Do incentives affect productivity?

Evidence from the Hungarian telecommunications industry

By

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Abstract

This thesis investigates the effect of a change in the reward scheme on the performance of the employees. The research is based on a policy change which increased the guaranteed wage minimum in Hungary in January 2017 and looks into the response of a Hungarian telecommunications company. In the methodology of the thesis panel data methods are used, namely Pooled OLS, and first differences methods as well as binary outcome models. In line with the previous literature I find that there was a drop in performance, even though not all results point in this direction. Furthermore, I find that there is no difference between the performance of those who left the company and those who stayed after the policy change. This thesis contributes to the literature on organizational economics by investigating the effect of a change in the proportion of the performance related payment instead of a change from fixed salary to piece-rate.

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1. Introduction

"Call it what you will, incentives are what get people to work harder." stated Nikita Khrushchev (First Secretary of the Communist Party of the Soviet Union) back in the 1960s. Even if not in this strict sense, the role of incentives is still a central question for policy makers all around the world. When economists think about how people decide whether to exert effort or not, they always try to see which choice is more beneficial for the individual. Based on this view the goal of policy makers is to make a system in which the socially optimal level of effort is the best option for all individuals. A direct way to make this happen is to give incentives in a way that ensures the choices to be optimal.

However, the question still needs to be asked: Are incentives important when the agent chooses the extent of effort she would like to use for a certain activity or work? Hence the goal of this thesis is to provide evidence for or against the statement above. Accomplishing this could back or reject many theories in the current literature of economics.

To achieve this, I analyze the effect of a policy change in January 2017 in Hungary. The government increased the guaranteed wage minimum by 25% from 129.000 HUF to 161.000 HUF. The guaranteed wage minimum is the minimal monthly gross salary that has to be paid for all semi-skilled employees. In response to this all Hungarian companies had to increase the wages of those below the new minimal amounts starting January 1st 2017.

What I am analyzing is the effect of the response of a Hungarian telecommunications company. The employees of the company affected by this change in the principles were those individuals who beyond their base salaries could earn both commission payment and yearly bonus as well. Both payments are dependent on the performance of the individuals. The main difference is that the commission payment is due on a monthly basis and has clearer rules and point system for acquiring it since performance indicators are measured objectively and then

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the results are translated to commission payment. The bonus is paid on a yearly basis and has less clear requirements due to the fact that it is based on the performance rating set by the line managers and they can review the suggested bonus payment amount for their employees.

The response of the company was that it increased the base salary of all employees who had it below the new minimum level. However, it was not the only change made. The target percentages were changed for both the monthly commission payment and the yearly bonus payment. The bonus payment was reduced to zero hence these employees received no annual bonuses after the date of the policy change. While the commission percentages were decreased only slightly. All in all, the total target cash amount increased for these employees which means that they are able to earn more than before. The sum of the base salary and the commission amounts ex post is greater than the sum of the base salary, the commission amount and the bonus ex ante, given that the employee reached an at least minimal incentive payment amount based on her performance.

However, the most important fact from my point of view is that there is a decrease in the ratio of the incentives payment compared to before the change. According to the economic theories this decrease should result in decreased performance since the employees have bigger portion of their possible income in fixed payment and they are less likely to put more effort into earning high incentive payments. Using this information, I aim to see if there is an effect of this change on the performance of the treated employees.

For the analysis I investigate the performance of the call center operators at the company since they were impacted by the change, and they have standardized performance measures which are then translated into incentive payment amounts. I have two main questions. First: Is there a change in their performance after the policy has changed? According to the intuition and previous literature a drop in their performance is expected. Second: Is there a difference between the ex-ante performance of the employees who left the company within three months

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of the policy change? The expected answer is that the employees with higher productivity gain more in a system which has more weight on the incentives so due to the change these employees are the ones more likely to leave. However, this estimation can have some bias due to the fact that the policy change affected all of the companies in Hungary, which means that every company needed to raise the base salaries, but there might be a case, that other companies did not change the incentive payment amounts. The results point in the direction that there was a drop in the performance due to the policy change. However, not all methods show significance. Also, the analysis does not show differences in performance between those who stayed at the company, and those who left.

In Section 2 I give an overview on the previous literature, show what role this paper can play in it, and what kind of contributions are made. In Section 3 I present the data used to analyze the effects on performance. Section 4 provides the methodological background of the analysis to provide the theoretical basis of the analysis. Section 5 shows the results acquired from the data analysis and provides interpretation of them. In the end, Section 5 restates the questions posed and gives the answers based on the results.

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2. Literature review

As mentioned already in economics, especially in the field of organizational economics, the question of incentives is one of the most important questions. It is widely agreed that a well set incentive payment increases the effort level of the agent which results in higher output levels for the company.

From the theoretical designs of the question of incentives it is important to mention Baker's paper from 2002 which investigates how to set up the optimal incentive contract using the performance measures available. He looked into two parameters of the performance measures: distortion and risk to see how they could be used and shows that complex issues in the real world can be viewed as trade-offs between these two factors. Also, Hölmstrom and Milgrom (1991) study the question of performance measures to see why it could be better to use fixed payment instead of incentives based payment. They base it on the fact that not all performance measures which affect the outcome are contractible. Furthermore, Hölmstrom (1982) studies the effect of incentives in teams by mainly looking at two important features: free riding and competition. Free riding proves to give the principal an additional task, to administer incentive schemes that do not balance the budget. It is shown that competition has merit in extracting information optimally, but is per se worthless.

A cornerstone for my thesis is Edward P. Lazear's paper (2000) that argues that switching from fixed wage to piece-rate increases the level of productivity and its volatility for employees. The two main ideas of this paper originate from his research. He investigates both the effect of the change on the effort of the individuals already working and the change due to attrition. However, my research is different in a way, that it provides a less drastic change. It is not switching from fixed salary to piece-rates but from base salary and incentive payment to higher base salary and smaller incentive payment. In this way it is possible to see whether the

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magnitude of the incentive matters or is it that the existence of the performance-based salary matters and the magnitude is secondary for agents. Which is a good addition after seeing that incentives do matter.

Apart from Lazear multiple economists and non-economists investigated the effect of incentives. George Baker (2000) looks at how to set performance measures so that the incentives can be the most efficient in inducing effort. Antti Kauhanen (2011) looks into what possible perils can be found when a company decides on changing the reward scheme used which helps in understanding how employees might think about these changes. Another view on this question is provided by Katherina Sherstyuk (2000). She is interested in seeing the effects of punishment instead of using incentives if an employee works below a set standard. Apart from economics other fields such as policy making in education (Springer et al. 2011) and health planning (Eldridge, Palmer 2009) are interested in seeing what effects incentive payments might have on the life of employees.

Furthermore, R. Drago and J.S. Heywood's paper (1995) looks at which factors might determine the use of incentives within a company. They found that the difficulty level of monitoring, job security, the competition on the market, and the relations in the industry account for most part for the decision of applying incentives based salary. This knowledge can be used to check whether according to that it is justified to have high level of incentives at the company or not and either justify the claims made or to reject them based on the data.

C. Newman and L Jarvis' research on incentives in agricultural labor market (2000) points out the fact that the effect of incentives may differ depending on whether the production is deterministic or there is uncertainty in the performance measure. They use the agricultural example to show how incentives work when your production depends on factors outside your reach as well. This helps understanding the effect of incentives better under circumstances when the performance measures are not one to one measuring the effort of the agent. It is especially

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true in the case when part of the performance measure is someone's opinion on your work. Your effort correlates with the rating but you are unable to set it certainly.

The main contributions of this paper to the current literature are the following. Due to the relative change in the reward scheme it investigates a more moderate shock than changing from fixed payment to piece-rate which is not present in the current literature. Furthermore, it is based on proprietary data which enables more freedom for the analysis than the usual public data.

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3. Data

For the data I collected information on the Call Center Operators at a Hungarian telecom company, which was gathered on a monthly basis for each individual who was employed in the period between January 2016 and March 2017. I focused on this group of employees to be able to see the effect of the change on their performance, since they have the same performance measures and the nature of their work is highly similar. All these positions are based on making phone calls with customers and solving their issues which results in facing standardized issues in many cases.

3.1. Variables

The variables can be separated into two main types. The first type contains the performance measures of the individuals, while the second mainly consists of control variables about their individual characteristics.

3.1.1. Performance measures

I received the performance related variables from the team at the Contact Center which is responsible for collecting and, organizing the different performance related variables for each individual and calculating the incentive payment percentage for each month based on these. Out of these factors I concentrated on two.

The first one is the *Transactional Net Promoter Score (TNPS)* which measures the customer satisfaction concerning each operator. After each call the customers get a text message from the firm asking them to evaluate the company on a 1-10 scale. Hence this measure might not simply show how customers evaluated the operators, but it is bound to have a high correlation with the performance. At the end of each month the TNPS is calculated by simply subtracting the ratio of detractors (customers who gave a rating of 1-6) from the ratio of

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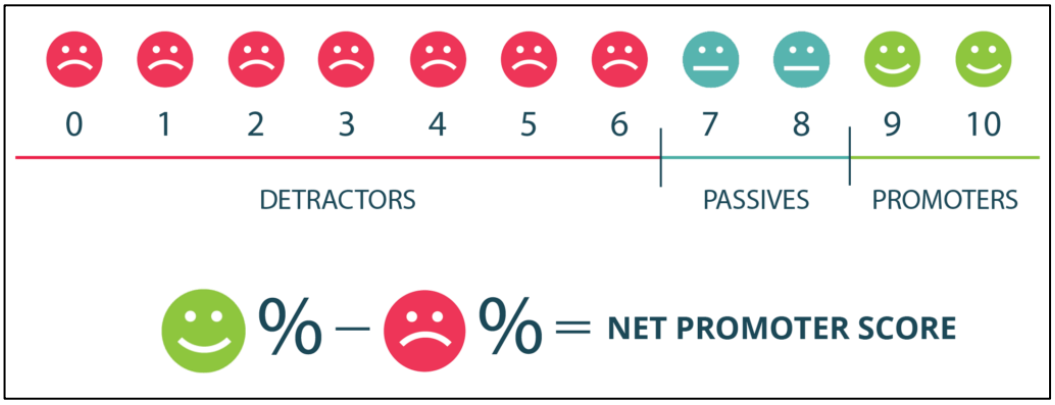
promoters (those customers who gave a rating of 9-10). Then it is presented in a percentage form. When calculating the incentive payment amount for the employees there is a table to change these scores into points, and the more points the employee has, the higher the incentive payment will be. For the interval that I do the analysis for this performance measure is calculated in a three month rolling average for each employee due to a change on the technical side at the start of 2016. This smooths out the trend in the variable but it has no effect on the analysis itself, since seeing the difference between the average performance of the individuals at the start of 2016 and at the start of 2017 is the main goal of my calculations.



1. Figure TNPS Calculation

(Source: https://www.wootric.com/net-promoter-score/nps-calculator/)

The second performance measure that I used is the *Average Handling Time (AHT)*. This variable measures the average time spent talking to each customer by each operator in the given month and it is calculated in seconds. In the incentive payment amount the method is similar. The average is translated into points and is then included in the overall incentive payment score. However, the AHT average has negative relationship with the points. The lower it is; the more points each individual gets at the end of each month. For better comparison I included the three months rolling average of this measure as well, so this way it matches to the way the TNPS score is set up in the upcoming models.

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These are not the only aspects which matter when calculating the final incentive payment amount for each month but I decided on including these in my analysis since they are the best fit when it comes to analyzing effects. Furthermore, they have high weights in the final calculations so these are important for both the company and the operators. Some of the other factors are First Contact Resolution (measures whether the operator was able to solve the problem on the first call by looking at the customer calling back in the next 7 days or not) and Knowledge level measure (based on the quiz they have to fill out at the start of every work day) both of which are calculated in percentage form.

I reported and organized the second set of variables using the SAP system's HR database. These variables give information on other characteristics of the employees at each period in time. I included them in the upcoming models as control variables to get as clean estimations as possible. Furthermore, another important aspect was to see that the sign of these coefficient of these variables match the intuitional values or not, since this may help in seeing whether there is some major issue in the model or not.

3.1.2. Non-performance related variables

The most important variable for the first part of the analysis is the *after dummy* which shows that the given data point is timed after the policy or before (1 if after) which enables to see the effect of the change in performance and will be in the focus in the first part of the analysis.

The outcome variable in the second part of the analysis is the *leaver dummy* which states whether an employee left the company till the end of March 2017. (1 if yes).

The other explanatory variables can be seen collected below. For the base salary I included the logarithmic version based on the assumption that it has a decreasing return to scale on performance.

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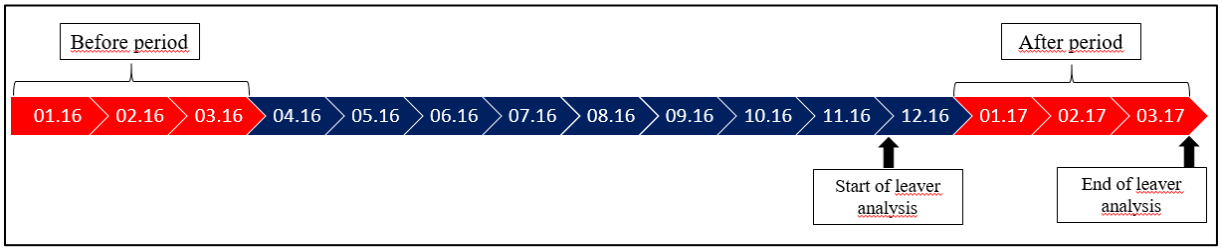
Explanatory variables:

- *gender:* The gender of the employee, 1 for female, 0 for male
- *age:* The age of the participant in the period in years
- *tenure:* The number of days since entry to the company
- *city:* 1 if lives in the same city of the work place, 0 otherwise
- *log_monthly_BS:* the natural logarithm of the monthly base salary in HUF
- *team_size:* the size of the team which the employee is part of

3.2. Timing

The data was collected for the interval between January 2016 and March 2017.



2. Figure Timeline

For the analysis I put together multiple sets of data. As a starting point I built three cross sectional sets. The first one shows the state of the call center operator population at the end of March 2017. This set serves as the after component for analyzing the effect of the change in the rewarding setup. I decided on choosing this, to see not only the immediate effect of the change, but the average change in the first three months after the policy change. This gives a better estimation for the overall effect. The second part shows the state of the call center operator population at the end of March 2016. This is the before component in the analysis. By choosing this set I excluded the effect of possible seasonality within the data. Even if there is a change in

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the behavior of the customers or in the workload depending on month, or holidays it does not affect my estimation. For example, around Christmas there tends to be bigger workload because of the number of phones given as presents. This does not affect my analysis since in the two sets of data the periods within the years match and it gives no additional room for seasonality bias. The third cross-sectional data is based on the state of the start of December 2016 The reason of this data is that using this set I am able to give estimation about the performance of the leavers after the change by using the first data set to get information on the leaving decision for each employee.

Apart from the cross-sectional data I use mixtures of them as well. For the before – after analysis I combine the data of March 2016 with the data of March 2017 by collecting only those individuals which appear in both and by including the before-after dummy I can estimate the effect of the change. All individuals appear as two observations in the new data. First they appear with all their information from the before dataset, with the additional dummy set as zero to include the variance in time as well. Second, they appear with all their data from the after set and with one as the time variable value. This way I can extract the policy effect from the data while controlling for the effect of the other variables. The second combination is to see from the data of December 2016 which employees left the company till the end of March 2017 to be able to build a binary outcome model based on the new set which includes the characteristics of the individuals in December 2016 while having the information of leaving.

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4. Methodology

In this section I express the approach of my analysis by showing the logic, such as why I used the different methods and models based on both the data by looking at descriptive statistics and the theoretical background which enables to choose the right models.

The analysis itself can be separated into two main sections. In the first part I aimed at analyzing the effect of the change in the reward scheme on the performance of the employees who continue to be employed at the company. While in the second part I focused on seeing whether there is a difference in the performance of those individuals who left the company and those who stayed.

4.1. Change in performance

As stated above for this analysis I use a dataset for all call center operators who worked at the company in January 2016. and stayed till the end of March 2017. The best option for this kind of research would be to do a difference in differences analysis. However, a control group is not available due to the fact that the treatment affected all the employees who could be evaluated by the performance measures investigated. All employees who are in call center operator positions and get TNPS scores were impacted by the change both from the base salary and the incentive perspective which makes it impossible to get a control group. Understanding this I went for the second best option for this analysis which is a before after analysis focusing on estimating the average difference in TNPS score for all employees while controlling for other factors using the variables extracted from SAP. An argument for the efficiency of the before after analysis is the fact that when I looked at all employees employed in each period, the 3 months rolling average TNPS score of the employees preceding the policy change hardly

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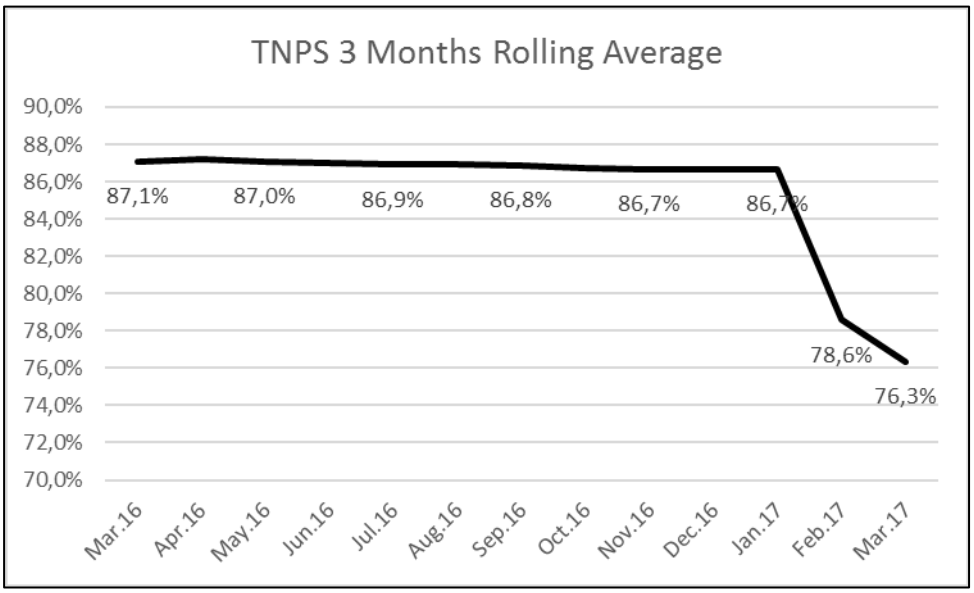
varies, while after the change there is a large drop in the score (Figure 3) which makes it clear that the change in the performance is due to the change in the reward setup.



3. Figure TNPS Trend

For this estimation I used two methods, the first one is the Pooled ordinary least squares models (OLS) with the TNPS score as the outcome variable. On the right hand side, the main independent variable of interest is the before-after dummy which in the OLS model simply shows the average difference between the TNPS score data points in Jan 2016. and March 2017. Apart from that I include various control variables as well based on the assumption that they might have significant effect on the TNPS score as well. For example, tenure intuitionally would have a positive relationship with the TNPS score since the more time you spend in a position, the more experience you get, which would result in a better service for the customers. By gaining experience the employee is becoming more prepared for the customers' needs, knows the systems better, and knows the most efficient ways to help. While AHT on the other hand might have a negative relationship with the TNPS score since by expectation the more time you spend on a customer the better they will feel about the service. Furthermore, to counter

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the serial correlation bias in the error terms I use clustered standard errors which in this case are more reliable.

The most suitable model is the following in general form:

$$TNPS = \alpha + \beta_1 After + \beta_2 gender + \beta_3 age + \beta_4 tenure + \beta_5 city + \beta_6 log\_monthly\_BS + \beta_7 team\_size + \beta_8 AHT + u$$

Based on the previous literature the following results are expected:

- *gender:* Both signs can be argued for based on the previous literature
- *age:* Expected to have positive connection to productivity
- *tenure:* The Expected to have positive and significant coefficient since tenure measures experience and more experience is expected to correlate positively with performance
- *city:* Positive sign is expected due to the extra daily travel time
- *log_monthly_BS:* Positive and significant connection is expected since higher wages induce performance increase

It is important to highlight that in the model when it comes to the before after dummy's effect endogeneity is not an issue since there is an exogenous shock independently of the values of all other variables. Due to this, the coefficient will be a clean estimator of the effect of the average change in performance for the employees.

The second method is the First differences. For this analysis the base is the two cross-sectional data sets as well. However, in first differences the aim is to see what factors might affect the differences in the variables between the two periods. For this, I first had to subtract the values of the variables for each individual in March 2016 from their values in March 2017.

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This way the variables with zero difference (for example gender) or constant difference (for example tenure) for all individuals drop out from the estimation. The OLS is then run on these differences. In my analysis the only variables which could play role in this analysis were the TNPS score, the monthly base salary and the AHT. First I run it on only the AHT, and then on both variables since there is small variance in the change of the base salary.

The most suitable model is the following in general form:

$$\Delta TNPS = \alpha + \beta_1 \Delta AHT + \beta_2 \Delta log\_monthly\_BS + u$$

4.2. Leaver analysis

In analyzing the leaving decision, I mainly focused on seeing whether there is a significant difference in performance between those who remained at the company and those who decided on leaving. For this the main data source is the cross sectional dataset from December 2016. it contains all the call center operators who were impacted by the change in incentives and it consists of 147 observations out of which 65 left till the end of March 2017. I used this information to include the Leaver dummy in the data.

Leaver decision	Mean TNPS
No	87,06%
Yes	86,17%

1. Table Performance by leaver decision

Looking at the mean TNPS value in each group it can be seen, that there is a close to one percentage point difference between the groups. Those who stayed have slightly higher TNPS scores than those who left. This contradicts the theory of the previous literature (source) which claims that if the company decreases the relative amount of performance based payment

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those individuals will stay whose performance is lower because their expected payment will increase due to the fact that they will have higher fixed part which eliminates part of the performance impact. However, even though in this case it seems that those with higher ex-ante performance stayed at the company the difference is small between the groups, and the models might show that there is no significance in the performance measures when controlled for other variables as well.

To investigate this, I use binary outcome models, namely logit and probit models. On the left hand side, there is the leaver dummy which is one if the employee left the company till the end of March 2017, and zero otherwise. On the right hand side, the main coefficients of the investigation are the coefficients of the TNPS score, and the AHT variables. If at least one of them is significant it means that even while there are control variables taken into consideration, those with different performance have different likelihood of leaving the company. The interpretation is not as straightforward as it is in the case of the OLS estimation, but as a rule of thumbs, it can be said, that if the coefficient is positive, then those individuals who have higher performance are more likely to leave the company, than those who have lower performance and vica versa.

According to the difference in the mean TNPS score, my expectation is to have negative coefficient on the TNPS variable. As for the control variables it is important here as well whether the sign of the coefficients fall in the same direction as intuition and previous literature would suggest. Such as age is a factor which according to literature has negative relationship with changing employer, while working far away from the work place makes it more likely to make changes (city dummy).

The most suitable model is the following in general form:

$$P(leaver = 1/x) = G(\alpha + \beta_1 TNPS + \beta_1 gender + \beta_2 age + \beta_3 tenure + \beta_4 city + \beta_5 log\_monthly\_BS + \beta_6 team\_size + u)$$

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Where

$$G(z) = \phi(z)$$

In this part of the analysis since the main focus is on seeing whether the TNPS score has significant explanatory power in the model, the question of endogeneity issues is minor again. This is due to the fact that the TNPS index is based on the reaction of the customer, which might have some correlation with the variables related to the call or to the operator itself, but the model contains countermeasures for that. Factors such as the handling time, tenure and the age of the employee contain information on the overall experience the customer is expected to have during the phone call. Hence reducing the possible endogeneity issues.

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5. Empirical Results

In this section discussion of all described setups is presented. First I present the results of the change on the average performance of the employees and in the second part I investigate the differences between the leaver and the staying group from performance point of view.

5.1. The change in performance

In this subsection I investigate the effect of the policy change using mainly two methods. Pooled OLS and First differences to see if there was a significant drop in performance between the two periods which can be attributed to the change in the reward setup

5.1.1. Pooled OLS

As stated already, in this model, the outcome variable is the TNPS score and the goal in this part is to see if there was a significant change in the performance of the employees between the two time periods investigated. The dataset includes information on 91 individuals which resulted in 182 observations due to the fact that each employee is represented in the data as two points. The final form of the regression can be seen in Table 2.

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	TNPS
after	-0,19 ***
	(0,07)
gender	0,002
	(0,012)
age	-3,38*10^(-5)
	(0,0009)
tenure	1,24
	(1,15)
city	0,015
	(0,012)
log_monthly_BS	0,32
	(0,25)
team_size	-0,002
	(0,002)
AHT	0,00034***
	(8,67*10^(-5))
constant	-3,04
	(2,99)
Obs.	182
R-squared	0,41

Robust standard errors in parenthesis

*** p<0,01 ** p<0,05 * p<0,1

2. Table Pooled OLS on TNPS

According to the results it can be seen that there are multiple control variables which remained insignificant. These are the *log_monthly_BS*, *age*, *gender*, *tenure*, *city* and *team_size* variables. A possible explanation for the insignificance of some of these measures is that the *TNPS* score serves the purpose of evaluating the experience of the customer during a phone call so factors such as age and the distance from the workplace might not have effect on the actual service that the employee is providing. As for the coefficient of the *tenure* the insignificance might result from the call center operators having a thorough training period before being put into the front lines to meet the customers and the fact that they have to do a quiz at the start of each day as well both of which ensure that even the new colleagues are able to provide high quality service by the time they meet the customers. An explanation for the coefficient on the

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log of the base salary can be that there is small variance within the teams, and only slightly bigger between the teams as well which could not show significance in this analysis.

The *average handling time* of the calls turned out to be significant in the model and the sign is in line with the intuition as well. It shows that one second higher *AHT* increases the *TNPS* score in expectation by roughly four basis points ceteris paribus. Hence the customers appreciate if the call lasts longer since it most likely results in more thorough investigation of their problem and they feel more cared for. It is worth mentioning however that this relation shows that the call center operators have an optimizing decision to make at each call. The longer the call is, the higher the expected customer satisfaction which can result in higher incentive payment, but on the other hand the higher the *AHT* is by the end of each month, the lower the incentive payment will be. This way they have to optimize *AHT* so that they can have the highest overall incentive payment by adding up the two factors.

As for the main variable of interest in this analysis it can be seen that it is highly significant, so there actually was a reaction from the employees from performance point of view to the change in the reward setup. Furthermore, the magnitude is even bigger than what could be seen from the descriptive statistics given in the methodology section. In contrast with the ten percentage point drop according to the descriptive statistics the model shows an even larger, namely close to nineteen percentage point drop in the TNPS statistics. The model shows a clearer estimation than the descriptive statistics so it can be said that the effect of the change in the reward scheme on performance was even larger than first suspected.

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5.1.2. First differences

In this estimation the outcome variable is the difference in the *TNPS* score for each individual between March 2017 and March 2016. On the right hand side, the difference in the

AHT and the *constant* can be found. In this setup it is the *constant* which shows the average difference in the two periods due to the change in the policy (Table 3.). The second model includes the differences in the monthly base salary as well, to see if it turns out to be an important factor. (Table 4.)

	delta_TNPS
delta_AHT	0,0002
	(0,0002)
constant	-0,10***
	(0,01)
Obs.	91
R-squared	0,008

Robust standard errors in parenthesis
*** p<0,01 ** p<0,05 * p<0,1

3. Table First differences model with AHT on TNPS

It can be seen that out of the two explanatory variables only the constant is significant in explaining the differences in the *TNPS* score. According to the coefficients the *TNPS* score dropped by ten percentage points due to the change in the reward scheme. However, since apart from the *constant* the only other explanatory variable is not significant, the *constant* is roughly showing the same as the graph of the average *TNPS* score. It is a basic attribute of the OLS estimation that if it is only the constant which is included in the model, then the estimation shows the average of the outcome variable.

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	delta_TNPS
delta_AHT	0,0002
	(0,0002)
delta_BS	-1,13*10^(-6)
	(1,38*10^(-6))
constant	-0,05
	(0,06)
Obs.	91
R-squared	0,015

Robust standard errors in parenthesis

*** p<0,01 ** p<0,05 * p<0,1

4. Table First differences model with AHT&BS on TNPS

In this second model none of the variables are significant which means together with the small R-squared that this model has no explanatory power. Hence a decisive point cannot be made about the effect based on these models. They are not showing reliable results in the investigated question.

5.2. Leaver analysis

The main idea of this analysis is based on previous literature which stated that implementing incentive payment scheme instead of base salary has an effect on the productivity of the individuals who are working at the company. The reason for this is because those individuals who are more productive prefer to have the incentive payment scheme to be able to get paid based on their performance, since it is more beneficial for them. On the other hand, the less productive individuals prefer the fixed payment scheme since for them having the incentive payment is less preferable.

According to this view due to the policy change, the individuals who have higher productivity would be less inclined to stay at the company since the incentive payment was

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relatively reduced. To test this, I ran the logit model (Table 4.) on the call center operator population data from December 2016 which includes 147 employees out of which population 65 employees left the company by March 2017. The model is built in a way that the leaving dummy is the outcome variable, and the 3 months rolling average *TNPS* score for the last quarter of 2016 is the main explanatory variable of interest to be able to see if there is a difference in the probability of leaving for employees who perform differently.

	leaver
TNPS	0,99
	(7,38)
gender	0,34
	(0,48)
age	-0,09 **
	(0,04)
tenure	-0,001
	(0,0006)
city	0,15
	(0,44)
log_monthly_BS	-36,00 ***
	(8,94)
team_size	-0,16 **
	(0,08)
constant	430,2 ***
	(104,8)
Obs.	147
McFadden R-squared	0,30

Robust standard errors in parenthesis
*** p<0,01 ** p<0,05 * p<0,1

5. Table Logit model on leaver dummy

It can be seen in the results that similarly to the previous analysis there are insignificant control variables such as *gender*, *tenure* and *city* dummy. The data doesn't show that these factors would significantly affect the probability of the employee leaving the company, even though the intuition would suggest differently. For example, living closer to the work place would by expectation reduce the probability to leave the company since it would mean shorter

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travel time on a daily basis. On the other hand, living in the city could mean, that it is easier to find another position, which makes the probability of leaving bigger.

Age on the other hand turns out to be significant. The model shows that in the data the older an employee is, the lower is the probability that he or she would leave the company. For the employee who is of average characteristics, the model shows that being older by one year decreases the probability of leaving by 0,002. This is due to the fact, that when somebody is older, it becomes harder to find a new position in general, and your opportunities get limited.

The *size of the team* in which the employee works is significant as well. It can be seen that by increasing the size of the team it becomes less likely that an employee leaves the company. For the employee who is of average characteristics, the model shows that having being in a bigger team decreases the probability of leaving by 0,037. A possible explanation for this could be that in larger teams the employees can share information and experience more effectively so that they feel more secure at their place of work and become less stressed.

In the question of the main explanatory variable it can be seen that it is not significant. Which means that according to the data performance wise the employees decided on leaving the company or staying randomly. Which means that by controlling for other variables employees with high productivity and with low productivity in expectation left with the same probability and there is no distinction in this area. This result contradicts the theory of the previous literature and shows that in this data, at this policy change the shock had no effect on the potential productivity setup of the workforce even if there seemed to be a slight difference when comparing simply the ex-ante average productivity of the leavers and those who remained at the company after the change.

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6. Conclusion

In this thesis I investigated the effect of a change in the reward setup on performance. Namely a policy change in January 2017 in reply to which the company increased the base salaries but decreased the maximal achievable incentive payment percentage and abolished the annual bonus. Dataset for the empirical analysis was obtained from a Hungarian telecommunications company between January 2016 and March 2017 The performance measure in focus was the customer satisfaction index (TNPS). Furthermore, I included various explanatory variables such as demographics (age, gender), and work related factors (Monthly base salary, team size). The central question of the investigation: Is there a change in performance due to the change in the relative incentive amount? Which was investigated using ordinary least squares estimation. Additionally, I compared the ex-ante performance of those who left the company and those who did not by estimating binary outcome model.

The most important limitation of this study is that for this type of analysis it would be the best to have a control group as well. However, from this data it could not be made due to the fact that all employees investigated who could be compared by the same measures were affected by the change. To counter that, the main argument for using the before after analysis is that the shock itself was exogenous and that it can clearly be seen that before the impact the performance measure had low variance overtime.

The results considering the change in performance due to the policy change strengthen the previous literature and the intuition. The answer is that there actually was a decrease in performance after the policy change occurred which cannot be attributed for any other effects. It means that by implementing the policy the average TNPS score dropped in the short term. However, not all points of the analysis point in this direction. The descriptive statistics and the Pooled OLS model shows that there actually was a drop in performance, but the first differences

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estimations did not yield significant results. As a future study it would be worth looking into what happened afterwards. Did it smooth out, and went back to the ex-ante average after the shock losing its effect and the expectations setting up to the new state?

For the leaver analysis significant difference between the performance of the two groups could not be identified. It means that the performance of the individuals did not affect the probability of leaving when this effect was controlled for by the other explanatory variables. Contrary to the previous literature which states that in a change of this kind it would be expected to see more productive workers as leavers.

A possible shortcoming of this investigation is that the base salary increase part of the change was policy induced, while the decrease in the incentives target percentage is a decision made by the company. Additionally, the policy change was a public knowledge so the employees might have expected that their base salary would be increased without the incentives being changed. Due to this they might have experienced the change as a reduction rather than a change in the setup in favor of the fixed part of the monthly income. It might be interesting to do an experiment in which a change of this kind is not induced by governmental policy, but a sole decision of the company.

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