Peer Effects on Working Hours: A Progress Report

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Abstract

We investigate whether a worker's working hours depends on that of coworkers and manager in the same peer group, and whether the worker's happiness depends on their peers' working hours. Using personnel records on working hours and peer group assignments from a large consumer-goods company, we find peer effects on working hours. When a coworker who tends to work long hours is assigned to a peer group, the other workers in the same group will likely work longer. Also, when a worker moves to a peer group whose manager works long hours, the worker will likely increase their working hours. Using the combined data from the personnel records with an original survey of each worker's happiness, we find that coworkers' working hours negatively relates to workers' happiness. We also find that workers feel happier when they work longer than their coworkers.

Keywords: peer effects, happiness, overtime work, personnel records.
JEL codes: J22, J28, M54

1. Introduction

In the workplace, managers often group work staffs into several group. Work staffs are influenced by coworkers in the same peer group as well as the manager. Peer effects in the workplace have been well studied. Mas and Moretti (2009) showed that workers' productivity increases when the workers work with more productive coworker in a large supermarket chain. Peer effects on productivity have been found high-skill occupation such as researchers (Azoulay et al. 2010) as well as a low-skill occupation such as fruit pickers (Bandiera et al. 2010) and call center workers (DeGrip and Sauermann 2012).[1] Moreover, Cornelissen et al. (2017) found peer effects on wages

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[1] Waldinger (2012) found no evidence for peer effect on productivity among scientists in a university.

using a representative data set and strong evidence for lower-skill occupations in particular.

However, there are few evidence on peer effects on working hours. Kuroda and Yamamoto (2013) showed that Japanese workers, who are long-hour-workers, after transferring to Europe, in which workers work less than Japanese workers, reduce working hours. This result suggests that working hours are influenced by the coworkers' labor supplies, though work environments are changed as well as coworkers. Collewet et al. (2017) found that men's working hours increase with that of their peers. Their peers do not necessarily correspond to their coworkers in the same workplace, because their definition of peers is "friends, neighbors, acquaintances, or people at work." Therefore, there are no evidence on peer effects on working hours in the same workplace.

Peer effects in workplaces have positive and negative effects. Peer effects raise productivity (Mas and Morretti 2009; Bandiera et al. 2010; DeGrip and Sauermann 2012). This is a positive aspect of peer effects. Negative aspects of peer effects are twofold. First, peer effects trigger longer work. It is a problem that non-workaholic workers are influenced their workaholic coworkers and manager and then work longer (Hamermesh and Slemrod 2005). The excessive work makes their mental health worse (Kuroda and Yamamoto 2016). Second, peer working hours negatively relates to one's happiness (Collewet et al. 2017). Collewet et al. (2017) found that individual happiness is negatively correlated with their peer working hours as well as their own working hours. They also found that people who work less than their peer are less happy. They called these facts as "conspicuous work" in contradiction to "conspicuous leisure" (Veblen 1899).

Our research questions are twofold. Fist, are individual working hours influenced by their peers' working hours? We focus on peer effects on working hours rather than wage and productivity. Second, do peers' working hours have an effect on individual happiness? We examine the effect of peer effect on well-being as well as behavior. To provide answers for these questions, we use personnel records in a consumer-goods company and conducted an original survey in the company. The company is a Japanese arm of one of the largest consumer-goods company in the world. We focus on office workers because they can choose by themselves.

The rest of this paper is organized as follows. Sections 2 and 3 describe our econometrics specification and our data, respectively. Section 4 reports our results. Section 5 investigates the relationship between happiness and peers' working hours. Section 6 concludes.

2. Econometrics Specification

We assume that working hours of worker i, working in peer group g, in period t can be written as

$$h_{igt} = \alpha_i + \beta \bar{h}_{-igt} + \gamma h_{gt} + \boldsymbol{X}_{gt} + \varepsilon_{igt}, \qquad (1)$$

where h_{igt} is the worker i's monthly working hours in peer group g, $\bar{h}_{-igt}$ is the coworkers'

Table 1 Descriptive statistics

	Obs.	Mean	SD	Min	Max
Total overtime work hours (monthly)	2588	31.47	15.21	-10.25	96.75
Individual fixed effect	2588	-0.13	14.73	-33.21	44.24
Group size	2588	5.96	2.81	2	13
Manager's individal fixed effect	2588	-1.29	15.85	-30.93	34.39
Average coworkers' individual fixed effect	2588	-0.14	10.57	-29.18	37.84
Proportion of changing a peer group	2588	0.03	0.17	0	1
Variation of the change in manager's individual fixed effect	2038	0.18	4.13	-42.46	48.54
Variation of the change in average coworkers' individual fixed effect	2035	-0.01	2.47	-23.33	30.37
Proportion of the change in manager's individual fixed effect	2038	0.04	0.19	0	1
Proportion of the change in average coworkers' individual fixed effect	2035	0.15	0.36	0	1

average working hours in peer group g, h_{gt} is the manager's working hours in peer group g, $\boldsymbol{X}_{gt}$ is a vector of peer group, group size, work level, department and period dummies, and ε_{igt} is error term.

Estimating equation (1) has Manski's (1993) reflection problem, which is the identification problem that is caused by the endogeneity of peer effects. A worker is influenced by the coworkers in the same peer group but influences the coworkers. To avoid the reflection problem, we use peer's average individual fixed effect instead of raw working hours[2]:

$$h_{igt} = \alpha_i + \beta \bar{H}_{-igt} + \gamma H_{gt} + \boldsymbol{X}_{gt} + \varepsilon_{igt}, \qquad (2)$$

where $\bar{H}_{-igt}$ is the coworkers' average individual fixed effects in peer group g, and H_{gt} is the manager's individual fixed effect in peer group g.

3. Data

Our estimated sample includes all office workers in the company between July 2016 and April 2017. We estimate individual fixed effects using the sample between December 2013 and June 2016. Therefore, we restrict the sample that entered the company before July 2016. The company introduced a new human resource system on July 2016. The system allows workers to choose both when and where they work by themselves. Thus, workers can freely choose their

[2] We estimate the individual fixed effect from only period dummies, because we are not provided the information about peer group, work level and departments for overall observation period. Our observation period is between December 2013 and April 2017. We get the information from June 2016 to April 2017. We estimate the individual fixed effect from December 2013 to June 2016.

Table 2 Peer effects on working hours

	(1)	(2)	(3)	(4)	(5)
Manager's individal fixed effect	0.103***	1.092***	0.962***	1.065***	-0.169
	(0.038)	(0.176)	(0.170)	(0.173)	(0.116)
Coworkers' average individual fixed effect	0.210**	0.181**	0.184**	0.174**	0.219*
	(0.084)	(0.085)	(0.086)	(0.085)	(0.118)
Mover			-2.398**	-1.240	-2.338**
			(1.180)	(1.094)	(1.122)
Mover * Manager's IFE				-0.166*	
				(0.091)	
Mover * Coworkers' IFE				0.000	
				(0.096)	
Manager's IFE_t - Manager's IFE_{t-1}					-0.092*
					(0.055)
Coworker's IFE_t - Coworke's IFE_{t-1}					-0.247
					(0.164)
Mover * (Manager's IFE_t - Manager's IFE_{t-1})					.
					.
Mover * (Coworker's IFE_t - Coworke's IFE_{t-1})					0.518**
					(0.229)
Controls	No	Yes	Yes	Yes	Yes
Constant	31.633***	55.948***	54.943***	54.924***	17.245***
	(0.047)	(2.490)	(2.549)	(2.564)	(2.342)
Observations	2588	2588	2588	2588	2034
R^2	0.017	0.146	0.148	0.150	0.143

Notes: Group size and dummies for peer group, work level, department and period included as controls. Robust standard errors in parentheses. ***, **, * denote significance at the 1, 5, 10 percent levels, respectively.

working hours compared with from before June 2016.

Table 1 reports descriptive statistics of the sample. We exclude the peer group whose size is one from our sample to estimate both manager's and coworkers' peer effects. The range of group size is from 2 to 13. The group size is wideness, so we will control the group size. The mean of total overtime is 31.35. The negative sign of total overtime mean that a worker comes home earlier than standard working hours[3]. The high variation of total overtime supports that workers freely choose their working hours. This is true for the estimated individual fixed effects. Some worker prone not to overtime work and others prone to overtime work.

4. Results

Table 2 shows the impact of peer quality, measured as the coworkers' average individual fixed effects and the manager's individual fixed effect, on working hours. Column 1 of Table 2 presents baseline result. This estimate indicates that a positive relationship between the manager's

[3] The standard working time in the company is 7 hours and 35 minutes per a day.

Table 3 Peers' individual fixed effects and happiness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Own IFE	-0.011*	-0.005	-0.005	-0.006	-0.013*	-0.034***	-0.033***
	(0.006)	(0.008)	(0.008)	(0.007)	(0.007)	(0.011)	(0.011)
Manager's IFE		-0.001	-0.001				
		(0.007)	(0.007)				
Coworkers' IFE		-0.027**	-0.028**				
		(0.013)	(0.013)				
Own IFE * Manager's IFE			-0.000				
			(0.000)				
Own IFE * Coworkers' IFE			0.000				
			(0.001)				
(Own IFE - Manager's IFE)2				0.000			
				(0.000)			
(Own IFE - Coworkers' IFE)^2				0.000			
				(0.000)			
Own IFE > Manager's IFE					0.092		-0.025
					(0.209)		(0.301)
Own IFE > Coworkers' IFE					0.033		-0.500
					(0.272)		(0.391)
Own IFE - Manager's IFE						0.001	0.006
						(0.007)	(0.012)
Own IFE - Coworkers' IFE						0.027**	0.023
						(0.013)	(0.018)
(Own IFE > Manager's IFE) * (Own IFE - Manager's IFE)							-0.009
							(0.018)
(Own IFE > Coworkers' IFE) * (Own IFE - Coworkers' IFE)							0.039
							(0.023)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constants	7.776***	7.380***	7.372***	7.369***	7.684***	7.380***	7.720***
	(0.517)	(0.575)	(0.603)	(0.606)	(0.552)	(0.575)	(0.681)
Observations	185	166	166	166	185	166	166
R^2	0.096	0.103	0.103	0.087	0.097	0.103	0.121

Notes: Dummies for work level and department included as controls. Standard errors in parentheses clustered by the peer group. ***, **, * denote significance at the 1, 5, 10 percent levels, respectively.

individual fixed effect and the worker's working hours and a positive relationship between the coworkers' average individual fixed effect and the worker's working hours. Thus, when coworkers who work long hours arrive a peer group, workers in the peer group work longer, and when workers move to the peer group whose manager work long, the workers work longer. These results are robust to the inclusion of control variables, including group size and dummies for work level, department, period (column 2).

In column 3, we control mover dummy. The coefficient indicates negative sign, meaning movers work less than stayers. This result seems a strange result, because movers do not settle the new peer group and it may take more working hours than before movers move. However, if we control the cross term of mover and manager's and coworkers' individual fixed effect, the coefficient of mover is not significant. The cross term of mover and manager's individual fixed effect is significantly negative. This result suggests that the manager who work long hours help the movers, therefore movers work less than stayers. In column 4, we control the changes in peer qualities and the cross term. Movers work longer if the mover move to the peer group in which

coworkers work longer than previous peer group.

5. Happiness and Peers' Working hours

We found peer effects on working hours. A worker working hours is influenced by the peer working hours. The peer working hours might have an effect on another outcome. Collewet et al. (2017) showed that workers' happiness is negatively correlated with their peer working hours. In this section, we investigate the relationship between happiness and peers' working hours.

We test whether peer working hours have an effect on happiness on the basis of Collewet et al. (2017). Collewet et al. (2017) test three hypotheses; externality, conformity and conspicuous work. In externality hypothesis, workers work longer if their peers work longer. In conformity hypothesis, workers try to shorten the difference between their own working hours and peers working hours. In conspicuous work hypothesis, workers want to work longer than their coworkers.

To test these hypotheses, we conducted an original survey of each worker's happiness in the company in July 2016. We combine data from personnel records with the survey. Table 3 presents the result testing these hypotheses. First, workers own individual fixed effect is negatively correlated with their own happiness (column 1). This result means that workers who tend to work longer are less happy. In column 2, we control peers' individual fixed effect. We find only coworker's individual fixed effects are negatively correlated with workers' happiness. This result supports conspicuous work hypotheses. Workers are less happy if their coworkers tend to work longer. Our results do not support externality hypotheses (column 3) and conformity hypotheses (column 4).

To test the conspicuous hypotheses more detail, we control the dummy variables for workers who tend to work more than coworkers and manager (column 4). These dummies are not significant. On the other hand, the difference between a worker's and coworkers' individual fixed effect is positively correlated with happiness, if we control the difference between a worker's and coworkers' individual fixed effect and the difference between a worker's and the manager's individual fixed effect instead of controlling these dummies (column 6). The estimate in column 6 suggests that if workers work more than their coworkers, workers become happier, though the long work per se is negatively correlated with happiness.

6. Conclusion

This paper combines data from a firm's personnel records on individual worker overtime and peer group assignments with a survey of each worker's happiness, to identify the causal effect of peer effects on overtime work and the correlation of peer pressure on happiness. We find peer effects on working hours. When coworkers who work long hours arrive a peer group, workers in the peer

group work longer. When workers move to the peer group whose manager work long, the workers work longer. We also find that a worker's happiness is negatively correlated with coworkers' working hours. Workers are happier when workers work longer than their coworkers. These facts are observed only for men.

In Japan, longer working is a social issue. Our finding indicates that coworkers' overtime work infects the worker's overtime work and the worker tend to work longer than coworkers to become happier. To prevent the negative spiral, managers should allocate workers who tend to work longer with coworkers who tend not to work longer. This human resource allocation might help reducing overtime work.

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