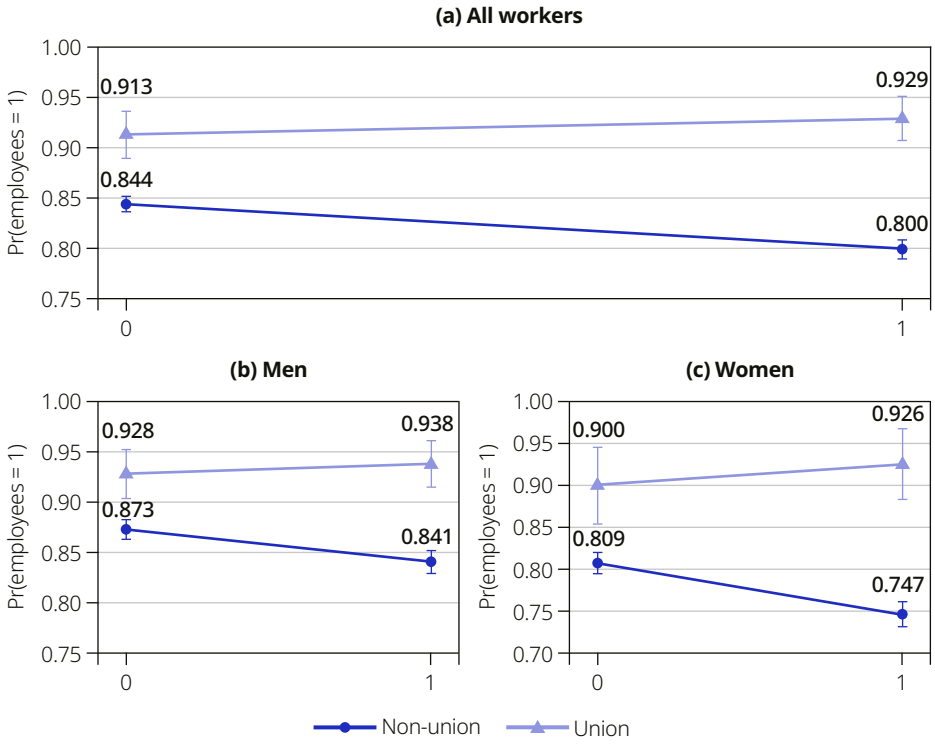
Variables	All workers		Men		Women	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Union	2.218**	(0.396)	2.165**	(0.493)	2.433**	(0.727)
Year 2020	0.681**	(0.035)	0.716**	(0.054)	0.651**	(0.046)
Union•Year 2020	1.898**	(0.486)	1.691*	(0.537)	2.212*	(0.989)
Woman	0.713**	(0.045)	–	–	–	–
Age 30–44	1.616**	(0.162)	1.902**	(0.280)	1.494**	(0.214)
Age 45–54	2.173**	(0.256)	2.163**	(0.373)	2.380**	(0.399)
Age 55+	1.477**	(0.185)	1.235	(0.223)	1.882**	(0.338)
Secondary education	1.041	(0.092)	1.143	(0.155)	1.031	(0.122)
Non-university higher education (2–3 years)	1.130	(0.128)	1.324*	(0.223)	1.022	(0.161)
University education (4 years)	1.279**	(0.142)	1.447**	(0.234)	1.118	(0.174)
Married	1.428**	(0.122)	1.937**	(0.229)	1.010	(0.132)
Other marital status	1.077	(0.124)	1.376*	(0.256)	0.734*	(0.117)
Regular	2.219**	(0.150)	2.308**	(0.253)	2.039**	(0.175)
Constant	2.659**	(0.996)	3.622**	(2.000)	1.754	(1.257)
Industry	13 dummies included		13 dummies included		13 dummies included	
Occupation	6 dummies included		6 dummies included		6 dummies included	
lnsig2u	1.271**	(0.198)	1.601**	(0.319)	1.007**	(0.251)
Observations	17 381		9 782		7 573	
Number of groups	9 873		5 455		4 403	

* and ** indicate statistical significance at the 10 and 5 per cent levels, respectively.

Notes: Coefficients indicate odds ratios. Thirteen industry dummies and six occupation dummies are included in the estimation. lnsig2u is the estimate of logged variance of individual specific error term.

Source: Author's calculations based on KLIPS 2018–20 data.

Figure 1. Probability of job retention by union membership and year (2018–19, 2019–20)



Notes: Along the x axes, 0 = 2018–19 and 1=2019–20. Predictive margins with 90 per cent confidence intervals.
Source: Author's calculations based on KLIPS 2018–20 data.

3.2. Changes in wages by union membership

This section examines whether there was a difference in wage growth by union membership during the pandemic. If a union has monopoly power and employment is determined by the labour demand curve, wages must be sacrificed in order to protect employment. However, if labour and management effectively negotiate wages and employment, both wages and employment can increase simultaneously. Therefore, at least in theory, it is difficult to determine whether wages will increase or decrease when employment increases among union members.

Table 6 presents the growth rates of hourly wages and monthly wages for 2018–19 and 2019–20. The variable of interest is wage change depending on union membership if the person stays in the same job. For example, a unionized worker's wages may decrease when they move to another job in the unionized sector. However, this does not necessarily mean that the union has sacrificed wages to protect their member's employment. Therefore, the estimates in this table are obtained by examining only workers who stayed in the same job.

First, as expected, the growth rate in the hourly wage for all workers for 2019–20 is lower than the growth rate for 2018–19. However, in the case of

Table 6. Growth rates for hourly and monthly wages by union membership (2018–20)

		2018–19 (A) %	2019–20 (B) %	B–A Percentage points
Hourly wage	Total	6.197	5.234	–0.963
	Union	3.743	4.939	1.196
	Non-union	6.512	5.283	–1.229
Monthly wage	Total	5.120	3.973	–1.147
	Union	4.655	3.826	–0.829
	Non-union	5.168	4.008	–1.160

Notes: Hourly wage is calculated by monthly wage/(weekly hours × 4.33). Any observations where the growth rate exceeds 100 per cent are excluded.
Source: Author's calculations based on KLIPS 2018–20 data.

union members, the hourly wage increases by 1.2 percentage points more in 2019–20 than in 2018–19. Here, the hourly wage is the monthly wage divided by the number of hours worked per week × 4.33. Therefore, the greater hourly wage increase for union members in 2019–20 compared with 2018–19 may be due to an increase in the monthly salary itself and to a decrease in the number of hours worked per week.

In 2018–20, about 72 per cent of wage workers in the KLIPS were regular workers and, when there was a union at the workplace, most of them were covered by wage agreements setting monthly rather than hourly wages. It is therefore difficult to determine whether or not the hourly wage shown in table 6 is the result of labour–management negotiations. To address this problem, the growth rate in monthly wages is also presented in table 6. For 2019–20, for both the unionized and non-unionized sectors, this growth rate decreases compared with 2018–19. This suggests that the unionized sector refrained from raising monthly wages during the COVID-19 pandemic. However, since the decline in the growth rate in the unionized sector is smaller than that in the non-unionized sector, this alone does not indicate that the unions sacrificed wages to secure the employment of their members.

In order to analyse the effect of unions on the growth rate of hourly and monthly wages, I estimate the following equation:

$$dlnwage_{it} = \alpha U_{it-1} + \beta U_{it-1} y_{2020} + \gamma y_{2020} + X_{it-1}\Gamma + \nu_i + \eta_{it} \quad (3)$$

where $dlnwage_{it}$ is the difference of log (hourly wage) or log (monthly wage) for 2018–19 and 2019–20 and other control variables are defined as in equation (2). Results from the Hausmann tests indicate that the fixed effects model is more suitable than the random effects model. The estimation results of the fixed effects model are presented in table 7.[6]

[6] Estimation results of the random effects model are not qualitatively different from those of the fixed effects model. Results are available upon request.

Table 7. Fixed effects estimation results for wage growth rates (2018–20)

Variables	Hourly wage			Monthly wage		
	All workers	Men	Women	All workers	Men	Women
Union	–0.021	–0.034	0.003	–0.007	–0.018	0.018
	(0.020)	(0.026)	(0.031)	(0.017)	(0.021)	(0.029)
Year 2020	–0.014**	–0.010	–0.020**	–0.016**	–0.012**	–0.021**
	(0.005)	(0.007)	(0.008)	(0.005)	(0.006)	(0.008)
Union•year2020	0.028*	0.021	0.042	–0.002	–0.008	0.004
	(0.014)	(0.017)	(0.026)	(0.013)	(0.015)	(0.023)
Age 30–44	–0.006	–0.008	–0.007	–0.007	–0.007	–0.008
	(0.043)	(0.051)	(0.077)	(0.037)	(0.045)	(0.063)
Age 45–54	–0.004	–0.007	0.002	0.008	0.013	–0.005
	(0.049)	(0.060)	(0.081)	(0.043)	(0.053)	(0.071)
Age 55+	0.026	0.005	0.047	0.056	0.071	0.034
	(0.058)	(0.078)	(0.092)	(0.054)	(0.075)	(0.083)
Secondary education	–0.094	0.000	–0.114	–0.070	–0.171	0.170**
	(0.094)	(0.000)	(0.125)	(0.149)	(0.174)	(0.087)
Non-university higher education (2–3 years)	–0.019	0.002	–0.033	–0.079	0.004	–0.043
	(0.093)	(0.007)	(0.125)	(0.072)	(0.006)	(0.086)
University education (4 years)	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.004	0.020	–0.041	0.071*	0.063	0.087**
	(0.047)	(0.064)	(0.052)	(0.036)	(0.050)	(0.042)
Other marital status	0.150	0.031	0.160	0.081	0.178	0.044
	(0.120)	(0.133)	(0.150)	(0.068)	(0.115)	(0.083)
Regular	–0.006	0.094	–0.092	–0.121**	–0.100	–0.148**
	(0.067)	(0.112)	(0.063)	(0.055)	(0.097)	(0.054)
Constant	0.102	–0.226	–0.156	–0.336	0.056	–0.765**
	(0.215)	(0.187)	(0.161)	(0.374)	(0.194)	(0.230)
Industry	included	included	included	included	included	included
Occupation	included	included	included	included	included	included
Observations	11 649	6 844	4 805	14 219	8 366	5 853
R-squared	0.008	0.007	0.015	0.008	0.009	0.016
Number of groups	7 194	4 132	3 062	8 447	4 840	3 607

* and ** indicate statistical significance at the 10 and 5 per cent levels, respectively.

Notes: Hourly wage is calculated by monthly wage/(weekly hours x 4.33). Any observations where the growth rate exceeds 100 per cent are excluded. Thirteen industry dummies and six occupation dummies are included in the estimation.

Source: Author's calculations based on KLIPS 2018–20 data.

First, it should be noted that, when using the fixed effects model, variables are omitted if their value does not change over time. Therefore, estimates for some variables are not shown in the table. Looking at the hourly wage results, the 2020 dummy is –0.014 for all workers and significant at the 5 per cent level, and –0.02 for women and significant at the 5 per cent level. This indicates that the hourly wage growth rate for all workers in 2019–20 fell by about 1.4 per cent compared with 2018–19, decreasing slightly more (by 2 per cent) for women. The coefficient of the interaction term between the union and the year 2020 dummies is 0.028 for all workers, which is statistically significant at the 10 per cent level, in keeping with the results in table 6. In other words, during the COVID-19 pandemic, the hourly wage of union members grew at a higher rate than that of non-union members. However, when men and women are separated, the statistical significance of the interaction term disappears.

Although the estimated growth rates for monthly wages are similar to those for hourly wages, there are some major differences. The biggest difference between them is the coefficient of the interaction of the union and year 2020 dummies. As regards the hourly wage, the coefficient of the interaction term was positive and statistically significant at the 10 per cent level for all workers, but when monthly wages are used the coefficient of the interaction term becomes negative and shows no statistical significance. As a result, whether using hourly wages or monthly wages, there is no strong evidence that unions sacrificed wages to protect the employment of their members during the COVID-19 pandemic.

3.3. Changes in working hours by union membership

During the COVID-19 pandemic, when companies' demand for output decreased and brought down their demand for labour, they had the option either to adjust the number of their workers or their working hours. The previous sections have shown that the decrease in employment was relatively small in the unionized sector and that the resultant wage change was not significant. On this basis, unionized companies can be expected to have reacted to the decrease in labour demand during the pandemic by reducing working hours, given that the decrease in the number of workers in the unionized sector was relatively small.

To examine the effect of unions on the rate of growth in working hours during COVID-19, I estimate equation (4) using a fixed effects model:

$$dlnhour_{it} = \alpha U_{it-1} + \beta U_{it-1} y_{2020} + \gamma y_{2020} + X_{it-1}\Gamma + \nu_i + \eta_{it} \quad (4)$$

where $dlnhour_{it}$ denotes the difference of log (weekly working hours) and other control variables are the same as in equation (3). Since the aim is to see the effect of unions on changes in the working hours of their members, the estimation is conducted only for those who keep the same job. The estimation results are presented in table 8. First, although the union and the year 2020 dummy variables themselves do not show statistical significance, the coefficient of the interaction term between them is negative for all workers (–0.023) and statistically significant at the 5 per cent level. This implies that the growth rate of working

Table 8. Fixed effects estimation results for working-hour growth rates (2018–20)

	All workers		Men		Women	
Variables	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Union	0.002	(0.011)	–0.001	(0.014)	0.014	(0.016)
Year 2020	–0.001	(0.004)	0.001	(0.005)	–0.003	(0.008)
Union•Year 2020	–0.023**	(0.008)	–0.021**	(0.010)	–0.030*	(0.015)
Age 30–44	–0.015	(0.016)	–0.016	(0.018)	–0.014	(0.030)
Age 45–54	–0.003	(0.021)	–0.011	(0.025)	0.003	(0.037)
Age 55+	0.006	(0.045)	–0.034	(0.034)	0.039	(0.080)
Secondary education	0.287**	(0.031)	0.000	(0.000)	0.282**	(0.044)
Non-university higher education (2–3 years)	–0.007	(0.031)	–0.001	(0.005)	–0.012	(0.042)
University education (4 years)	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)
Married	0.063	(0.042)	0.039	(0.050)	0.125	(0.081)
Other marital status	–0.065	(0.163)	0.213**	(0.076)	–0.117	(0.224)
Regular	–0.011	(0.055)	–0.078	(0.072)	–0.019	(0.072)
Constant	–0.237	(0.382)	–0.038	(0.114)	–0.069	(0.507)
Industry	13 dummies included		13 dummies included		13 dummies included	
Occupation	6 dummies included		6 dummies included		6 dummies included	
Observations	11 849		6 945		4 904	
R-squared	0.012		0.008		0.032	
Number of groups	7 276		4 173		3 103	

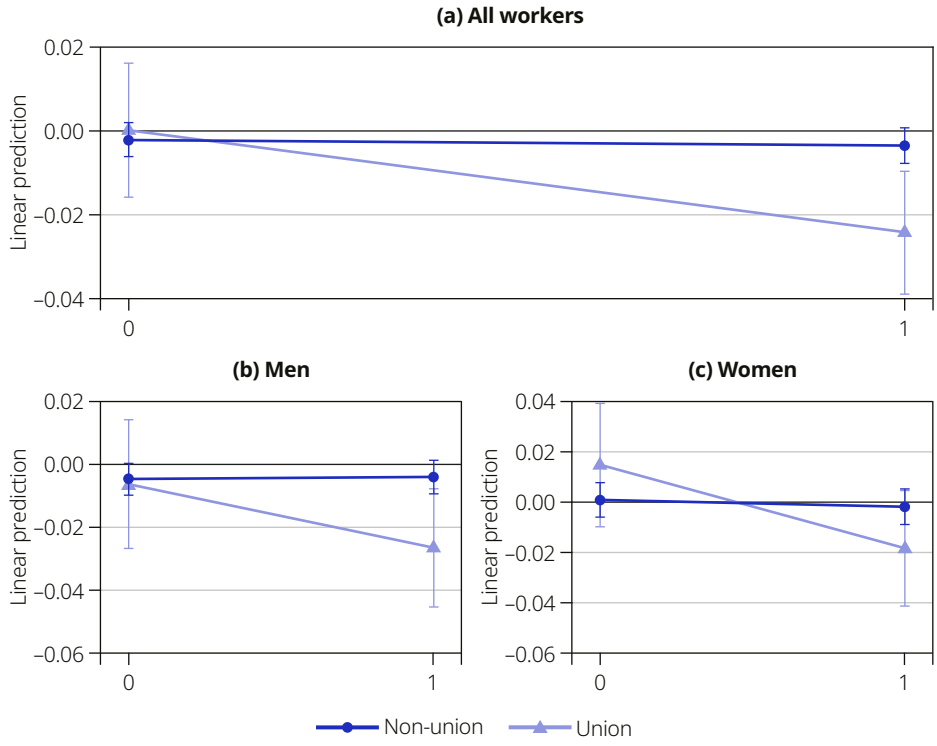
* and ** indicate statistical significance at the 10 and 5 per cent levels, respectively.
Note: Thirteen industry dummies and six occupation dummies are included in the estimation.
Source: Author's calculations based on KLIPS 2018–20 data.

hours for union members decreased by about 2.3 percentage points more than that for non-union members during the pandemic. Second, coefficients of the interaction term are all negative for both men and women, and statistically significant at least at the 10 per cent level, with the coefficient for women being larger than that for men in absolute value. This indicates that the decrease in working hours was more significant for female union members than for their male counterparts, which is consistent with the earlier finding of stronger union influence on women's employment protection than on men's.

Figure 2 presents the estimated working-hour growth rates by union membership and year. The growth rates are calculated using sample means of all covariates, except for union membership and year. The growth rates in working hours for all workers are almost the same for both union and non-union members in 2018–19, but in 2019–20 the working hours of non-union members do not change, while those of union members decrease by about 2 per cent, and this difference is statistically significant at the 10 per cent level.

Examining the estimated working-hour growth rates by sex, there is a striking difference between men and women. For male union and non-union members, the change in working hours between 2018 and 2020 is similar to that for all workers. However, for women, the growth rate in working hours is higher

Figure 2. Estimated working-hour growth rates by union membership and year (2018–19, 2019–20)



Notes: Along the x axes, 0 = 2018–19 and 1=2019–20. Predictive margins with 90 per cent confidence intervals.
Source: Author's calculations based on KLIPS 2018–20 data.

for union members than for non-union members in 2018–19, but the pattern is reversed in 2019–20. Although these predicted values do not show statistical significance at the 10 per cent level, it is fair to say that female union members experienced a greater reduction in working hours during the pandemic in comparison with male union members. In sum, the results provide evidence that when the demand for output decreased as a result of the COVID-19 pandemic, the unionized sector responded by reducing working hours rather than employment and the non-unionized sector responded by adjusting employment rather than working hours. The findings also indicate that the union effect was stronger for women than for men.

4. Discussion

4.1. Union coverage

Until now, the unionized and non-unionized sectors have been defined based on union membership. However, the influence of unions is not limited to union members. According to article 35 (General Binding Force) of the Trade

Table 9. Cross-tabulation between union membership and union coverage (2018–20)

		Not covered by collective bargaining	Covered by collective bargaining	Total
Non-union member	Number of people	23 979	1 132	25 111
	Row %	95.49	4.51	100.00
	Column %	100.00	30.73	90.77
Union member	Number of people	0	2552	2552
	Row %	0.00	100.00	100.00
	Column %	0.00	69.27	9.23
Total	Number of people	23 979	3 684	27 663
	Row %	86.68	13.32	100.00
	Column %	100.00	100.00	100.00

Source: Author's calculations based on KLIPS 2018–20 data.

Union and Labour Relations Adjustment Act of the Republic of Korea, when a collective agreement applies to more than half the workers in a workplace, it also applies to other non-unionized workers in that same workplace. Therefore, in many studies, union coverage is used as an alternative to union membership to differentiate between the unionized and non-unionized sectors.

Although the KLIPS does not provide information on whether collective agreements apply, union coverage can be defined by using the answers to the question, "Why did you not join the union?" There are three response options to this question: (1) "I feel no need to join a union because I am dissatisfied with union activities/family or friends advised me not to join/my employer persuaded me not to join"; (2) "I am not eligible to join a union"; and (3) "I do not have a union". In this study, whether employees are covered by a collective agreement is determined by them either being a union member or answering (1) to the above question.

Table 9 presents cross-tabulation between union membership and coverage (based on the above definition) in 2018–20. The unionized sector according to union membership accounts for 9.23 per cent of all workers, whereas the size of the unionized sector on the basis of coverage increases to 13.32 per cent. Among those subject to collective agreements, union members account for about 69 per cent and non-union members account for about 31 per cent. In addition, 4.5 per cent of non-union members appear to be subject to collective agreements. The proportion of workers who are not members of a union but are covered by a collective agreement is, therefore, non-negligible.

The job retention rate was estimated using union coverage instead of union membership with the random effects logit model, and the results are presented in table 10. The results are not significantly different from those in table 5, which used union membership. That is, workers covered by collective agreements are still more likely to keep their jobs than those who are not covered. Also, this

Table 10. Random effects logit estimation results for job retention rates using coverage (2018–20)

Variables	All workers		Men		Women	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Coverage	2.265**	(0.339)	2.037**	(0.396)	2.765**	(0.669)
Year 2020	0.677**	(0.035)	0.709**	(0.054)	0.649**	(0.046)
Coverage•Year 2020	1.851**	(0.392)	1.695**	(0.456)	2.037**	(0.715)
Observations	17 381		9 782		7 573	
Number of groups	9 873		5 455		4 403	

** indicates statistical significance at the 5 per cent level.
Notes: Coefficients indicate odds ratios. The variables shown in table 5 are also included in the estimation but not reported here.
Source: Author's calculations based on KLIPS 2018–20 data.

Table 11. Fixed effects estimation results for monthly wage growth rates using coverage

Variables	All workers		Men		Women	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Coverage	–0.017	(0.015)	–0.024	(0.018)	–0.001	(0.026)
Year 2020	–0.015**	(0.005)	–0.012**	(0.006)	–0.019**	(0.008)
Coverage•Year 2020	–0.006	(0.011)	–0.004	(0.013)	–0.015	(0.019)
Observations	14 219		8 366		5 853	
Number of groups	8 447		4 840		3 607	

** indicates statistical significance at the 5 per cent level.
Note: The variables shown in table 7 are also included in the estimation but not reported here.
Source: Author's calculations based on KLIPS 2018–20 data.

effect is stronger for women than for men. However, one difference from the previous results is that the coefficient of the interaction term between coverage and the year 2020 dummies is slightly smaller than the coefficient of the interaction between the union membership and the year 2020 dummies in table 5, especially for women. This implies that union members receive more employment protection than workers who are just covered by collective agreements.

Table 11 presents the results of estimating the monthly wage growth rate on the basis of coverage by a collective agreement. Estimated results do not show any qualitative difference from those presented in table 7. The monthly wage growth rate in 2019–20 is lower than in 2018–19, and the decrease is more pronounced for female workers. In addition, although the coefficients of the interaction term between the coverage and the year 2020 dummies are negative, they are not statistically significant. Therefore, there is no indication that unions suppressed wage increases during the pandemic, even when using the union coverage variable.

Lastly, table 12 shows the results of estimating the rate of change in weekly working hours using union coverage. Again, the results are not qualitatively

Table 12. Fixed effects estimation results for working-hour growth rates using coverage

Variables	All workers		Men		Women	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Coverage	–0.004	(0.010)	0.005	(0.013)	–0.020	(0.013)
Year 2020	–0.001	(0.005)	0.002	(0.005)	–0.004	(0.009)
Coverage•Year 2020	–0.016**	(0.007)	–0.020**	(0.009)	–0.011	(0.013)
Observations	11 849		6 945		4 904	
R-squared	0.011		0.008		0.032	
Number of groups	7 276		4 173		3 103	

** indicates statistical significance at the 5 per cent level.
Note: The variables shown in table 8 are also included in the estimation, but not reported here.
Source: Author's calculations based on KLIPS 2018–20 data.

different from those presented in table 8. In 2019–20, working hours for those covered by collective agreements decrease compared with those not covered, although the effect is not as significant. However, there is some difference between men and women. There is a greater rate of reduction in working hours for men than for women, whereas the rate of reduction in working hours is greater for women than for men when union membership is used. This suggests that during the COVID-19 pandemic, women who joined a union received stronger employment protection than those who were covered only by the collective agreement, but they experienced a greater reduction in working hours.

4.2. The global financial crisis

I have investigated the role of unions in protecting employment during the COVID-19 pandemic by treating the pandemic as a negative exogenous economic shock. This section examines whether the results are similar when using the global financial crisis of 2007–09 as a negative economic shock. The crisis hit the Republic of Korea in the last quarter of 2008 and its adverse economic impacts peaked in 2009. The 2007–09 KLIPS data can therefore be used to analyse whether unions provided employment protection for their members in 2009.

Table 13 presents estimation results for job retention and the rate of growth in monthly wages and working hours from 2007 to 2009. They indicate that union members were more likely to retain their jobs than non-union members. However, there is no significant difference in the growth rates of wages and working hours between the two sectors. In addition, the coefficients on the interaction between the union and year 2009 dummies are all statistically insignificant, which indicates that unions did not play a significant role in protecting the employment of their members in the Republic of Korea during the global financial crisis.

There are at least two reasons why the role of unions in employment protection is not apparent during the global financial crisis. First, the economic impact of the crisis on the Korean economy and labour market was less severe than that of the COVID-19 pandemic. As table 14 indicates, the decline in gross

Table 13. Estimation results for job retention rates and wage and working-hour growth rates (2007–09)

Variables	Job retention		Wages		Working hours	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Union	3.083**	(0.554)	0.020	(0.024)	0.031	(0.027)
Year 2009	0.993	(0.068)	–0.047**	(0.009)	–0.024**	(0.011)
Union•Year 2009	1.219	(0.308)	0.019	(0.020)	0.01	(0.020)
Observations	7 837		6 067		4 934	
Number of groups	4 639		3 756		3 146	

** indicates statistical significance at the 5 per cent level.

Notes: Coefficients of job retention indicate odds ratios. The variables shown in table 5 are also included in the estimation, but not reported here.

Source: Author's calculations based on KLIPS 2007–09 data.

Table 14. Growth rate and employment during the global financial crisis and the COVID-19 pandemic

	Global financial crisis		COVID-19 pandemic	
	2008	2009	2019	2020
Growth rate (%)	3.0	0.8	2.2	–0.7
Percentage change in growth rate		–2.2		–2.9
Employment (1 000s)	23 775	23 688	27 123	26 904
Change in employment (%)		–0.37		–0.81

Source: Korean Statistical Information Service (KOSIS).

domestic product (GDP) and employment during the pandemic was much more severe than during the global financial crisis. It is, therefore, possible that the employment protection effect of unions was not evident at that time.

Second, the nature of the economic impact of the global financial crisis differed from that of the COVID-19 pandemic. In the Republic of Korea, the former mainly hit the manufacturing sector, whereas the latter mainly affected the service sector, including the food, retail, travel and hospitality industries. Given that union density is lower in the service sector than in the manufacturing sector, the pandemic is likely to have lowered the welfare of non-union workers more than the global financial crisis, thereby manifesting the role of unions in protecting their members' employment.

4.3. Government subsidies during the COVID-19 pandemic

During the COVID-19 pandemic, the governments of many countries applied various policies to maintain the income and employment of their people. In the Republic of Korea, two disaster subsidies were awarded at the national level. The first was paid to all citizens and the second was paid selectively to people with low income. At the local level, governments implemented various financial aid programmes for their residents.

In addition, many types of employment maintenance subsidies were awarded to companies that tried to keep their workers' jobs. For example, the Korean Government paid three quarters of furlough compensation to small and medium-sized companies and two thirds to large companies. Furthermore, some industries, such as travel, tourism, transportation and entertainment, were designated as special employment support industries and received more generous financial support.

The effect of government COVID-19 relief subsidies could, in part, explain the findings on job retention, wages and working hours over this period. In this regard, the 2020 KLIPS conducted a supplementary survey regarding the impact of the COVID-19 pandemic, providing information on whether an individual received a government disaster subsidy or furlough allowance. However, simple frequencies indicate that 94 per cent of respondents received a disaster subsidy and less than 1 per cent received any type of furlough allowance. The reason for this may be that this furlough allowance was mostly paid in the second half of 2020, whereas approximately 50 per cent of respondents in the 2020 KLIPS were interviewed before July 2020. Therefore, using the furlough allowance information in the 2020 KLIPS will seriously understate the effect of that allowance.

One way to circumvent this problem is to control for firm size in the regression, since furlough allowance was paid differently depending on firm size and industry.[7] Industry dummies were already included in the previous regression, so this only requires the inclusion of the firm size variable. Table 15 presents estimation results for job retention and the growth in wages and working hours, including 11 firm-size dummies in the regression models.

The results in table 15 are not qualitatively different from the results obtained without controlling for firm size, although the number of observations

Table 15. Estimation results for job retention rate and wage and working-hour growth rates controlling for firm size (2018–20)

Variables	Job retention		Wages		Working hours	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Union	1.651**	(0.299)	–0.025	(0.020)	–0.010	(0.014)
Year 2020	0.657**	(0.047)	–0.015**	(0.007)	–0.001	(0.006)
Union•Year 2020	2.097**	(0.527)	–0.004	(0.015)	–0.019*	(0.010)
Observations	10 314		8 531		6 927	
Number of groups	6 510		5 501		4 631	

* and ** indicate statistical significance at the 10 and 5 per cent levels, respectively.

Notes: Coefficients of job retention indicate odds ratios. The variables shown in table 5 and 11 firm size dummies are also included in the estimation, but not reported here.

Source: Author's calculations based on KLIPS 2018–20 data.

[7] In 2018, the Korean Government implemented a 52-hour work week regulation. This regulation was first applied to firms with more than 300 employees and then extended to firms with 5–299 employees from 2020 onwards. The hope is that including firm-size dummies in the regression picks up the effect of this regulation on employment, wages and working hours.

fell significantly owing to missing information for this variable. According to this regression, union members were 2.1 times more likely to retain their jobs than non-union members in 2020, and the growth rate of working hours for union members decreased by about 2 percentage points more than that for non-union members in the same year.

5. Concluding remarks

During the COVID-19 pandemic, many countries provided massive financial support to keep workers employed and to save the self-employed from closing their businesses. The Republic of Korea introduced an employment maintenance subsidy policy to protect the wages and jobs of workers in companies experiencing financial difficulties. Furthermore, the Government provided disaster subsidies to small business owners and self-employed workers in order to compensate for the losses suffered as a result of the pandemic. However, any internal systems that help companies maintain employment without such financial support provide a good institutional means of reducing social costs, including loss of human capital and welfare due to lay-offs. This study has examined whether unions played such a positive role during the COVID-19 pandemic.

Since the bargaining power of unions can affect the productivity and profit of companies, it can be difficult to identify union action when companies find themselves under financial pressure. However, by dealing an exogenous economic blow to companies and unions and causing them to negotiate employment, wages and working hours, the COVID-19 pandemic provides a natural experiment to evaluate the role of unions in coping with an economic crisis.

This study has examined the effects of unions on the job retention rate, wages and working hours using KLIPS data for 2018–20. The advantage of using this longitudinal data is that they indicate whether an employee kept their job at the same company before and after the outbreak of COVID-19, and to observe the changes in the wages and working hours of those who retained their jobs.

Estimating the random effects logit model that controlled for unobserved individual heterogeneity indicates that union members were 1.9 times more likely to keep their jobs during the pandemic than non-union members. In addition, the union effect on the job retention rate was found to be stronger for female union members than for their male counterparts. This suggests that women received more union protection than men during the pandemic.

Second, estimating a fixed effects model using the wage growth rate as a dependent variable indicates no significant difference in this rate between union and non-union members in 2019–20. Therefore, unions do not appear to have sacrificed wages in order to protect the employment of their members during the pandemic. However, an estimation of the fixed effect model using the growth rate of working hours as a dependent variable shows that union members decreased their working hours by 1.6 per cent more than non-union members in 2019–20. This provides evidence that unions reduced working hours in order to protect the employment of their members during the pandemic. Furthermore, the downward effect on working hours was stronger among

female union members than among their fellow male members. This is consistent with the finding that women received more employment protection from unions than men.

Lastly, the analysis was extended by using union coverage instead of union membership, by drawing a comparison with the effect of the global financial crisis and by controlling for firm size. Although the union effect in these alternative specifications slightly changes in magnitude, the qualitative results remain the same. Of course, these findings are limited to the Republic of Korea. It would therefore be interesting to consider how unions in other countries influenced the employment conditions of workers in response to the COVID-19 pandemic.

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