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Interaction Effects of Reduced Working Hours and Flexible Working Hours on Drinking Behavior

Jeong-Hun Ji, Sang-Hyeon Lee*
Department of Food and Resource Economics, Korea University

근무 시간 단축과 근무 시간 유연성이 음주 행동에 미치는 상호작용 효과

지정훈, 이상현*
고려대학교 식품자원경제학과

Abstract This study investigates the interaction effects of reducing working hours and the flexibility of working hours on drinking behavior. To identify the causal effects of working hours and their interaction with the flexibility of working hours, we exploit the reduction of the standard workweek from 44 to 40 hours in Korea as a quasi-experimental design. The result indicates that a reduction in working hours was not only found to have no effect on reducing drinking, but also to have the potential to increase drinking. However, we found that impact of reduced work hours on drinking behavior may vary depending on the status of workers' flexibility of working hours. Workers with flexible working hours may decrease their drinking behavior when working fewer hours, while those without flexible working hours may increase their drinking behavior when working fewer hours.

요 약 본 연구는 근무 시간 단축과 근무 시간의 유연성이 음주 행동에 미치는 상호작용 효과를 살펴본다. 근무시간의 인과적 효과와 근무시간 유연성과의 상호작용 효과를 확인하기 위해 본 연구는 법정근로시간이 44시간에서 40시간으로 단축된 상황을 준실험 설계로 활용한다. 연구 결과에서 근무시간 단축은 음주 감소에 영향을 미치지 않을 뿐 아니라 오히려 음주를 증가시킬 가능성이 있는 것으로 나타났다. 그러나 근무시간 단축이 음주 행동에 미치는 영향은 근로자의 근무시간 유연성 여부에 따라 다르게 나타났다. 근무시간이 유연한 근로자는 근무시간이 줄어들면 음주할 가능성이 감소하는 반면, 근무시간이 유연하지 않은 근로자는 근무시간이 줄어들면 음주할 가능성이 줄지 않는 것으로 나타났다.

Keywords : Unhealthy Behavior, Alcohol, Drinking, Working Hours, Flexible Work

1. Introduction

Public health policymakers and researchers in numerous countries are deeply concerned about the prevalence of individual unhealthy behaviors, such as drinking alcohol, due to the health problems they cause [1]. According to Griswold et al. [2] alcohol was the seventh leading risk factor for premature death in 2016, contributing to 2.8 million deaths worldwide. That number is equivalent to 2.2% of all female deaths and 6.8% of all male deaths that year. Their results show that the safest level of drinking is none. It has been observed that individuals who drink often face higher healthcare expenses [3]. Therefore, the reduction of drinking behavior not only leads

*Corresponding Author : Sang-Hyeon Lee(Korea Univ.)
email: lsh21c@korea.ac.kr
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to improvements in public health but also contributes to a reduction in healthcare costs.

There is a strong correlation between health related behaviors and working hours [4]. In theory, working hours can directly affect an individual's health through physically demanding tasks that lead to exhaustion, or indirectly affect health by influencing income and the available time for engaging in health-related activities [5]. However, measuring a causal relationship between working hours and health related behaviors is challenging due to the endogeneity of working hours. Working hours are not randomly assigned, as individuals may choose to work more to earn higher income, introducing biases into any simplistic regression analysis attempting to measure the impact of working hours. This endogeneity problem may arise from factors that are not directly observed, influencing both working hours and health behaviors. These factors could include personal values. It also may arise from reverse causality, where an individual's health status could also impact their choices regarding working hours. Therefore, except for a few notable studies from quasi-experimental designs, causal evidence remains scarce [5-8]. These studies suggest that reducing work hours has a potential to improve physical and mental health.

Flexible working conditions, which are increasingly popular in many countries, have emerged as a factor that influences health of employees. Empirical evidence strongly supports the notion that flexible working hours can assist employees in adjusting their schedules to maintain a healthier lifestyle [9-11]. According to these evidences, flexible working conditions can have positive impacts on health as reduced work hours.

Considering the similar health benefits of both flexible working conditions and reduced working hours, understanding the interaction between these two is crucial for developing effective strategies to reduce alcohol consumption of employees. Reducing working hours can help improve health related behaviors of employees, but it may not be enough. By introducing flexible working conditions, employees can choose better work schedules and have more control over their work and personal lives. This may give them additional tools to promote health and reduce stress. As working hours are becoming shorter and more flexible, investigating the impact of reduced work hours on employees who are able to adjust their work schedules can provide essential evidence for creating more effective policies and practices that aims to reduce alcohol consumption. However, to the best of our knowledge, the interaction between working hours and the flexibility of working hours is an unexplored research area.

In order to investigate this research area, the present study aims to examine the interaction effects of reducing working hours and the flexibility of working hours on drinking alcohol. To identify the causal effects of working hours and their interaction with the flexibility of working hours, we exploit the reduction of the standard workweek from 44 to 40 hours in Korea as a quasi-experimental design. We analyze data from the Korean Labor and Income Panel Study (KLIPS) which is a longitudinal survey of urban households in Korea applying the reduction in the standard workweek to the instrumental variable estimation methods. The findings indicate that a reduction in working hours was not only found to have no effect on reducing drinking, but also to have the potential to increase drinking. However, we found that impact of reduced work hours on drinking behavior may vary depending on the status of workers' flexibility of working hours. Workers with flexible working hours less likely to drink when working fewer hours, while those without flexible working hours not less likely to drink when working fewer hours.

The contribution of this study lies in its exploration and analysis of research areas that

have not been addressed in previous studies or are still surrounded by questions. Previous research has not considered the effects of the interaction between flexibility in working hours and working hours in examining unhealthy behaviors. This study fills this gap and provides new insights and understanding of the interaction effects which are not well covered in the literature. While the main focus appears to be on drinking, the study aims to contribute to a broader understanding of the relationship between working conditions and health-related behaviors. The study also potentially contributes to understanding workplace policies and their impact on employee health.

The paper proceeds as follows. Section 2 gives relevant institutional details of the reduction of the standard workweek in Korea. Section 3 provides theoretical framework and Section 4 introduces our empirical strategy. Section 5 describes our data. Section 6 shows our results. Section 7 concludes.

2. Institutional Background

The Labor Standards Act (LSA) in Korea regulates the standard workweek. In an effort to improve the welfare of workers, the Korean government started reducing the standard workweek in the early 2000s. In October 2002, a proposal was made to revise the LSA, aiming to decrease the workweek from 44 to 40 hours while maintaining the same pay level. The objective of this policy was to enhance the quality of workers' life. After extensive debate, the revised law was passed by the National Assembly in August 2003 [12].

The new LSA introduced a phased implementation of the 40-hour workweek system from July 2004 to July 2011, based on the size of the establishments, allowing employers time to adjust and reduce working hours. Initially, the 40-hour workweek was enforced in workplaces with 1,000 or more employees in July 2004. Fig. 1 illustrates the schedule for implementing the new LSA according to establishment size. Over time, the coverage of the new LSA was gradually extended to smaller establishments: workplaces with 300-999 employees in July 2005, 100-299 employees in July 2006, 50-99 employees in July 2007, 20-49 employees in July 2008, and finally all workplaces with 5 or more employees in July 2011. Violating the law could lead to imprisonment for up to 2 years or a fine of approximately $10,000 [13].

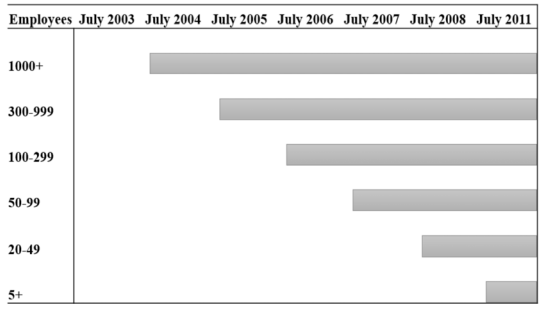

Fig. 1. The time schedule of the law's implementation

In this study, it is essential to consider certain aspects of the law adoption process. The process is relevant to our empirical approach as we aim to ensure that the changes in working hours resulting from the new LSA are not linked to the drinking behavior of the workers. It is also important to note that no other labor market policies were implemented simultaneously with the new LSA [14]. As a result, our empirical approach, which utilizes the reduction in standard working hours resulting from the new LSA, can effectively capture the causal impact of working hours on the drinking behavior of the workers.

3. Theoretical Framework

We explore how working hours and flexibility of working hours can impact individuals' health behaviors, specifically their consumption of health-related goods, using the health capital

framework proposed by Grossman [15,16] and Xu [17]. According to this framework, an individual's utility depends on their current health status (H), the time-intensive health-related goods (A), such as physical activity or healthcare, the less time-intensive health-related goods (C), such as drinking, other forms of consumption (X), and individual characteristics (Z) like age and education level. Individuals' utility can be represented as follows:

$$U = U(H, C, A, X; Z) \quad (1)$$

Individuals' health is produced through a given production technology, as indicated by the following equation:

$$H = H(C, A, T_W; Z, F, \varepsilon) \quad (2)$$

where F represents local environmental factors that influence health, such as workplace flexibility or air quality. The health-related goods A and C, along with the time spent working (T_W), are inputs in the health production function. Working hours can affect health due to work-related stress or psychological effects resulting from changes in hours. The individual's inherent health characteristics are denoted by ε.

In most simple consumer models, individuals face a single budget constraint and can freely choose their working hours to maximize their utility. Under such circumstances, the consumer faces two constraints: a time constraint and a budget constraint, expressed as follows:

$$T - T_W - t_C C - t_A A - t_X X = 0 \quad (3)$$

$$WT_W + p_C C - p_A A - p_X X = 0 \quad (4)$$

In equations (3) and (4), T represents the fixed amount of available time, W is the hourly wage rate. t_C, t_A, t_X are fixed time costs per unit of the respective goods, while p_C, p_A, p_X are monetary costs per unit of the goods. The Lagrangian condition can be represented as:

$$L = U[H(C, A, T_W; Z, F, \varepsilon), C, A, X; Z] + \lambda(T - T_W - t_C C - t_A A - t_X X) + \gamma(WT_W + p_C C - p_A A - p_X X) \quad (5)$$

In this model, individuals maximize their utility by selecting the quantity of goods they consume, taking into account both constraints. The first-order conditions are as follows:

$$\partial U/\partial C = \lambda t_C + \gamma p_C - (\partial U/\partial H)(\partial H/\partial C) \quad (6a)$$

$$\partial U/\partial A = \lambda t_A + \gamma p_A - (\partial U/\partial H)(\partial H/\partial A) \quad (6b)$$

$$\partial U/\partial X = \lambda t_X + \gamma p_X \quad (6c)$$

$$T - T_W - t_C C - t_A A - t_X X = 0 \quad (6d)$$

$$WT_W + p_C C - p_A A - p_X X = 0 \quad (6e)$$

As shown in equations (6a) and (6b), health-related goods A and C have both direct and indirect effects on utility. The indirect effect operates through their impact on health. The way these first-order conditions are expressed incorporates the indirect effect of consumption as part of the marginal cost of consumption. For instance, for goods that harm health, like drinking, increased consumption raises the marginal cost due to its health effects. In general, the marginal utility gained from greater consumption of these goods is equal to the marginal cost, which includes both the monetary and time prices of consumption as well as the health effect.

Solving the first-order conditions in equation (6) leads to reduced-form demand functions for A, C, and X in the general form:

$$D_i = D_i(t_C, t_A, t_X, p_C, p_A, p_X, W, T_W, Z, F, \varepsilon), \quad i = A, C, X \quad (7)$$

Equation (7) indicates that the demand for health-related goods (A and C) depends on prices (p_C, p_A) and time inputs (t_C, t_A), wages (W), working hours (T_W), personal characteristics (Z), environmental factors (F) such as workplace flexibility, and the individual's health endowment (ε). For the purposes of this paper, we consider that workplace flexibilities (F) may interact with working hours (T_W) since both can influence health. This assumption can be represented as follows:

$$D_i = D_i(t_C, t_A, t_X, p_C, p_A, p_X, W, T_W, Z, F, \varepsilon, T_W F), \quad i = A, C, X \quad (8)$$

Equation (8) extends the demand for health-related goods to depend on the interaction between working hours (T_W) and workplace flexibilities (F), denoted as $T_W F$. In this model, we can identify the impact of working hours on health as ($\partial D_i / \partial T_W | F$), which depends on workplace flexibilities.

4. Empirical Strategy

In the empirical investigation, we consider the alcohol drinking status of workers. Standard OLS regressions yield biased estimates for the effect of interest if unobserved factors correlate with both working hours and drinking status. To identify the causal effect, we apply a two-stage least squares (2SLS) approach using the reduction in standard working hours in Korea as an exogenous variation in working hours and estimate the following model:

$$\begin{aligned} h_{it} &= \delta_1 s_{it} + \theta_1 (s_{it} \times f_{it}) + \pi_1 f_{it} + x_{it}^{'} \tau_1 + \phi_i + v_{it} \\ h_{it} \times f_{it} &= \delta_2 s_{it} + \theta_2 (s_{it} \times f_{it}) + \pi_2 f_{it} + x_{it}^{'} \tau_2 + \omega_i \\ &\quad + u_{it} \\ y_{it} &= \alpha h_{it} + \beta (h_{it} \times f_{it}) + \gamma f_{it} + x_{it}^{'} \tau_0 + \mu_i + e_{it} \end{aligned} \quad (9)$$

where y is drinking status of individual i at time t. h denotes working hours. x is a vector of observed socio-economic characteristics including gender, age, child presence, education level, and household income. The instrumental variable s refers to a dummy that indicates whether the 40-hour workweek is expected to be mandated in individuals' workplaces based on establishment size from 2004 to 2011. There is a concern that if firms reduce hours on their own, individuals who want to work fewer hours will seek jobs at those firms, so changes in work hours at firms will be endogenous. However, the law implementation we used eliminated these concerns. f refers to the work time flexibility indicator, and $h \times f$ is an interaction term. $s \times f$ is an instrument for $h \times f$, which is valid in the case where h is endogenous, f is exogenous, and s is a valid instrument for h [18]. In this study, we treat f as an exogenous variable for the alcohol drinking status among workers. This is because companies provide flexible working conditions to employees, with the aim of enhancing productivity and satisfaction [19], regardless of the workers' current situation of drinking. v_{it}, u_{it}, and e_{it} represent error terms. The error term e_{it} accounts for the impact of all variables that were not included in the drinking demand function in Equation (8) due to limitations in the available data.

In the model, to account for the heterogeneity of individuals, we assume that individual-specific effects occur. ϕ_i, ω_i, and μ_i are unobserved individual-specific effects that are not correlated with error terms. When they are assumed to be a fixed parameter, this alternative model is estimated using fixed effects two-stage least squares (FE2SLS), when they are stochastic, the model is estimated using Baltagi's random-effects two-stage least squares 2SLS (EC2SLS) suggested by Baltagi [20]. EC2SLS is just the random-effects counterpart of a classical error-components panel data regression [21]. The Hausman test suggested by Baltagi [22] is used to aid in model selection on the basis of consistency and efficiency of the estimators. The null hypothesis of the Hausman test is that EC2SLS is the more efficient way to yield a consistent estimator than FE2SLS. We should opt for using EC2SLS models if the Hausman test fail to reject the null hypothesis [23].

The coefficient α gives the effect of working hours on y, while γ gives the effect of work time flexibility on y, and β gives how working hours and work time flexibility jointly affect y.

The estimation was performed using Stata 17, and we computed robust standard errors clustered at individual level to address any potential heteroscedasticity. Also, the estimation

adopted linear probability model as it is a general method to obtain a conditional probability model of a binary variable. It is generally the best strategy to estimate causal effects on binary outcomes and choosing linear regression over logit or probit does not involve any tradeoff in terms of statistical significance [24].

5. Data

This study use data from the KLIPS. The KLIPS was conducted in 1998 by the Korea Labor Institute, which surveyed a nationally representative sample of 5000 urban households and their members aged 15 years or older. The KLIPS collects detailed information on individuals, including their employment, hours worked, earnings, education, and other demographic and household characteristics. In addition to conducting a survey on labor market activities and income, a supplementary survey on the health of the respondents was also carried out in 2001. The data set enables researchers to determine whether a worker was subject to the reduced 40-hour workweek policy in a given year, since it contains detailed information on the number of employees at the establishments to which workers belonged.

Our analysis data covers from 2003 to 2012, i.e. from the year before the law was implemented to the year after the law was last implemented. Our focus was on individuals between the ages of 15 and 64 who are actively participating in the workforce, which constitutes the working-age population, and we do not consider self-employed workers. The sample included 45,140 observations of employees who were below the age of 65 out of a total of 127,730 observations. For the study, 25,178 observations (6,373 workers) were used, excluding missing data.

Table 1 provides the descriptive statistics of the variables considered in the study. Using the answers to questions on drinking status, we created a dichotomous variable indicating 'current drinker' against currently not drinker. About 74% of the observations were found to drink currently. With regard to working hours, the average weekly working hours was 45.8. We created a dichotomous variable indicating 'I set the working hours for myself' against 'I work according to set work hours' from the question about working hour flexibility. About 12% of the samples were found to set working hours flexibly on their own.

Table 1. The descriptive statistics

Variable	Obs	Mean	S.D.
Drinking status [Yes=1, No=0]	21,568	0.74	0.44
Weekly working hours	24,017	45.79	10.94
Flexibility of working hours [Yes; self-determined = 1, No; follow set working hours = 0]	11,208	0.12	0.32
Full-time employee	9,613	0.10	0.30
Temporary worker	876	0.22	0.41
Daily worker	719	0.22	0.41
Gender [Female=1, Male=0]	25,178	0.36	0.48
Age	25,178	38.99	10.32
Children in high school or younger [Yes=1, No=0]	25,178	0.49	0.50
Education [Higher than a high school graduate = 1, High school graduate or less = 0]	25,178	0.53	0.50
Household income [10 million KRW]	25,178	4.32	3.02
Number of individuals	6,373		
Number of observations	25,178		

Note: 10 million KRW is about 7,600 USD.

Fig. 2 shows the distribution of the workers' weekly hours worked. Due to the absence of a maximum weekly hour provision in the new LSA, employers continued to pay premium rates for holiday and weekend work. As a result, it was possible to work 68 hours or more under the new LSA. The distribution for workers in establishments under the new LSA shows that the largest share of workers actually worked for 40-hour a week compared to the workers not covered by the new LSA. On average, workers under the new LSA worked approximately 44.39 hours per week,

while those not covered by the new LSA worked 49.07 hours. This implies that the decrease in average weekly work hours is largely due to the new LSA, which has greatly increased the proportion of workers subject to the 40-hour workweek.

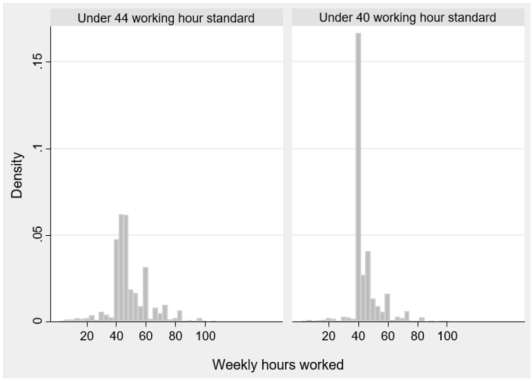

Fig. 2. Distribution of workers' weekly hours worked

6. Result

Table 2 reports the estimation results. We estimated our analysis model using FE2SLS and EC2SLS estimation methods accounting for the endogeneity of working hours. Following Baltagi [23], the Hausman tests based on the difference between FE2SLS and EC2SLS were applied and insignificant test values, $\chi 2$, were obtained at 5% significance level, failing to reject the null hypothesis. Therefore, we conclude that EC2SLS is a more efficient way than FE2SLS and only report the EC2SLS estimation results. The overidentification test failed to reject the null hypothesis that the instruments are valid instruments. Hence, we conclude that the instruments used in our analysis model are valid.

For men without flexible work hours, the effect of working hours is estimated to be statistically significant, with a one-hour decrease in work hours associated with a 0.63%p increase in drinking behavior. However, the coefficients of flexibility of working hours and the interaction term between working hours and flexibility of working hours are estimated to be statistically insignificant. This could be due to the effects of flexible working hours are only evident in certain groups. For example, Haley and Miller [11] reported that the effects of workplace flexibility were not significant for married workers but were significant for unmarried workers suggesting that the impact of flexibility in working hours may vary depending on the specific characteristics of the workers. Therefore, we conducted a subgroup analysis to further investigate the potential effects of flexibility in working hours and the interaction effects within different subgroups.

The subgroup analysis was conducted based on gender, education level, and age group. The estimation results by gender are presented in Table 3. For men, workers who have the flexibility of working hours are found to be 123%p less likely to engage in drinking compared to those without flexibility. Since this marginal effect is the slope of the function at the mean, its absolute value can be greater than 1 even if the values of the function are all between 0 and 1. For men with flexible work hours, a one-hour reduction in work hours is associated with a 2.03(=0.0247-0.00444) percent point decrease in probability of drinking. These findings suggest that there is a synergistic effect between working hours and the flexibility of working hours, which may contribute to a reduced likelihood of drinking among men. The effect of working hours is estimated to be statistically insignificant, suggesting that a reduction in working hours may not help reduce alcohol consumption for men without the flexibility of working hours. For female workers, we were not able to find any significant evidence of the interaction effects between working hours and flexibility of working hours.

Table 2. The estimation results

	Coef.	S.E.
Work hour	-0.0063*	(0.0034)
Work hour × Flexibility	0.0103	(0.0088)
Flexibility	-0.4900	(0.4290)
Female	-0.369***	(0.0190)
Age	-0.006***	(0.0008)
Presence of children	-0.0175	(0.0134)
High education	-0.0387*	(0.0219)
Household income	0.00178	(0.0017)
Observations	8,598	
Number of individuals	2,088	
Hausman test: p-value	0.378	
Overidentification test: p-value	0.412	

Note: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Robust standard errors clustered at individual level are reported in ( ).

Table 3. The estimation results by gender

	Male (1)	Female (2)
Working hour	-0.00444	-0.0129
	(0.00285)	(0.00967)
Working hour × Flexibility	0.0247**	-0.00475
	(0.0124)	(0.0187)
Flexibility	-1.227**	0.258
	(0.622)	(0.862)
Observations	5,959	2,639
Number of individuals	1,383	705
Hausman test: p-value	0.489	0.959

Note: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Robust standard errors clustered at individual level are reported in ( ). All models include age, the presence of children in high school or younger, education, household income.

Table 4 presents the estimation results by education level. A dichotomous variable was created to distinguish individuals with education levels higher than a high school graduate from those with a high school graduate or lower. For workers with lower education levels, those with flexibility in working hours are found to be 98%p less likely to engage in drinking compared to those without flexibility. Moreover, the probability of drinking among workers with flexibility in working hours decreased by 1.3%p as work hours were reduced by one-hour. This suggests that not only does having a flexibility in working hours have a positive effect, but also a reduction in work hours may additionally help in decreasing the drinking behavior of individuals in this group. The effect of working hours is estimated to be statistically insignificant, suggesting that a reduction in working hours may not help reduce alcohol consumption for lower educated workers without the flexibility of working hours. For highly educated workers, we were not able to find any significant evidence of the interaction effects between working hours and flexibility of working hours.

In Table 5, the estimation results are presented by age group. When dividing the age range, we chose to simply divide the group into three age bands (upper, middle, and lower) rather than split the group into many bands, and used a distribution of age in the data to divide the age range into the three bands. The age groups are divided into three categories: under 35, 35-50, and over 50. For workers over 50, the presence of flexibility in working hours is estimated to reduce the probability of drinking by 96%p. Furthermore, for workers over 50 with flexibility in working hours, a one-hour reduction in work hours can further reduce the probability of drinking by 0.8%p. However, a one-hour reduction in working hours appears to increase the probability of drinking by 1.1%p for workers over 50 without flexibility in working hours. This finding may be due to the high proportion of leisure activities that involve alcohol consumption among workers over 50, thus potentially increasing the likelihood of drinking when they have more time to have leisure activities. According to the Korea National Leisure Activity Survey of Ministry of Culture, Sports and Tourism (MCST), the percentage of individuals who consider drinking alcohol as a leisure activity is

8.9% for those under 50 and 17.6% for those over 50 [25]. Given the contrasting impact of reduced working hours on drinking behavior depending on the flexibility in working hours, it is deemed necessary to introduce flexible working time arrangements along with reduced working hours for workers in order to reduce alcohol consumption. For workers under 35 and workers between the ages of 35 and 50, we were not able to find any significant evidence of the interaction effects between working hours and flexibility of working hours.

Table 4. The estimation results by education level

	High school graduate or less (1)	Higher than a high school graduate (2)
Working hour	-0.00605	-0.00449
	(0.00408)	(0.00728)
Working hour × Flexibility	0.0199*	-0.0166
	(0.0115)	(0.0265)
Flexibility	-0.976*	0.780
	(0.574)	(1.207)
Observations	5,022	3,576
Number of individuals	1,314	790
Hausman test: p-value	0.962	0.367

Note: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Robust standard errors clustered at individual level are reported in ( ). All models include gender, age, the presence of children in high school or younger, household income.

Table 5. The estimation results by age group

	Under 35 (1)	Over 35 & under 50 (2)	Over 50 (3)
Working hour	0.00941	-0.00354	-0.0114**
	(0.00924)	(0.00431)	(0.00560)
Working hour × Flexibility	0.00258	0.00151	0.0197**
	(0.0248)	(0.0149)	(0.00945)
Flexibility	-0.149	-0.0624	-0.961**
	(1.178)	(0.722)	(0.466)
Observations	1,358	5,594	2,583
N. of individuals	456	1,475	833
Hausman test: p-value	0.398	0.878	0.995

Note: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Robust standard errors clustered at individual level are reported in ( ). All models include gender, age, the presence of children in high school or younger, education, household income.

The effect of flexibility in working hours on reducing drinking was estimated to be significant only for men, those with lower education levels, and those over 50. Compared to women, those with higher education levels, and younger individuals, men, those with lower education levels, and older people have a relative deficiency in social relationships [26]. Individuals lacking social connections are more likely to choose alcohol as a means of stress relief [27]. We deduce the result can be largely attributed to the potential of workplace flexibility, facilitated by adjustments in working hours, to encourage workers with insufficient social connections to engage in social activities to relieve stress, which is a healthier alternative to drinking. Evidence to support this hypothesis could be found by investigating the relationship between flexible work arrangements and an individual's social network, but we leave this for future work.

The utilization of subgroup analysis may result in inaccurate outcomes for certain subgroups, thereby failing to identify an effect even if it exists. This occurs due to the small sizes of the analyzed groups, which limits the number of individuals available to detect an effect. However, we believe our sample is sufficient to overcome these issues.

7. Conclusion

The interaction effect between reducing working hours and the flexibility of working hours is an unknown area of research. This study investigated the interaction effects of reducing working hours and the flexibility of working hours on drinking behavior.

The result indicates that a reduction in working hours was not only found to have no effect on reducing drinking, but also to have the potential to increase drinking. However, we found that impact of reduced work hours on

drinking behavior may vary depending on the flexibility of working hours. Workers with flexible working hours less likely to drink when working fewer hours, while those without flexible working hours not less likely to drink when working fewer hours. This underscores the importance of implementing and extending flexible work policies as they can contribute to healthier lifestyle and well-being among workers reducing alcohol consumption.

Firms should consider these insights when designing and implementing workplace policies. Encouraging employees to work flexible hours, especially when implementing a reduction in work hours, can potentially promote healthier behaviors. Our results show that flexible working helps to reduce drinking behavior positively, which has considerable potential to promote employee health. By introducing flexible work hours, employees will have more time to devote to healthful activities such as exercise and relaxation, which can be used as a mechanism for companies to actively support employee health.

The study provides valuable insights into the complex interaction effects between reduced working hours and the flexibility of working hours. However, further research is necessary to gain a comprehensive understanding of the underlying mechanisms driving these interaction effects and to explore their implications in various contexts, such as labor productivity or the allocation of employees' time. Changes in the social environment can influence drinking behavior. Therefore, future research should investigate drinking behavior, considering both the work and social environments. This approach will provide a more comprehensive understanding of how individuals in the workforce engage in drinking behavior. Expanding the research in these areas by considering flexibility in different settings will enhance our knowledge and provide more implications of the interaction between reduced working hours and flexibility in the workspace.

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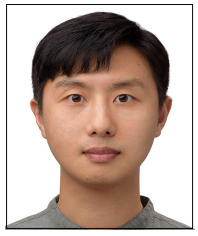
Jeong-Hun Ji [Regular member]



- Aug. 2015 : Kangwon Univ., Business administration, MBA
- Feb. 2020 : Kangwon Univ., Department of agricultural and resource economics, MA
- Sep. 2021 ~ current : Korea Univ., Dept. of Food and Resource Economics, PhD candidate

〈Research Interests〉
Food consumption, Health economics

Sang-Hyeon Lee [Regular member]

- Dec. 2014 : Texas A&M Univ., Agricultural Economics, PhD
- Jan. 2015 : Korea Rural Economic Institute, Research Fellow
- Jun. 2017 : Kangwon Univ., Dept. of agricultural and resource economics, Professor
- Sep. 2022 ~ current : Korea Univ., Dept. of Food and Resource Economics, Professor

〈Research Interests〉
Agricultural and Food Policy, Behavioral and Experimental economics