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ECON 318

Analysis of Work-From-Home Policies' Effects on Selected Employee Outcomes

Introduction

In response to high employee turnover resulting from long commutes, a company is looking to test the effectiveness of work from home policies. The company is a major Chinese travel agency that wants to see how their pilot program of work from home policies impact employee outcomes in regards to performance measures and rates of retention. In their pilot, the company had 249 call centre employees randomly selected to work from home, while 118 others served as the control group working from the office. In this report, we look at the data collected from the pilot program, and analyse it to identify trends and any possible changes to be made to the program.

1. Data Cleaning

The data provided consisted of details relating to the employees. The included datasets consisted of employee attitudes, characteristics, status, performance, a performance panel, quits, and their quit dates. After careful inspection of the data, we find that the data in the datasets for employee status, attitudes, and quits did not have problem values. The other datasets we utilised in our analysis regarding employee characteristics and performance panel did have notably gaps that were then addressed according to the summary in the following table.

Dataset File	Observation	Variable	Problem	Change
attitudes.dta	No problem values detected	–	–	–
employeecharacteristics.dta	personid = 148 personid = 239	Prior_experience Prior_experience	-99 -99	-99 years of experience is impossible, both changed to missing values
employeecharacteristics.dta	personid = 148 personid = 239	Age Age	-99 -99	-99 years old is impossible, both changed to missing values
employeecharacteristics.dta	personid = 148 personid = 239	Tenure Tenure	-99 -99	-99 tenure is impossible, both changed to missing values

employeeStatus.dta	No problem values detected	–	–	–
performance_panel.dta	personid = 29216 month = 3 year = 2011	performance_score	1000	The performance score is calculated on a scale of 1-100, thus value of 1000 is invalid, and changed to missing value
performance_panel.dta	personid = 29996 month = 3 year = 2011	performance_score	1000	The performance score is calculated on a scale of 1-100, thus value of 1000 is invalid, and changed to missing value
performance_panel.dta	personid = 29996 month = 7 year = 2011	performance_score	1000	The performance score is calculated on a scale of 1-100, thus value of 1000 is invalid, and changed to missing value
performance_panel.dta	personid = 38046 month = 4 year = 2011	total_monthly_calls	-999999	-999999 (negative) calls a month is impossible, therefore is invalid and changed to missing value
performance_panel.dta	personid = 31292 month = 4 year = 2011	calls_per_hour	200	200 calls per hour seems to be an outlier and excessively high for a value, changed to missing value
quits.dta	No problem values detected	–	–	–

2. Methodology

The analysis for these datasets focused on looking at employee outcomes regarding performance and retention rates. First we looked at creating a difference-in-differences analysis of the performance_panel dataset, between the control and treatment groups of employees. Through this, we ensured that the variables of interest remain consistent between both groups of employees before the treatment. This is done to fulfil the parallel trends assumption that makes the difference-in-differences analysis valid. The table in **Figure 1** represents the characteristics of the control and treatment groups before the start of the pilot program.

		(1)		(2)	T-test
		0		1	Difference
Variables	Observations	Mean/SE	Observations	Mean/SE	(1) - (2)
Average performance evaluation	1188	79.626	1293	79.653	-0.027
		[0.234]		[0.235]	
Average calls / hour	1187	20.469	1293	20.241	0.227
		[0.077]		[0.075]	
Monthly calls total	1234	1839.872	1378	1823.332	16.539
		[22.898]		[25.471]	

Figure 1.

Looking at the table, we can see that the differences between the control and treatment group in areas of average performance evaluations, average calls per hour, and total monthly calls, were not statistically different. Because of this we can see that the parallel trends assumption holds for our difference-in-differences analysis.
A difference-in-differences regression analysis was performed with the average performance evaluation acting as the dependent variable as it can serve as a proxy for overall performance of a selected employee.

Retention rate is the other target outcome of interest. This outcome was initially tested with various external variables that have the ability to impact an employee's decision to stay within a role. The other variables were age, tenure, wages + bonuses, or even cost of commute, and apartment living status. Ultimately, the retention rate in this study was regressed against basewage, costofcommute, prior_experience, rental, tenure, and treatment variables. These variables made the final cut for analysis because they effectively encapsulated many of the desired variables of interest. Additionally, the R-squared resulting from their regressions were high enough to justify favouring this model over previously tested ones.

3. Discussion of Findings

The result in our difference-in-differences regression run on the average performance evaluation is found in the table for **Figure 2**. Here, we can observe that the control group experiences a drop in performance post treatment. Meanwhile the treatment group,

	(1)
	performance_score
post	-2.198***
	(-4.45)
treatment	0.0265
	(0.04)
postxtreatment	1.992**
	(2.92)
_cons	79.63***
	(163.21)
N	4401

t statistics in parentheses

* p < 0.05, ** p < 0.01, *** p < 0.001

Figure 2.

postxtreatment sees a statistically significant positive change of about 1.992. Since the t-statistic for this particular variable of interest is at 2.92, with an associated p-value of 0.004. Thus we can conclude from the model that employee performance sees a statistically significant, positive effect when employees are working from home, compared to those working in the office in this program.

In regards to retention rates, the results from comparing the treatment and control groups can be found in the table for **Figure 3.**

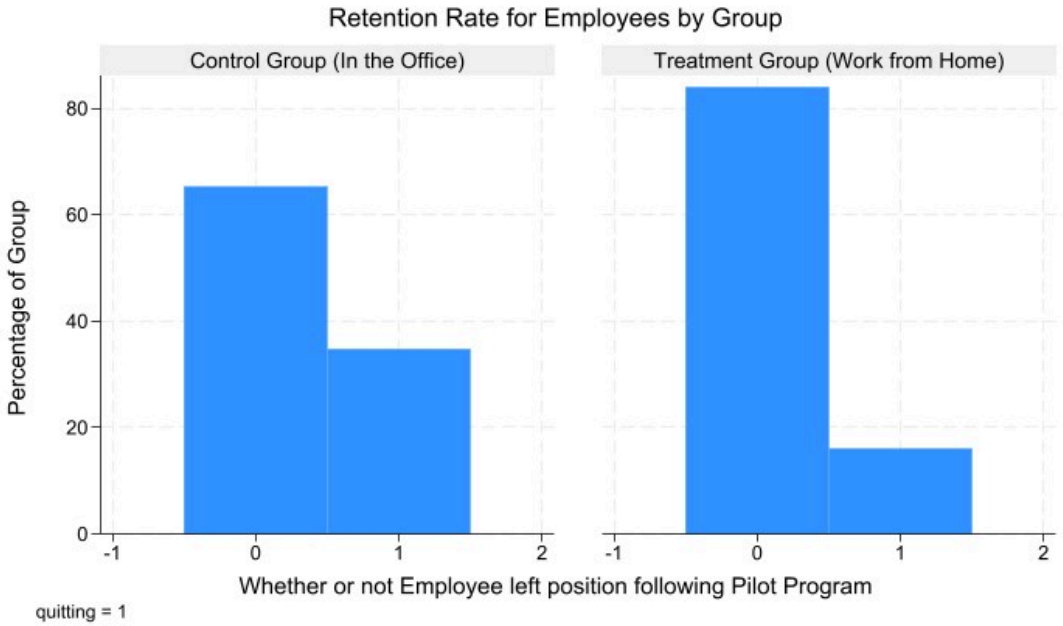

Figure 3.

The most apparent finding during this analysis was how significant an effect the treatment of work from home has on the retention rate of employees. We found that for the group of employees who were working from home, they were 19.5% less likely to quit compared to those who were working from the office in the control group. When looking at the quantitative statistical significance for the treatment, we see a t-statistic of -3.67 or a p-value of nearly 0.00 (**Figure 4.**) . As a result, even when comparing to other factors in the experiment, we can conclude that the treatment had the biggest and highest significant effect on whether or not an employee quit the company. For example, the cost of commuting, while statistically significant, has a negligible nominal effect on the whether or not an employee decides to leave their role. Similarly tenure, while being statistically significant, has a negligible effect on the employees quitting, noted by its coefficient of -0.00373.

	(1)
	quitjob
treatment	-0.195***
	(-3.67)
rental	0.0627
	(0.93)
costofcommute	0.00834*
	(2.11)
basewage	-0.000128
	(-0.54)
prior_experience	0.000451
	(0.43)
tenure	-0.00373*
	(-2.13)
_cons	0.563
	(1.65)
N	247

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 4.

4. Conclusion

Through our analysis of the data supplied from the pilot program, we conclude that the company should continue to pursue work from home policies for their employees, and even advance them on a company-wide level. Owing to the analysis results, the overwhelmingly positive benefits for the company and employees spells out the success of such policies. The results see that work from home policies significantly increase the performance and productivity of employees, when compared to those that work in the office. In addition to this, the retention rate among employees who were from home were also significantly higher. Moving forward, the company is recommended to keep running this work from home program, and continue to track employee performance on a system-wide level, in order to ensure that performance truly retains its upward positive trajectory.