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TITLE:

A difference in differences analysis on how a change in employment affects motivation amongst temporary employees

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Preface

This master thesis has been completed as final part of the two-year Master's program in economics and administration with specialization in economic analysis at the Business School at University of Stavanger.

In the spring of 2016, I took the course MØA280 - Empirical Labor Economics. In this course, I learned a lot about different motivation factors and how they would affect employees. This gave me the idea to analyse motivation as my master thesis.

First of all, I wish to thank my supervisor, Professor Mari Rege, for good advice, input and discussions. Furthermore, I would like to thank SpareBank 1 Kundesenter AS, which has allowed me to write this thesis and gave me all the information I need. They have supported me along the way, and showed great interest in this thesis. I would especially like to thank Rune Bertelsen who is head of Sparebank 1 Kundesenter AS.

At the end, I would like to thank family and friends for insightful input and feedback throughout the semester. An extra big thank to Renate Fuglestad and Stian Berge.

Abstract

This master thesis investigates how temporary employees' motivation changes when a company starts to hire more permanent employees. It is imperative to know how changes in the work situation affects the motivation of the employees, because motivation can be the difference between a successful or a non-successful organisation. I used customer service surveys as an indicator of performance, and looked at performance as a continuation of motivation. The increase in permanent employees took place in the first week of 2016, which made it possible for me to do a difference in differences analysis before and after the increase in permanent employees. In addition, I also performed an event study. I found no statistically significant change in the motivation of temporary employees when there was an increase in permanent employees. The outcome of this thesis forms a conclusion that states that temporary employees perform correspondingly both before and after an increase in permanent employees.

Tore Berge

Stavanger, June 2017

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Introduction

One of the most important questions in most organizations are how to best motivate the employees. Motivation can affect performance and keep sick leave low. Motivation can also be the difference between a successful or a non-successful organisation. Employees can have different set of motivation factors, which can vary from employee to employee or department to department. This master theses will look at how an increase in permanent employees affects the temporary employees' motivation? For a company with a mix of temporary and permanent employees, it is important to know how changes in the work situations affect the different type of workers.

This thesis will be looking at a substantial change in the ratio between temporary hire and permanent hire in a costumer center. The change is an increase in permanent staff. This change was made because of a more predictable future for the costumer center and a need for long time staff. Normally when we look at motivation factors we will focus on wages, workload and work hours. This thesis will look at how an increase in permanent employees affects the motivation of the temporary employees. Will a temporary employee get an increase or decrease in motivation, if the company starts to hire more people on permanent contracts, while the temporary employee remains temporary?

This thesis has two competing hypotheses, the first is that temporary employees are experiencing a decrease in motivation arising from the increase in permanent employees, and the second is that there is no change. I will use an event study to investigate the change in motivation, and then I will perform a difference in differences analysis and find evidence of the change.

The main goal in this thesis is to see how the change affect the motivation of temporary employees. Good motivation will affect the performance, and the performance affects the customer satisfaction. In my analysis, I will use customer satisfaction as a measure of motivation.

In my thesis, I will focus on some key mechanisms that affects motivation. The first is the wage mechanism. There is a wage difference between the temporary and permanent employees, where permanent employees earn more money. The job security mechanism is a factor that affects the temporary employees, which means that they will have to do a good job to get a new contract. Peer effect is a mechanism that explains how workers affect each other.

The permanent employees sit mixed with temporary employees and they have no permanent work space. The job characteristic model looks at different aspects that could change an employee's motivation.

This thesis is written in cooperation with one of the largest banks in Norway. They use a system called Bright to see how the customers reacts to the conversation they had with the customer center. I have full access to all off the employees work schedules and all Bright data. I will use the program Stata to process the dataset, and further carry out the analysis. The dataset spans over 2 years, from January 2015 to December 2016.

Motivation is very important to provide the best customer service. When an advisor is helping a customer, he can choose to only answer the question the customer asks, or he can provide something extra. This could for example be more information about the issue the customer is experiencing, or information on a product he thinks would be good for the customer. The motivation can change how the advisor act towards the customer. An employee with bad motivation will not provide the "little extra".

This thesis investigates the effect of an increase in permanent hire, the increase is called the treatment. The results from this analysis does not show that the treatment did change the motivation of the temporary employees. If there is a decrease in customer satisfaction, it could be a result of a decrease in motivation. There are two competing hypotheses in this thesis. One expects that the treatment decreased the motivation, and the other expects there to be no change. The difference in differences analysis shows that there is no statistically significant effect, which means that I find no evidence that shows a change in motivation. One of the hypothesis expects this to be true. There are several points in the theory that suggested there to be no change. Job security and the job characteristic model supports the belief that there should be no change, while wage expects a decrease in motivation. Peer effects could go both ways, depending on who sit next to each other and how other employees are behaving.

There are also weaknesses in this thesis and these could also explain why the treatment did not change the motivation. It could be result from the of difference in trends between the control group and treatment group. Control group are permanent employees and treatment group are temporary employees. For this difference in differences analysis to be reliable, the trends should be as similar as possible before the treatment, this is not the case in my thesis. Even with no significant change, the treatment could still be a negative motivation factor. A possible outcome of this, is that there are more important factors that affect the level of

customer service, for example job security. If the temporary employees would start to perform bad, then they would not get a new contract. This amongst other factors may be more effective than the treatment. The other main reason is that the dataset is relatively small. I might find different numbers in a larger dataset.

The thesis is structured as follows. First a presentation of why this master thesis is important and information about the change. Then follows a review of existing literature regarding job motivation, and factors that may influence motivation. Furthermore, in the data chapter I presented the dataset and then the empirical strategy is described. This chapter is followed by a review of the implementation and results of the analysis. Based on my findings follows a discussion, then after the discussion I draw one conclusion.

Background

Temporary employees

There is a lot of temporary employees working in costumer centers and banks (Manpower.no, 2017). The temporary employees are often hired in another company and then gets a temporary contract with the costumer center or the bank. There are a lot of students that work next to their studies, and they often work as temporary hires. This is also the case in the bank that I get my data from.

There have always been more temporary employees in this costumer center, then permanent employees. This is because this particularly center is relative new and did not know how many employees it needed. The costumer center has expanded in the last years and have increased their number of employees. The ratio between temporary and permanent employees have stayed somewhat stable. This was until January 2016, when the costumer center had become larger and they knew better how many employees that they needed. They started hiring more permanent staff and the ratio in permanent staff went up.

The customer center works for all of the banks in the bank alliance. They talk to regular customers with problem on their online bank or if they have question about fees and unknown transactions. There are also employees that handles insurance and company costumers.

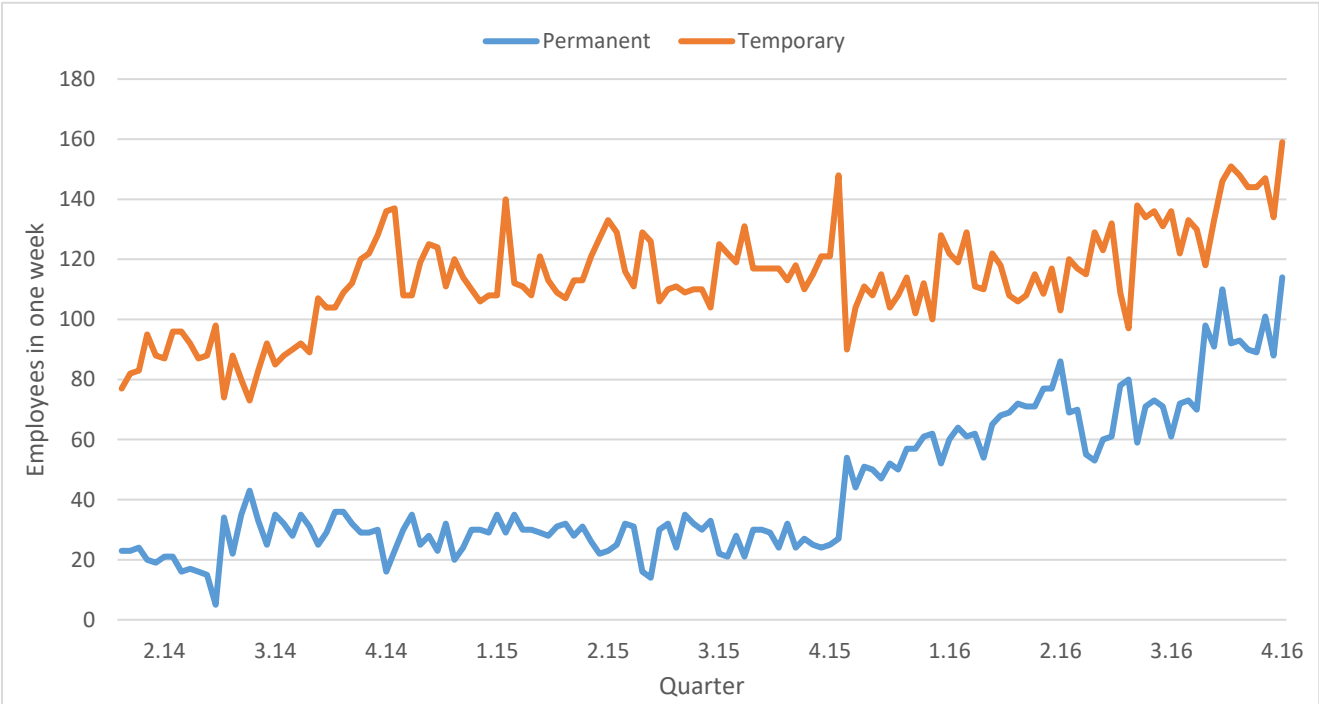
There are some differences and similarities between temporary and permanent employees in this costumer center. Almost every permanent employee work with insurance, when it comes to temporary employees only a few have that competence. The costumer center is open every day of the week, and both temporary and permanent employees normally work every second

weekend. Normal work days per week for a permanent employee are 3 days per week, while for a temporary employee they normally work every other week 2 and 3 days. In a regular month, the permanent employees will work 2-3 days more than a temporary employee. None of the employees have a permanent office space. When they arrive at work, they choose an office space. In each office space, there are four employees sitting together and there is always a good mix between temporary and permanent employees. The costumer center also has a shift leader that does not answer phones and helps everyone at work. They are always permanent employees.

The treatment

I investigate the effect of an increase in permanent hire, while temporary hire decreases. This change is illustrated by the graphs in figure 1 and 2. Figure 1 shows total work days per week. The first week in this graph there were 100 work days in total, 77 of these were temporary hires. The graph shows a decrease in the blue line between second and third quarter every year, this is the summer months and the contractor/students want to work more and the permanent hires take vacation.

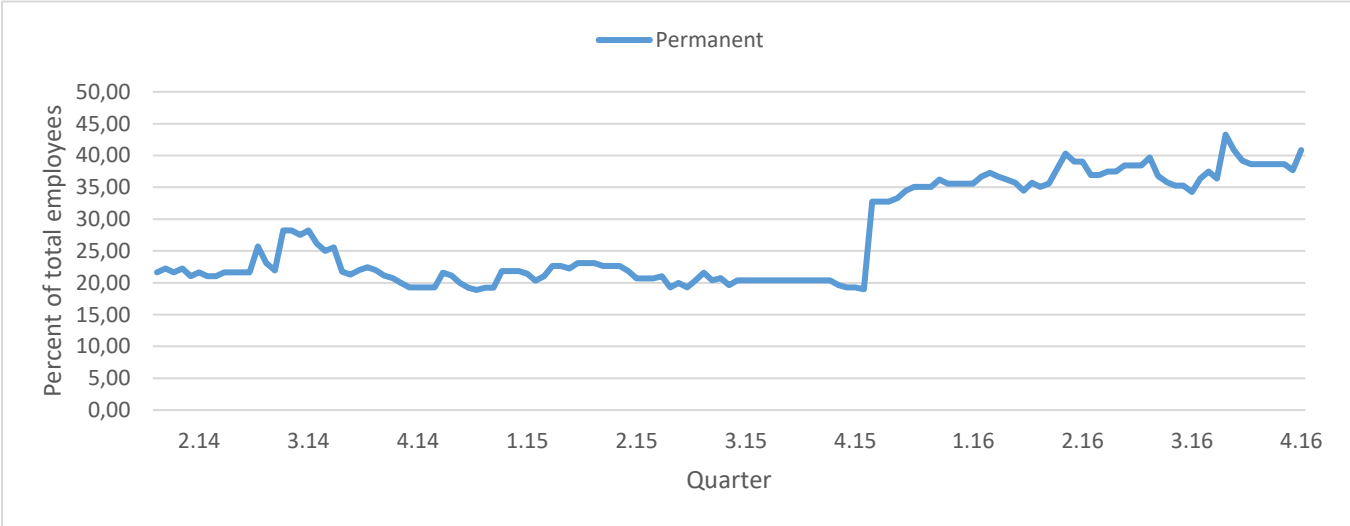
Figure 1 – Total Work Days per Week



Notes: The graph illustrates how many work days permanent (blue) and temporary (orange) had every week from 2014 to 2016. The time show each quarter of a year. 1.16 meaning January to March 2016.

The graph in figure 1 shows a huge difference in total work days on permanent and temporary staff. Temporary staff gets a decrease and then stays almost stable. The decrease in temporary staff is because some got offered permanent job and others quit. Permanent hire increases from 27 days a week to 54 days in the first week in January 2016. Temporary hire decreases from 148 days a week to 90 days in the same week. Some of the huge difference between the last week in 2015 to the first week in 2016 can be explained by the holiday. Every holiday it is more temporary employees, because they do not have school and are able to work more. Permanent employees tend to take more vacation in holiday periods. Figure 1 shows that the space between permanent and temporary staff decrease a lot.

Figure 2 - Permanent Hire as a Percent of Total Employment

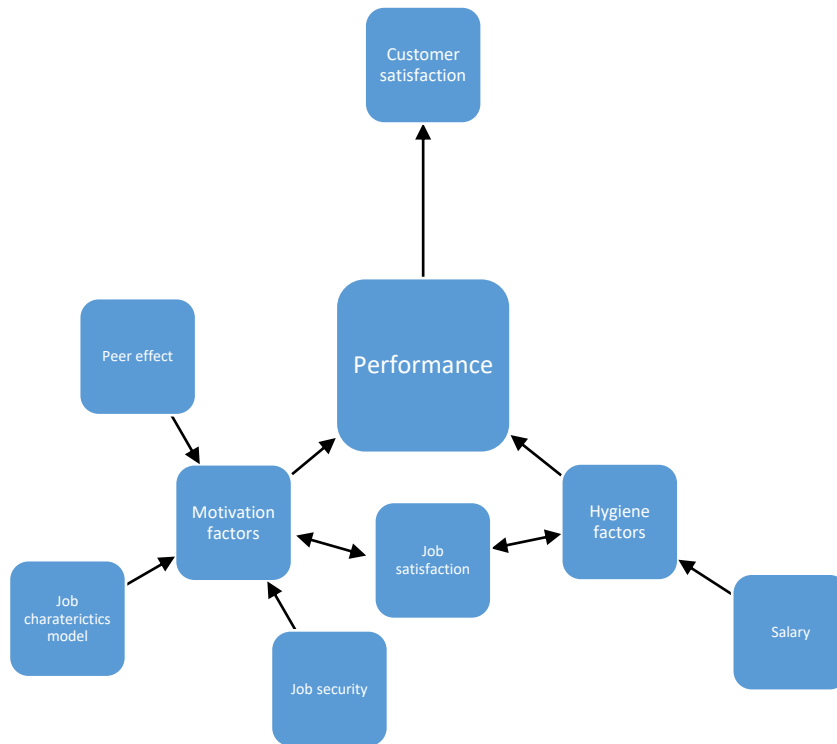


Note: The graph illustrates how many percent of total employment that are permanent employees.

Figure 2 here shows the same change. The blue line is permanent hire as a % of total employees. Week 1 one in January shows an increase from 20-25% to 35-40 % in permanent hire.

Relevant theory

Figure 3 – Customer Satisfaction



Note: This figure shows the mechanism that I focus on in my thesis and how they affect customer satisfaction.

This model shows the effects that this thesis will focus on. On factors that increase motivation this thesis will look more closely at peer effects, the job characteristics model and job security. These are all effects that are visible in a customer center where everyone sits together. The thesis will also look at salary as a mechanism that decreases motivation.

Individuals' overall attitude to their work consists of several components, which as a rule often is referred to as **job satisfaction**. This attitude has been an important part since the 1920s-organizational psychology. Job satisfaction represent one of the largest research fields in working life, and is considered an essential part of the understanding of the behaviour of individuals in an organization. This can be of great importance to businesses in terms of employee welfare, productivity, and absence (Kaufmann & Kaufmann, 2003, p. 218). One of the motives for studying job satisfaction are according to Arnold, et al. (2005, p. 257) the assumption that job satisfaction results in motivation among employees. Another motive is the

idea that satisfied and comfortable workers perform best at work (Sundstrom & Sundstrom, 1986). Job satisfaction is believed to have important implications on overall productivity in organizations (Kaufmann & Kaufmann, 2003, p. 224).

Frederick Herzberg's two factor theory proposes a distinction between the so-called **motivation** and **hygiene** factors in a job. Hygiene factors involves external features of the work, like working conditions, pay and working environment. Motivation implies recognition, work challenge and use of skills. According to theory, motivation factors lead satisfaction to the extent they are present, however the absence of these does not result in failure satisfaction. On the other hand, hygiene factors do not cause complacency, although dissatisfaction can occur in the absence of these (Arnold et al., 2005). In a study conducted by Jurgensen (1978), employees are asked to rank the factors that make a job good or bad. The results show that for both men and women it is the nature of the work itself that constitutes the most important aspect. In addition, among the major job satisfaction aspects (such as wages, opportunity for promotion, colleagues), it is the work itself that largely predicts overall job satisfaction.

When we look at performance changes it is done many papers regarding wage. Cohn, Fehr, Herrmann and Scheneider did a field experiment regarding wage. They put groups of two workers, in one group they reduced both wages, and in the other group they only reduced one of the workers wage. This experiment showed us that if only one of the workers got payment cut, then the production decrease twice as much as if both got cut. The worker that got cut got a huge decrease in productivity. (Cohn et al., 2012). This could be related to this paper. The temporary hire does not get a wage cut, however an increase in permanent hire means an increase in the wage difference. Permanent hire earns more money than one that works temporary. The field experiment showed that an increase in wage did not increase productivity. This could mean that a permanent hire most likely will not perform better than someone that works temporary, although it could decrease the productivity of the temporary hire. The article "Inequality at work" look at the difference in salaries on job satisfaction. Here they find a clear negative production effect for those that earn less than the median (Card et al., 2012). The salary difference can be one aspect that affects the temporary hire's motivation.

Peer effects can also be related to this master thesis. One example on a peer effect are how the productivity of a worker depends on the productivity of co-workers in the same team. There is strong evidence that a high productivity worker increases the productivity to those

around him (Mas and Moretti, 2009). There is also evidence that working together is better than working alone, especially for low-productivity workers (Falk and Ichino, 2006).

One of the most influential theories regarding how aspects of work affects individuals is the **job characteristics** model by Hackman and Oldham (1976). According to this model work interior features the main underlying assumption for employee sense of job satisfaction (Locke, 2004). The model lists five core characteristics that forms the basis for an individual's job satisfaction:

Variation in skills - the extent to which tasks require different skills

Task Identity - the extent to which the employee performs a lot of work, unlike a small part of it

Task significance - the extent to which the work is seen as important

Autonomy - the extent to which the worker has freedom within the job

Feedback - the extent to which the worker is given feedback on their own performance

The first three of these, variation in skill, task identity and task significance makes according to psychologists, work more meaningful to the employee. Autonomy implies that employees have freedom and space to make decisions, which contributes to a sense of personal responsibility. Feedback is required for the worker to identify problems, try out new ideas and implement those that are good (Lazear & Gibbs, 2009, p. 192-193). According to theory, work possessing the characteristics that the model describes, probably satisfy individuals' needs for mental challenges and enrichment of the work (Danielsson & Bodin, 2008). In addition to describing job satisfaction, job characteristics model in the literature describes the individual motivation (Jacobsen & Thorsvik, 2010, p. 233; Lazear & Gibbs, 2009, p. 192). Job satisfaction plays an important role in the endeavor for higher performance and motivation among employees (Danielsson & Bodin, 2008). Being motivated means that you are driven to do something.

Hypotheses

Motivation is crucial in all service professions. Job security is one of the mechanism that affects motivation. If the company starts to hire new permanent employees, while the temporary employees still are temporary, then that could make the temporary employees feel as if their job is more unsecure. This does not necessary mean that they will start to preform

less, because they will have to show that they are worth it and by doing a good job they could prove that. While job security could increase performance, wage is a mechanism that in this case will decrease motivation. The wage difference between temporary and permanent employees will make a temporary employee perform less. Peer effects is a mechanism that can affect both ways, all depending on who sit next to each other and how other employees are behaving. All employees could act differently.

Given the theory I have defined earlier in the theses, I get two competing hypotheses. The first hypotheses that I want to examine in this study is if the increase in permanent hire decreases the motivation of the temporary hire. The second hypotheses expect there to be no change in motivation after the increase in permanent hire. Motivation is calculated by how good customer service they provide. The wage difference supports the first hypotheses; however, the job security supports the second hypotheses. Peer effects can support both of the hypotheses, depending on how the other employees are acting.

Data

General description of the dataset

All data used in this thesis comes from Bright. In this system, it is possible to see what the bank have delivered of customer service yearly and monthly. It will therefore be possible to compare numbers from 2016, to numbers from 2015. I have data from week 1 in 2015 until week 52 in 2016.

Creating the dataset was not easy. All data from Bright comes per year or per month. I needed a dataset where I had weekly data for every person in the company. There were also some restrictions to what type of data I was given access to. I only got access to a special created ID number to per employee. ID numbers was from 100-181. I ended up with a dataset that has 13 columns and 8 507 rows.

Besides Bright dataset I have also shifts schedules, where can I see how many employees are at work every day, every week and every month. This becomes important in terms of calculating the change in permanent and temporary employees.

Once a customer has talked to the customer service, then there is a high probability that they will be called back by an automatic reply. It is optional if the customer wants to respond and normally response rate is between 20-25% according to Bright. Here there are 6 questions, where the grade is 1-5. The questions are:

Table 1 - Bright Questions

Area	Question	Grade
Commitment	How did you experience the advisor's commitment and understanding of the conversation?	1-5. 5 if they are happy and 1 if they are unhappy
Overall satisfaction	How satisfied are you with the conversation?	1-5. 5 if they are happy and 1 if they are unhappy
Initiative	How did you experience the advisor's ability to provide sound advice during the conversation?	1-5. 5 if they are happy and 1 if they are unhappy
Knowledge	How did you experience the advisor's expertise?	1-5. 5 if they are happy and 1 if they are unhappy
Solution	To what extent did the advisor answer to your question?	1-5. 5 if they are happy and 1 if they are unhappy
Response	How happy are you with the time it took before you came to an advisor?	1-5. if they are happy and 1 if they are unhappy

Note: This table shows all of the questions and how they are rated.

Responsiveness are not relevant to this task. Response time is not something that we can manage and is not influence based on motivation. This is something the management uses to analyse if we have enough people at work.

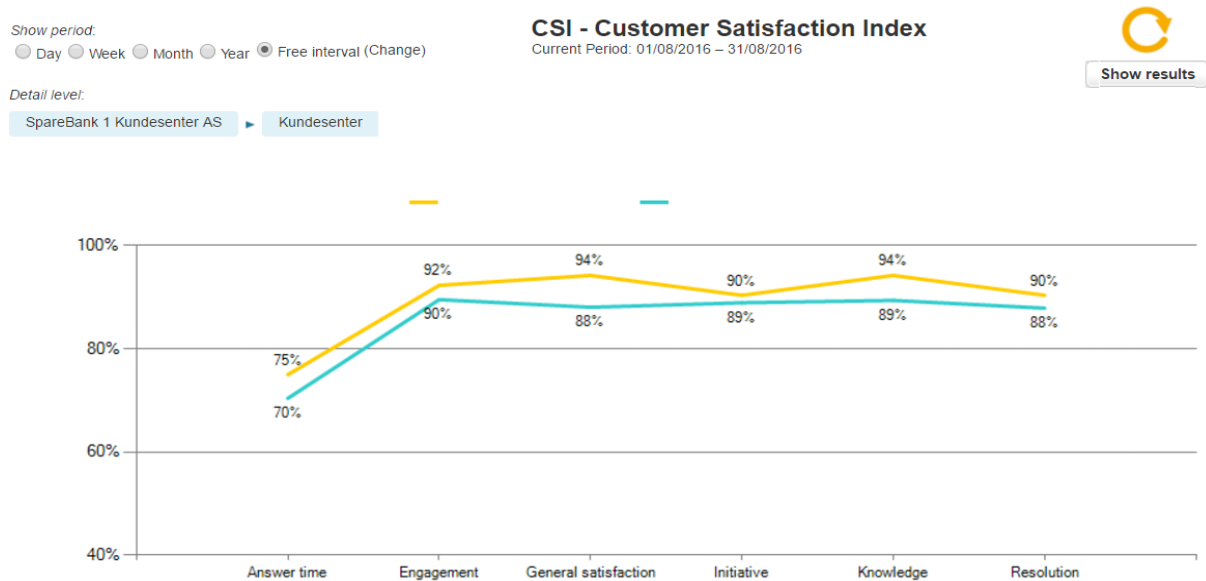
The customer can rate 1-5. 1 = 0%, 2 = 25%, 3 = 50%, 4 = 75% and 5 = 100%. The bank's requirement is to be over 90% average on all questions. This is both for every employee and total for the customer center. The data that I use in my analysis is between 0-100 and is therefore normalized.

There is a restriction in this system. Bright can only give 10 customer surveys per person, per week and a maximum of 40 a month. If the employee does not fill up 10 surveys in a week,

then they follow the employee on to the next week. Which means that the employee then can get 10 surveys and the ones that the employee did not receive the week before.

Figure 4 is an example of how the customer satisfaction index looks. The yellow line is one random person's average, while the blue is the average of all contractors at work. Here I have chosen 01.08.2016-31.08.2016. In this month, there was a total of 949 responses on temporary employees.

Figure 4 – Customer Satisfaction Index



Note: This graph shows the customer satisfaction index for august 2016. The yellow line is a temporary worker and the blue line are all of the temporary workers combined.

Variables

The main objective in this master thesis is to investigate the effect of the increase in permanent employees on temporary employee's motivation. Average, commitment, general satisfaction, initiative, knowledge and solution will be my dependent variables. Average is my key dependent variable.

The most important independent variable is if the employee is permanently employed or temporary employed.

I will control for if the employee is male or female and if their age is below or over 30. This is to make the result more reliable. See a complete list in Table 2.

Table 2 - Description of the Variables

Variables	Description
Dependent variables	
Average	An average of the other 5 dependent variables
Commitment	0-100
Overall satisfaction	0-100
Initiative	0-100
Knowledge	0-100
Solution	0-100
Independent Variables	
Temporary	1 if temporary hired, 0 if permanent hired
Male	1 if man, 0 if woman
Below 30	1 if under 30, 0 if over 30

Note: This table shows all of my dependent and independent variables.

I use the dependent variable average in my main results. It is an average of all the other variables and shows the overall satisfaction of the customer.

Sample restrictions

To do a difference in differences analysis I need to have a treatment and a control group. The treatment group are temporary employees and the control group are permanent employees. To assure a clean definition of treatment and control, I had to do some exclusion. All of the employees had to be in the same position over the time period. Therefore, I excluded all employees that went from temporary to permanent in my time period. Most new employees have a constant increase in knowledge and how well they are performing, because of that I excluded all employees that started working after September 2015. Because of a small number of employees that are still in the dataset, I choose to set the time period 2 months before and after the first week in 2016. If I were to choose a larger time period, then I would get less employees in the analysis. It is especially the permanent employee group that gets reduced too much. By increasing the time period with 1 month, I would go from 16 permanent employees to 11 permanent employees. This is because 5 of the employees would then have been working too short of a time. If I were to reduce the time period with one month,

I would still have 16 permanent employees, however the data set would decrease in size because of a reduction in observations.

Descriptive statistic

The dataset is summarized in the table below. My dataset consists of 81 individuals over a two-year period. After doing the sample restrictions, I have 28 temporary employees and 16 permanent employees. The two groups have 640 observations in total over the 16 weeks period. This is a relatively small dataset. Using quantitative data, it is a requirement that the sample should be large and representative. This is important in order to avoid bias in the estimators, which will then give a wrong picture of the situation. When the sample size is increased, the error margins become smaller, when the sample size is lower the margin of error will be larger (Jacobsen, 2005, p. 289).

Table 3 - Descriptive Statistic

Variable	Treatment group Mean (Std. Dev) Observations = N	Control group Mean (Std. Dev) Observations = N	Total Mean (Std. Dev) Observations = N	TTest Mean [Std.Err] P value = P
Panel A. Permanent				
Gender	0,43 (0,50) N = 28	0,19 (0,40) N = 16	0,32 (0,47) N = 81	-0,24* [0,15] P = 0,09
Age	0,18 (0,39) N = 28	0,69 (0,48) N = 16	0,42 (0,50) N = 81	0,51*** [0,13] P = 0,0012
Panel B. Pre-treatment				
Observations	8,66 (4,50) N = 221	6,83 (4,24) N = 109	8,19 (4,61) N = 345	-1,83*** [0,52] P = 0,0004
Commitment	91,45 (7,92) N = 221	91,80 (11,38) N = 109	91,62 (9,12) N = 345	0,35 [1,08] P = 0,78
Overall satisfaction	90,41 (8,68) N = 221	89,32 (13,39) N = 109	90,12 (10,36) N = 345	-1,09 [1,23] P = 0,44
Initiative	90,49 (9,19) N = 221	89,83 (13,87) N = 109	90,29 (10,79) N = 345	-0,66 [1,28] P = 0,65
Knowledge	91,04 (8,00) N = 221	91,26 (10,42) N = 109	91,14 (8,88) N = 345	0,22 [1,04] P = 0,85
Solution	90,49 (8,94) N = 221	89,08 (11,55) N = 109	90,02 (10,03) N = 345	-1,41 [1,16] P = 0,27

Average	90,78 (7,21) N = 221	90,26 (10,29) N = 109	90,64 (8,33) N = 345	-0,52 [0,98] P = 0,64
Panel C. Post-treatment				
Observations	9 (4,55) N = 209	6,25 (3,94) N = 101	8,33 (4,65) N = 341	-2,75*** [0,53] P = 0
Commitment	90,26 (11,29) N = 209	91,75 (10,38) N = 101	90,58 (10,68) N = 341	1,49 [1,33] P = 0,25
Overall satisfaction	89,75 (9,55) N = 209	90,05 (11,05) N = 101	89,58 (9,91) N = 341	0,30 [1,22] P = 0,82
Initiative	89,52 (10,97) N = 209	89,95 (13,25) N = 101	89,48 (11,38) N = 341	0,43 [1,42] P = 0,78
Knowledge	90,12 (10,66) N = 209	91,90 (10,01) N = 101	90,42 (10,29) N = 341	1,78 [1,27] P = 0,15
Solution	89,66 (10,28) N = 209	89,20 (16,48) N = 101	89,30 (12,30) N = 341	-0,46 [1,53] P = 0,80
Average	89,62 (9,02) N = 209	90,57 (10,69) N = 101	89,87 (9,34) N = 341	0,71 [1,16] P = 0,57

Notes: Standard deviation in parenthesis. Standard error in brackets. Pre-treatment is from week 46 to week 53 in 2015. Post-treatment is from week 1 to week 8 in 2016. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

There are some important differences that's visible in this table. There is a difference in the gender distribution in the treatment group and the control group. 0 means female and 1 means male, which tells us that there are a lot more male workers in the treatment group. The difference between gender is significant different by $p < 0,10$. There is also a significant difference in the age variable by $p < 0,01$. Most workers in the treatment group are students or started as a student, while the control group are educated workers with a little more experience. The largest difference between the treatment and the control group are the number of observations. Both before and after the treatment the different is significant by $p < 0,01$. There are about two times more observations in the treatment group then in the control group if observation before and after are added. This can be explained by the number of people in the two groups. The control group are 16 and the treatment group are 28.

I have also added a total group. This groups exist of the workers from the treatment, control group and all that did not fit in the two previous groups. That means that the total is all of the workers.

One of the hypotheses expect a change between pre- and post-treatment. This table shows a small change. Pre-treatment average shows that the treatment group delivers 0,52 more than the control group. Post-treatment average shows that the control group delivers 0,95 more than the treatment group. The largest change is explained by the treatment group, because the average on treated have been reduced by 1,16.

Validating the variables

I wanted to see if there is a correlation between the questions from Bright. I do this to verify if the questions are good or if they should be changed.

Table 4 – Correlation between Variables

	Commitment	Overall satisfaction	Initiative	Knowledge	Solution
Commitment	1,0000				
Overall satisfaction	0,7523	1,0000			
Initiative	0,7072	0,7225	1,0000		
Knowledge	0,7132	0,7079	0,7354	1,0000	
Solution	0,4800	0,6031	0,5290	0,6455	1,0000

Note: The top of the table shows which question is asked, and the left side shows which question I correlate against.

Table 4 shows how correlated the questions are. 1 meaning 100 % correlated. Commitment are 100 % correlated to the commitment question. From this table, it is easy to see that only solution shows a somewhat non-correlation to the other questions. If a customer answer 5 on commitment, the customer will also most likely answer 5 on overall satisfaction, initiative and knowledge. However, it is not sure that the customer will answer 5 on solution. This could mean that the first four questions do correlate too much. It could be possible to only have overall satisfaction and solution. This could possible give a more reasonable result. It could also be wise to make new questions, and find some that does not correlate to much with each other.

Empirical strategy

To explain my empirical strategy, I will start by explaining the following regression equation which is estimated using OLS (Ordinary Least Squares).

$$\text{Customer service} = \alpha + \delta \text{did}(\text{temporary} * \text{treatment}) + \rho \text{Individual} + \sigma \text{Week}$$

In my thesis, it is mainly customer satisfaction which serves as the dependent variable. I have made a variable called temporary, that is a dummy variable that shows if the employee is permanent or temporary hired. I also made a dummy called treatment that shows if the week is before or after the change, 1 after change and 0 before. Did is a dummy variable that combines temporary and treatment, meaning 1 if the worker is temporary and are working after the change. 0 if not. I use the variable Did to estimate the difference in difference effect. The did coefficient tells me if the change that has occurred because of the treatment.

By using fixed effects, I check for unobservable permanent characteristics for individuals and weeks and how these affect the customer service estimates. According to Bårdsen and Nymoen (2014, p. 130) I can estimate the individual effects by including dummy variables in my regression. The variable week is a time dummy that captures aggregated factors that would have caused changes in customer service even without treatment. Examples of this may be macroeconomic factors that affect future prospects and wage adjustments. Individual are permanent factors on the employees in the bank. α is the point of intersection.

In order to determine whether there has been a change in customer service based on the ratio between permanent and temporary hired, I use difference in differences. Unlike a time series estimate of the treatment effect on subjects (which analyses differences over time), or a cross-sectional estimate of treatment effect (which measures the difference between treatment and control groups), the difference in differences uses panel data to measure the differences between treatment and control group before and after the treatment.

No groups are randomly distributed. When I want to find the effect of the change in this experiment I need data both before and after the change (Wooldridge, 2009, p. 453). There are advantages of having a control group. If I couldn't have used a control group, I'd only seen the changes in temporary hired, however I could not see if there is a natural change. The control group allows me to see what would have happened without the change. It means that I look at the changes in the treatment group and compares this with the natural change in the control group.

The identifying assumption in a difference in difference analysis is that the trends before the treatment are parallel.

Based on the foregoing I have defined six models that I want to test:

$$1) \textit{Customer service} = \alpha + \beta\textit{Temporary} + \gamma\textit{Treatment} + \delta\textit{did}$$

The first model only looks at the effect the treatment has on employee customer service. Even if this model would be statistically significant, it will not be sufficient grounds for claiming that the change affects temporary employees' motivation. It must be checked for several factors.

$$2) \textit{Customer service} = \alpha + \beta\textit{Temporary} + \delta\textit{did} + \sigma\textit{Week}$$

In model (2) I include the week variable which is a time fixed effect. By doing this I check for changes that is the same for all individuals over time. One of the reasons that I include fixed effects on time is that I will check for the fact that there might have been other changes done in this period.

$$3) \textit{Customer service} = \alpha + \beta\textit{Temporary} + \delta\textit{did} + \sigma\textit{Week} + \textit{Gender}$$

Model (3) includes fixed effects on gender.

$$4) \textit{Customer service} = \alpha + \beta\textit{Temporary} + \gamma\textit{Treatment} + \delta\textit{did} + \sigma\textit{Week} + \textit{Gender} + \textit{Age}$$

Model (4) includes fixed effects on age as well as gender.

$$5) \textit{Customer service} = \alpha + \gamma\textit{Treatment} + \delta\textit{did} + \rho\textit{Individual}$$

In model (5) I include all fixed effects on individuals, both observable and non-observable.

$$6) \textit{Customer service} = \alpha + \delta\textit{did} + \rho\textit{Individual} + \sigma\textit{Week}$$

The sixth model is my strongest test and includes fixed effects on both week and individual. Here I control for both observable and non-observable effects on individuals.

I will do all these analysis on my main variable average. This is the average of all the questions that goes in the customer service. After that I will also do the same six tests to all of the five different variables that is a part of the Average variable. I will do this to see if there is a larger change in one of the areas.

I have also done an event study approach to make graphs that shows the trend before and after the treatment. The indicator is equal to 0 when it is week 1 in 2016. The range of observations goes from week (-8) to 8. Indicator 1 is when the change happened. All observations between (-8) to (0) will not be effected by the change. This will create a trend that I can compare to the new trend after the treatment.

The regression I use in the event study are as followed:

Customer service

$$= \alpha + \beta_1 Week(temporary) + \beta_2 Week(1 - temporary) + \gamma Individual$$

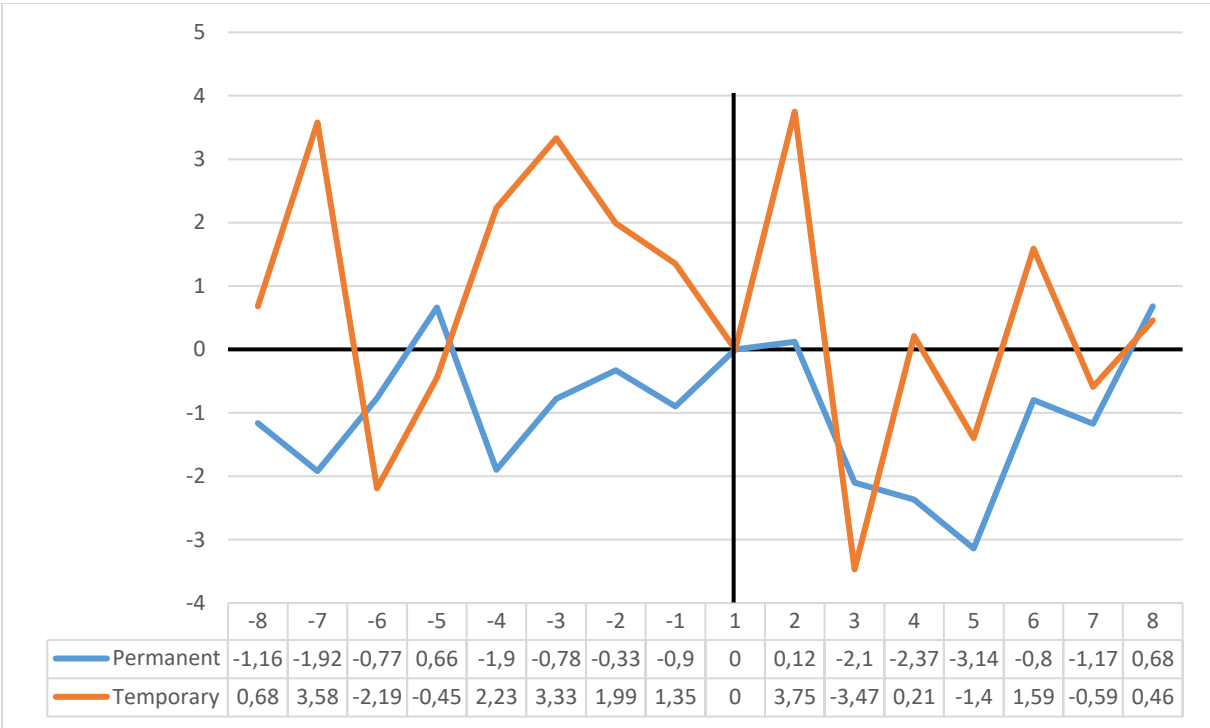
Week is a vector for every week ($w_{-8} - w_{-1}, w_2 - w_8$). Week 1 is not in the week variable, because I have to set Week 1 equal 0 so that both permanent and temporary starts at the same point. The person gets 1 if the observation is in that specific week and 0 if not, I have to make one dummy if the person is temporary and working in that week or if the person is permanent and working in that week. At the end, I correlate for individuals.

Results

Main results

The results from the event study is presented first. Figure 5 shows that the trends before the treatment does not follow each other. This can be explained by table 3 – descriptive statistic where it is shown that there are 28 employees in the treatment group and 16 in the control group. The same table also show that there is a statically significant difference in observations between the groups. Meaning that the temporary employment will have a higher variation than the permanent.

Figure 5 – Event Study



Note: Event study. The graph shows the trend that permanent (blue) and temporary (orange) employees have before and after the treatment. Treatment is applied in week 1.

The permanent employees’ customer service stays approximately the same through the entire period, while the temporary employees have a decrease after the treatment. The temporary employees are mostly over the 0 in pre-treatment, and post-treatment they are mostly under the line. This could tell us that the change has affected the temporary and not the permanent. It could also mean that other factors come into play and affected the temporaries trend.

Table 3 post-treatment shows a standard deviation at 9 on average in the treatment group. In the event study the treatment group changes from 3,75 to -3,47 which is a 7,22 from week 2 to

week 3. This is almost as large as the standard deviation, and that shows that there is a huge variation in the data.

The main focus of this study is to investigate the effect of the change on the motivation of the temporary employees. Table 5 presents the results of my difference in differences analysis. The analysis is performed based on what is described in the empirical strategy.

Table 5 - Difference in Differences

Model	1	2	3	4	5	6
Treatment	0,418 (1,5122)	0,476 (1,5098)	0,476 (1,5111)	0,482 (1,5090)	0,298 (1,4898)	0,340 (1,4873)
Observations	640	640	640	640	640	640
Adjusted R ²	-0,0028	0,0035	0,0019	0,0046	0,0512	0,0577
Fixed effects included:						
Week		Y	Y	Y		Y
Gender			Y	Y		
Age				Y		
Individual					Y	Y

Note: Standard errors in parentheses. *p<0.1, **p<0.05, ***p<0.01

Model 1 of table 5 shows the result of the first regression. This regression includes one dummy variable for whether the individual is treated (value 1) or not treated (value 0). The coefficient has a value of 0.418. The result is not statistically significant. Model 1 does not take into account that there may be differences between age, gender, week and individuals, In have check for the different fixed effects in the following models.

In model 2 there is added fixed effect of week. The week variable does not show a statistical change and does not affect the customer service. This could be because I used a short time period, and that this could be different if I had used a longer time period.

A dummy for female is added in model 3. There is little change in the numbers and gender does not affect the score.

Fixed effects of week, gender and age is added in model 4. The adjusted R² are 0,0046 in model 4 and that shows how little effect these fixed effects has on the change.

In model 5, only fixed effects of individuals are added. This is the largest change in the models. I add fixed effects of individuals to rule out compositional differences.

Model 6 is a continuation of model 5, in addition, week is added again. Again, there is little change. This model is the best of the models and is the main model.

What is most interesting in all of the models are how small the adjusted R^2 are. The adjusted R^2 shows how much of the variation that can be explained by the fixed effects. The highest R^2 are model 6 which have 0,0577. This is low, and tells us that none of the fixed factors affects the coefficient.

None of my models are statistical significant. There might be several reasons for that. The main reason is the size of the dataset. I will also do the same 6 regression analysis on all of the dependent variables.

Table 6 – Difference in Differences Analysis on all of the Dependent Variables

Model	1	2	3	4	5	6
Commitment	0,502 (1,7042)	0,544 (1,7016)	0,548 (1,7021)	0,552 (1,7024)	0,549 (1,6707)	0,592 (1,6662)
Adjusted R^2	-0,0006	0,0057	0,0051	0,0047	0,0627	0,0709
Overall satisfaction	0,424 (1,7309)	0,463 (1,7365)	0,466 (1,7376)	0,473 (1,7338)	0,327 (1,6993)	0,358 (1,7044)
Adjusted R^2	-0,0032	-0,0067	-0,0078	-0,0034	0,0574	0,0551
Initiative	0,568 (1,9120)	0,646 (1,9040)	0,641 (1,9046)	0,650 (1,8997)	0,465 (1,8873)	0,529 (1,8790)
Adjusted R^2	-0,0034	0,0080	0,0075	0,0126	0,0470	0,0587
Knowledge	0,337 (1,6286)	0,406 (1,6127)	0,406 (1,6140)	0,409 (1,6145)	0,293 (1,6258)	0,348 (1,6096)
Adjusted R^2	-0,0006	0,0220	0,0205	0,0199	0,0281	0,0507
Solution	0,618 (1,9029)	0,650 (1,9068)	0,648 (1,9080)	0,654 (1,9073)	0,293 (1,8919)	0,306 (1,8952)
Adjusted R^2	-0,0022	-0,0031	-0,0044	-0,0036	0,0343	0,0344
Observations	640	640	640	640	640	640
Fixed effects included:						
Week		Y	Y	Y		Y
Gender			Y	Y		
Age				Y		
Individual					Y	Y

Note: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

In the commitment variable, there is little change between the different fixed effects. This shows that age, gender, week and individual does not change how committed the employee is. None of these numbers are significant and the highest adjusted R^2 is only 0,0709.

The Overall satisfaction variable shows that there is a change in individual. This means that some employees perform better than others, and that if we adjust for individual then the number change less.

In the initiative variable analysis, there is again a small change when I adjust for individual. This means that some employees are better at trying to sell products than others. The numbers are not statistically significant. This means that the change is not a result from the treatment.

The Knowledge variable shows that there is none or little change in whether the employee is male or female, and under or over 30. The individual effect still does some change here, although it is not much.

In the Solution variable, individual is the variable with largest difference between model (1) and (5) when I assess the dependent variable solution. Here the coefficient change from 0,618 to 0,293. It is still not because of the treatment, however it shows that some employees are better at finding solutions than others.

There is no statistically significant change in table 5 or 6. The highest adjusted R^2 in the two tables are 0,0709. This is in the commitment variable and model six. The adjusted R^2 show how little of the variation that can be explained by the fixed factors.

Discussion

Discussion of results

Based on the underlying theory there are good reasons to expect that the treatment did not change the customer satisfaction provided by the temporary hired. Their motivation might have changed, however there are more factors in this case. One of the most important factors in recent years, are job security. A temporary worker need to be perform better than the permanent employees, because then they will get a new contract. According to the theory, job satisfaction can act as a function of employee's personality, and according to Arnold, et al. (2005, p. 262), some people are more satisfied than others by nature. The temporary workers are mostly students who would most likely strive to perform good so that they get a new contract, and they most likely also get motivated by others to perform well.

Furthermore, one can also look at job satisfaction as a feature of the work, and according to Herzberg's two-factor theory they can be called motivational factors, such as the use of skills, giving a sense of satisfaction to the extent that they are present in the work. It is also possible to look at the job characteristic model of Hackman and Oldham (1976), which describe the importance of variety of skills and skill task identity. These factors could have a larger impact and be more important than the treatment that I have analysed in this thesis.

There are also some mechanisms that would suggest a decrease in motivation. Wage especially are a factor that decreases motivation in this situation. The wage difference is a negative hygiene factor. Job security could also decrease motivation, because their job becomes less secure. Nevertheless, the job security effect can go both ways.

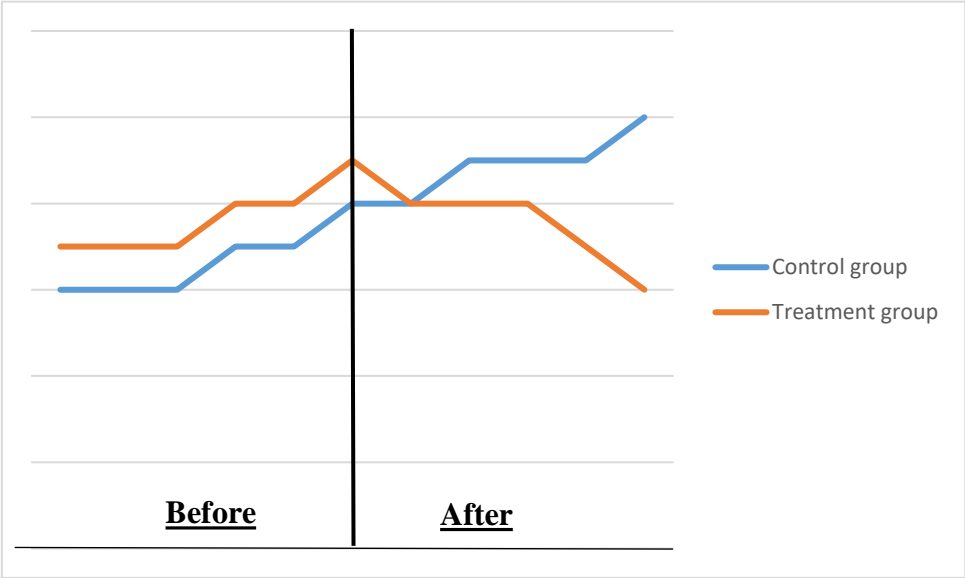
I cannot find any significant differences in the treatment effect on men and women; this may be the because the individuals that are tested have the same type of position. It is possible that I had found statistically significant values on gender if I had a larger dataset. Another finding is that there are no differences in the treatment effects regard to other individual-specific characteristics. A small treatment group can make it difficult to get statistically significant results.

Weaknesses

The largest weakness in this analysis is the size of the dataset. I did not find any evidence that the change effected the temporary employees. This could have been different if I had the possibility to acquire a larger dataset. It is more difficult to find statistically change in small datasets.

To be able to do a difference in differences analysis I will have to have a control group and a treatment group. They need to have the same trend before the change. My event study shows that there is a trend difference before the change, and therefore it is difficult to compare the two groups. To be able to identify a complete change, the trend should have been similar to the graph below:

Figure 6 - Difference in Difference Example



Note: The X axis shows time and the Y axis is unit. This graph shows how the trends in the event study should have looked to be able to get a significant difference after the treatment. This is only an example.

This is just to show how an event study should have been. In this example, the control group and treatment group have the same trend before the treatment and only the treatment group gets a change after the treatment. Real life would not have perfect graphs. My event study does not show the same trend before the treatment. See figure 5.

There are also some differences in the job that the permanent and temporary employees do. The number of employees that work with insurance is much higher in the permanent staff than in the temporary staff. The insurance advisors will talk to another group of costumers and this could affect the data from Bright. However, table 3 - Descriptive statistic shows how similar the numbers are. This strengthens my belief that this did not affect the dataset in a major way. After the change, there is only a 0,95 in difference between the temporary and the permanent staff. From a scale from 0-100 % that's under 1 % difference.

The control group and treatment group are also working together. They sit next to each other and will have an effect on each other. Both groups get affected by the change and therefore the control group are not a good group to use. To fully see a change in this analysis it would be great to assess two different costumer centers, where only one of them got the change.

Table 3 descriptive statistic shows that there is a significant difference between gender and age between the control and treatment group. This could be a weakness, meaning that there are too large differences in the groups. However, the regression analysis in table 5 model 4, shows a small adjusted R² on gender and age, which means that those effects does not change the customer satisfaction too much.

Robustness analyses

To be able to perform this thesis I have done a lot of exclusions, however, I did not do any changes with regards to observations. In my robustness analysis, I removed all weeks where the employee has less than X observations. A possible outcome of this was to show that I could have set a minimum requirement on the observation number.

Table 7 – Robustness Analysis

Regression	1	2	3	4	5	6
Treatment	0,340 (1,4873)	0,156 (1,3560)	0,372 (1,3146)	0,804 (1,3613)	0,789 (1,4328)	0,732 (1,4915)
Observations	640	607	570	520	482	434
Adjusted R ²	0,0577	0,0696	0,0549	0,0401	0,0368	0,0491
Observation drop	None	1	2	3	4	5

Note: Standard errors in parentheses. All regressions have the same specifications as my preferred model (Table 5, Model 6) *p<0.1, **p<0.05, ***p<0.01

There are still no statistically significant change and the adjusted R² are still small. Here we see that the estimates are very similar to the estimates in the preferred model.

Conclusion

In this study, I have highlighted a change in permanent employees and assessed how that effected that effected the temporary employees. More specifically, how the change affects the customer service provided by the temporary employees. My analysis was based on data from Bright, which is a customer service rate system.

I have worked with two competing hypotheses, where one expected that the increase in permanent employees would give the temporary employees a decrease in motivation, the other expected there to be no change after the treatment. The analysis shows that there was no change, and that one of the hypotheses are not supported. The difference in differences analysis finds no change, however the event study shows a small decrease in customer service provided by temporary employees. However, there is a huge variation in the event study, which decrease the value of the findings.

Weaknesses in the dataset has caused challenges in doing the analysis, and the interpretation of the results. The largest problem has been the small size of the dataset. A more comprehensive dataset could have shown a completely different result. There is also a problem with the difference between the control group and treatment group. The control group have more insurance advisors than the treatment group, they also sit next to each other and a change in treatment group could also affect the control group.

I did also analyze the questions from Bright to see if there was a high correlation between the questions. There I found that four of the five questions had a high correlation. A high correlation means that the questions are too similar or that the customers answer equally on them. This is a weakness in the dataset, especially when I used an average of all 5 questions in my key variable.

There is a great possibility of generalizability in this thesis. If I had a more comprehensive dataset and could find evidence of a change, then this could have been important knowledge for a lot of companies. Finding no change can also prove valuable information for a lot of companies. Every company that experience an increase or decrease in permanent employees compared to temporary employees could use this information.

The study also raises several interesting issues for further research. With a more extensive dataset it is possible to look more closely to the difference between temporary and permanent employees. It could also be possible to investigate if age, gender and experience are factors that affects the level of customer service provided by the employee. With a dataset that

include data from every day, it could be possible to see if the weather affects the employees. It could also be interesting to see if there is a perfect combination between temporary and permanent employees or how the employees affect each other. It could be interesting to see the effects of putting a low archiver next to a high achiever. All these areas affect the customer service provided by the customer center.

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