Public Sector Leadership*

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September 2, 2019

We document the impact of leadership on employee effort in the public sector in Denmark. Using hospitalization of leaders, we show the causal impact of leaders on employee effort measured through employee absenteeism both in the entire public sector and in the three main sub sectors of health, education and public administration. We identify four aspects of leadership (personal traits, shocks and use of prescription medicine, incentives structures and entity organization) and document the correlation with employee absenteeism. We then decompose absenteeism into incentives (unit) effects and selection (employee) effects and we find that the incentives effects explains between 66 and 82 pct of the variation in effort. We show important variation in correlation between the four leadership characteristics and incentives and selection effect across the three main sub sectors. Our result are consistent with the notion that leaders personal characteristics and their actions are crucial in promoting employee effort in the public sector.

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*We thank Jihye Jang for excellent research assistance and He Zhong and Pernille Bang for data management. We are grateful for comments from seminar participants at the INSEAD Economics symposium and Copenhagen Business School. We thank the research office in Statistic Denmark for long term collaboration. We are grateful for financial support from the Danish National Research Foundation (Niels Bohr Professorship).

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I. Introduction

We document the importance of public sector leadership in inducing employee effort as measured through reducing employee absenteeism. The public sector constitute an important part of all economies across the world. The share of labor market working in the public sector varies between OECD countries between 9 to 32 pct (OECD 2018). Thus organizing public sector entities to increase quality and quantity of output while reducing cost is high on national and international policy agendas (xx World Bank). Reforms of public sector entities often focus on streamlining organizations and strengthening leadership to improve efficiency and encouraging labor effort (xx World Bank).

Leadership research in organizational behavior and management has analyzed many elements of successful leadership in both the private and public sector. Individual traits such as drive, personality type, engagement and skills may both affect who becomes a leader and the success of a given leader. Most of the research relies on qualitative data provided through case studies, interviews, or small-scale surveys. In this paper, we document the importance of leaders in a yearly average of 14759 production units with 475351 employees covering the entire public sector in Denmark and the three main sub sectors of health, education and public administration.

Whereas national governments, OECD and the World Bank push for public sector reforms, the economic literature on the role of leadership in promoting public sector efficiency is limited. Obviously measuring leadership, performance and efficiency in the public sector is challenging given that public sector units vary considerably in organizational structure, objectives and outputs across different parts of the public sector. In the absence of a common metrics to measure the role of leadership, the economic literature have focused on important sub sectors where measurements of input and quantity and quality of output are possible either through surveys, randomized experiments or through registers. Within the health sector, Janke et al (2018) finds little impact of hospital CEOs on survey outcomes in UK. Their methodology is to exploit leaders that move across hospitals. Hospitals are giant units with a total of 400.000 employees, however, they only have a relative small sample of CEOs that move

hospitals within the sample and outcome measures are survey based focusing on capacity, use of hospital beds and quality of services. Other papers have focused on measurable practices and competitive environment: Bloom et al (2014 and 2018) links better managerial practice of hospitals to better health and efficiency outcomes. For the educational sector, Hoxby (2000) shows that increased competition among school leads to higher school productivity. For the administrative sector Rasul and Rogger (2018) show that better management practices in Nigeria improves the efficiency of public sector projects.

In the development literature there has been an increasing focus on how to get public employees to show up at work. Government employees not showing up for work is a major problem in developing countries. Chaudhury et al. (2006) documents rates of absenteeism for government doctors are 25 pct. in Peru, 37 pct in Uganda, and 40 pct in Indonesia. The experimental literature has in collaboration with local governments tried to come up with mechanisms that lover absenteeism, from simply asking teachers to take a picture of themselves in the classroom (Duflo et al. 2012) to remote biometric monitoring stations in India (Dhaliwal and Hanna 2016). A special challenge is that the power of such mechanisms are reduced over time (Banerjee et al. 2008, Olken and Pande 2012).

We take a different approach in this paper. We investigate the impact of leadership on labor efficiency covering all production units in the entire public sector in a single country, using employee absenteeism as a common measure of efficiency. Using absenteeism as a proxy for effort has a number of advantages: First, it is a common measure observed at the individual level for all public sector employees. Second, it is a measure that we can link to leadership characteristics and organizational structure at the public sector unit level, that is on the level of each kindergarten, retirement home or administrative unit in the local, regional or central government. These two aspects allow us to estimate the causal relationship between leadership and absenteeism using production unit and leader fixed effects. Third, it exists for all public sector entities across all sectors. Since many employees move between public sector units, we are able to decompose absenteeism into a incentive (unit) and a selection (individual) effect. Hence, we can compare the role of leadership style across entities and branches within

the public sector. We acknowledge, however, that absenteeism is not a complete measure of worker efficiency. Only a part of worker absenteeism is at the discretion of individual employees and it does not measure variation of work effort when employees are at work.

Exploiting the variation of absenteeism across time and public sector units allow us to investigate a number of important questions: Is there important variation in employee effort across the public sector units? Does leaders affect the level of absenteeism and which leadership characteristics correlates with higher effort through lower absenteeism? What share of absenteeism is due to units incentives and what share of absenteeism can be explained by hiring employees with low or high absenteeism? What types of leadership is correlated with attracting more efficient employees? For example are older leaders, female leaders, leaders that use anti-depressant medicine or opioids, leaders that have a tough policy again absenteeism, correlated with lower or higher employee absenteeism? And do such effect come through incentives or selection? Does the impact of leadership and organizational structure vary across sectors within the public sector? The answer to such questions are crucial to develop best practices for improving employee efficiency in public sector entities.

Our data set covers 14.759 public sector entities with 475.351 employees on average per year. We have detailed information about every absence spell of all public sector employees. We begin the analysis by documenting the pattern of absenteeism inside the public sector and across sub-sectors. On average, a public sector employee is absent 12.3 days a year, a number that is highest in the health sector and lower within the educational sector and public administration. Across entities we document that there are 13,3 days difference between the average individual absenteeism level for above and below median and the difference between the top and bottom deciles are 33.9 days. We then document that absenteeism is important at the aggregate and individual level. A rough estimate states that the government could save XXX mill used by reducing public sector absenteeism by one day, or equivalently hire almost 3.000 more school teachers. On the individual level absenteeism is correlated positively with job separation and negatively with promotion.

We go on to show that employee absenteeism increases when leaders are away from the

job. We follow Bennedsen et al 2019 and show that when leaders are hospitalized - and thus absent from the workplace - effort is reduced through higher absenteeism. This method allows us to include leader-public unit fixed effects and thus provide evidence for a causal impact of leadership on absenteeism. We document that the causal impact of leaders on employee absenteeism is strong both in the entire public sector as well as in the 3 sub sectors of health, education and public administration.

Next, we define four elements of leadership. First, individual traits including age, gender and a proxy for social preferences based on gender composition in the family of leaders. Second, personal shocks measured as hospitalization of leaders, deaths in close family and use of two types of prescription drugs (anti-depressant medicine and opioids). Third, leadership policy including wage dispersion, bonus policy, sensitivity of absenteeism to wages and job separation and policy towards employees with high level of absenteeism. Finally, organizational structure including size and hierarchical structure. wages and job separation to absenteeism. Whereas individual leaders do have a say in organizational structure of a public unit, we recognize that such elements partly are determined by the type of the unit and the sub-sector it belongs to.

We investigate to what extent the variation in absenteeism correlates with each of these four elements of leadership. Female leaders and leaders with more female children correlate with higher absenteeism as do hospitalized leaders. On the other hand, the use of anti-depressant drugs correlates with lower employee absenteeism. We also document variation in correlations across the three main sub-sectors health, education and public administration. For example, leader's personal use of prescription opioids in the health sectors correlates with lower absenteeism.

In the rest of the paper, we decompose these overall correlations in two important dimensions. First, we separate two broad groups of mechanisms. Leadership characteristics have a direct impact on the type of employees that arrive and exit the entity, the extensive margin. We denote this selection effects. However, leadership also affect the effort level of the current set of employees in a particular entity, the intensive margin. We denote this incentive effects. We separate the impact of these two theories by estimating a model of absenteeism as a function of time, individual and public sector

unit effects, following the seminal model of Abowd, Kramarz and Margolis (1999, henceforth AKM). We aggregate the individual effects to the entity level and document that the incentive effects explain more than two thirds of the variation above and below the median absenteeism level both in the entire public sector and in the three main sub-sectors. Since our model relies on individuals that moves job within the public sector, it is important to document that there is no systematic pattern pre-move in the group of movers. We document this through event studies that provide estimates of the incentive effects that are consistent with the estimates from the AKM model.

After having established the relative importance of incentives and selection effects in explaining variation in absenteeism, we continue to analyze which leadership elements that provide higher incentives for lower absenteeism and which leadership elements that correlates with selecting less absent employees. Overall, we document a tendency that leadership elements correlates differently with incentive and selection effects and across the three main sub-sectors health, education and public administration.

We begin with analyzing which leadership elements that correlates with selecting employees with over absenteeism. For the entire public sector we do not find an impact of personal traits however both the leaders use of anti-depressant drugs and hospitalization of leaders correlates with a lower selection effect. On the other had more wage dispersion and stricter policies of job separation correlates with selecting employees with higher absenteeism. We show that such correlations varies importantly across health, education and public administration. For instance leaders in education leaders with a higher ration of female children correlates with selecting employees with lover absenteeism whereas educational leaders use of opioids correlates with selecting employees with higher level of absenteeism. The negative correlation between leadersâĂŹ hospitalization and a negative selection effect is strongest in the administrative sector, whereas the positive correlation between wage incentives and selecting more absent employee is most visible in the health sector.

Looking at the correlation between incentives effect and leadership elements for the entire public sector reveals a positive correlation with female leadership and hospitalization of leaders, whereas leaders that consume opioids correlates with lover

absenteeism. However, when we look at the sub-sector level we notice that most of the correlation origins from the health sector.

The rest of the paper is organized as follows. In the next section, we present our empirical strategy and discuss key assumptions. In Section 3 we present the data employed in the analysis document simple descriptive statistics. Section 4 presents the estimation of leadership on absenteeism both in the entire public sector and in the three main sectors. This section also provides causal evidence through estimating the effect of hospitalization of leaders on unit-level absenteeism. In Section 5 we decompose the variation in absenteeism into incentives and selection effects and analyze the correlation between elements of leadership on these two effects. Section 6 concludes.

II. Empirical Strategy

III. Data and Descriptive Statistic

III.1. Data sources

Employee absenteeism. Our main data set is the administrative register of employee absenteeism for the entire public sector in Denmark. Statistics Denmark collects absence data for all employees in the central and local governments.

Public sector institutions are required to report each spell of absence for all employees in the institution. For each spell, the data contain the employee national identification number (CPR number), the public sector unit where he or she works, start day, end day, and one of four absence categories: "Own sickness", "Child sickness", "Work accident" and "Maternity/Paternityrelated absence". In the analysis below, we focus on the category Own sickness because the reporting of other categories is rare.

Reporting is mandatory for each unit and stated in the law. Statistics Denmark has developed software integrated into the payroll system to facilitate collecting absence information. Thus, the cost for a unit of collecting absence data is considered minimal.

Absence days are not related to vacation days. The number of vacation days in the public sector is determined by a combination of law and centralized negotiation between central and local governments and the public sector trade unions and is not determined at the local level in the individual public sector units. The law establishes the right to five weeks (25 days) of holidays every year that are not recorded in the absence data. Our analysis is based on absence data for the years 2010-2014 for all employees in the public sector.

Integrated Database for Labor Market Research. We use the matched employer-employee data set for the public sector from the Integrated Database for Labor Market Research (IDA database) at Statistics Denmark. In addition to the employer's identification number (public sector unit), the IDA data set contains employees' demographic information such as age, gender, and the employeeâĂŹs position in the organization. The position in the firm is based on the Danish occupational code, defined based on the international standard classification of occupations (ISCO). We have access to this data set for every year in the period 1995 - 2016.

Prescription Database. We have access to the national database that collects all use of prescription medicine for the entire population of Denmark. This database is administered by the government's health authority (SSI). By linking the prescription data base to the IDA database we are able to get information of the use of anti-depressant drugs and the use of opioids among both employees and leaders in the public sector units.

National Patient Registry. Data on hospitalizations are from the National Patient Registry (NPR) at Statistics Denmark. This data set records public hospital interactions of all Danish citizens and contains the employee national identification number (CPR number) and the number of hospitalization days per calendar year. It also contains detailed information about length of each hospitalization spell and the diagnosis assigned.

III.2. Sample construction and summary statistics

Our unit of analysis is each public sector unit (PU). A public sector unit is the lowest unit in the public sector where employment, remuneration and absenteeism is recorded. Examples of public sector units include a single school, a single kindergarten, a library, a retirement home, a group of public dentists and assistants in a municipality, an independent administrative section in a hospital, an environmental control office in the municipality, the competition authority and the consumer protection agency.

Table 1 presents the key figures about our public sector units. We collect information for all public sector units. On average, we have 14759 units pr. year in the 5 years from 2010 to 2014. For ease of comparison, we eliminate part time workers and only retain full-time workers. On average, a public sector unit has 30 full time employee. Thus, our sample covers on average 475.351 employees across all sub-sectors and regions. 60 pct of these work at the local government level and the rest on the regional and national government level. The health sector is the largest sub sector with half of the full time employees. After health, follows education with approximately one quarter and public administration with a fifth of the full-time employees. Unit sizes are highest in the public administration with an average of 71 employees per unit and lowest in the health sector with 25 employees per unit.

The organization of public sector units vary across sectors. Some units have clear leadership with the equivalent of a CEO in a private firms. Others have leaders based on job categories. For instance the leadership in a hospital department both include head nurse, head doctor and sometimes head of administration. To be sure to have a representative set of leaders in all public sector units, we define leaders in the following way based on the job categorization variables provided by Statistic Denmark. First, we define top managers as leaders. However, 56 pct. of the unit years do not have a top manager. Then we proceed to the group of senior managers and pick out those with highest wage. For each unit we put a cap on the number of leaders, so for every 10 employees we have a maximum of 1 leader and no unit will have more than 10 leaders. That is units with less than 10 employees have 1 leader, units with 1120 employees have 2 leaders, units with 2130 have 3 leaders, etc etc. Finally, public sector units with more

than 100 employees have 10 leaders. Using this categorization we have an average number of leaders of 2.6 and a median of 1.7.

Table 2 documents personal characteristics of the leaders in our sample. Given our definition above we have 35.422 leaders per year or 177.110 leader unit year observations. More than half of these are in the health sector and only 13.5 pct are in the public administration sector. Leaders in all sectors are around 50 years old. The average income is 449.714 DKK (approximately 60.000 EUR) and leaders in health are lowest paid and leaders in public administration receive on average the highest income. There are 68 pct women among the leaders in the entire public sector. In the health sector 4 out of 5 are women, whereas it is equally distributed between men and woman in education and there is a small majority of men in the public administration. On average they have been leaders for slightly more that two and a half year in all three sub sectors.

The last part of Table 2 provides summary statistics for some of our proxies for leadership preferences and shocks to leaders. We will use hospitalization events below to support provide evidence for a causal impact of leaders on absenteeism. Table 2 shows that leaders on average has at least one hospital event in 7 pct of the leader unit years. On average leaders have 0.9 daughters in the family, which we will use to proxy their social preferences. Finally, the use of anti depressant drugs and opioids happens on average in 13 pct and 17 pct of the leader unit years. It is interesting to notice that leaders are more likely to use prescription drugs in the health sector and least likely in the public administration.

In Table 3 we provide sample statistics for the employees in our sample. We have a total of 1684763 employee years in the 5 years of data. The average age of a public sector employee is 46 years without significant variation across the three main sub-sectors. The average number of absenteeism days per employee per unit is 12.31 or approximately 6.2 pct of the contracted yearly work-days. Employee absence is higher in the health sector (14.22 days pr. year) and lower in the educational sector and public administration (a little more than 10 days in both).

There is a dominance of female employees with approximately 7 out of 10 employees

being female. In the health sector is 86 pct., in the education sector it is 62 pct. whereas in public administration it is 50 pct. The average employee wages do also vary significantly across sectors. On average, the yearly wage is 375605 DKK (approximately 50500 EUR). The wage is significantly higher in the public administration and almost 20 pct higher on average than in the health sector with the educational sector in between. The preceding numbers highlights the importance for analyzing the role of leadership both across the entire public sector but also within each of the three mains sub-sectors.

Finally, we document hospitalization events and use of prescription drugs. We notice that hospitalization is a rare event in the sample with hospitalization on happening around 7 pct of the unit years for each employee. Furthermore, the average number of hospitalization days per year is 0.02 for the entire sample with little variation across sub sectors. On average approximately 1 out of 7 employees takes anti-depressant drugs and the same number take opioids in a given hear. Again use of prescription drugs is higher in the health sector than in other sectors.

Table 3 shows that a total of 55 pct. of our employee year sample are categorized as movers, that is they move jobs within our sample. Movers have on average higher age, more likely to be men, higher wages and are on average 3 pct. more absent. There are statistical significant but economically small differences in these numbers across subsections.

III.3. Variation in days absent across firms

Table 4 shows the difference in average days absent for different classifications of public sector units. Our main measure of absenteeism at the unit level is computed by first averaging days absent across all employees in the unit in a given year and then averaging over years. The difference in average days absent between public sector units above and below the median is 13.3, whereas the difference between units in the top and bottom quartile is 22.1 days which is more than 10 pct of the contractual yearly work-days. This difference widens to 44.4 days, corresponding to approximately 23 pct. of annual working days, when we compare units at the top and bottom 5 pct of the distribution.

Furthermore, these differences persist within sectors as the rest of Table 4 and Figure 1 document. Each box plot in Figure 1 presents the minimum, first quartile, median, third quartile, and maximum days absent for each industry. We notice that the median days absent is highest in the health sector and lowest in the public administration and that considerable variation exists within all three sectors.

IV. The impact of leadership on employee absenteeism

IV.1. The importance of absenteeism

We proxy employee effort with absenteeism. As discussed in the introduction absenteeism as an efficiency measure has a number of clear advantages: It can be measured on the individual level for all public sector employees and it can be aggregated across public sector units. Thus it is a metric that can be used to compare efficiency across public sector units and sectors for the entire public sector. We can link it directly to leadership characteristics in the relevant unit of analysis, i.e. we can link variation across units and across time in leadership traits, shocks, policy and organization to variation in individual and aggregated absenteeism.

We admit that absenteeism measure at most the extensive margin of effort, that employees show up at work. It is important that we measure absenteeism as own sickness, so we do not believe it captures work at home to a very large extent. Only employees who report sick to the job and then work at home would be working while absent in our data. However, our measure do not measure any intensive margin of effort, the extent to which employees work overtime or slack while being at the workplace.

To support our argument that absenteeism is a good proxy for employee efficiency we now provide suggestive evidence. First, Figure 2 provide evidence that our measure is related to employees being away from work. In the left figure we measure the

relationship between number of days hospitalized and individual absenteeism. The figure provide two insights: First, when employees are hospitalized they do show up as absent in our data, that is evidence for that the measure do report real absenteeism. Second, even short hospital stays imply long spells of absenteeism. This is noteworthy since we will use hospitalization of leaders as our empirical strategy to show an causal impact of leadership on employee absenteeism. The second figure shows that when younger employees go to hospital they need less days to recover before they are back at work. Again this is what we would expect and thus provide additional evidence for that our measure of absenteeism do reflect real absenteeism.

Public sector absenteeism is a huge challenge in it self. As mentioned in the introduction, the absenteeism rates in key public sector jobs in emerging market countries have been measured to be anything up to 50 pct. In the OECD countries the average absenteeism for public employees are XX pct. In our sample we show that the average absenteeism is more than 12 days a year. Reducing the average absenteeism with one day is estimated to be the equivalent of 2.800 more employees and to save around 790 mill DKR in less payments for overtime work and temporary appointments. The total effect on the national budget would be 420 mill DKR (Ministry of Employment and Ministry of Finance, dec. 2018).

Admittedly, we cannot provide direct evidence for the correlation between variance in absenteeism and variance in standardized measures of output or productivity. XX shows how absenteeism of teachers in the US is negatively correlated with student grades. However, on the employee level we document in Table 5 that absenteeism is perceived to be important by leaders and is strongly correlated with promotion and job separation. In specifications controlling for employee and Production Unit controls and with industry and employee fixed effect, we see that increased absenteeism is correlated with a smaller likelihood of promotion and a larger likelihood that the employee is separated from the production unit in the following year.

IV.2. Leadership and absenteeism

As discussed in the methodology section above our empirical strategy is to measure the impact of leader hospitalization events on employee absenteeism. The advantages of this approach is that we can use the same public unit leadership match as counterfactual. We compare variation of employee absenteeism between spells where leaders are separated from their production units through hospitalization events and spells where the same leader and the same public unit is matched in normal times. In econometric terms, this allows us to use Leader-Production Unit fixed effects, which solves the issue of endogenous matching that may challenge other identification strategies such as Leader fixed effects.

IV.2.1. Leadership hospitalization events and employee absence: Univariate Results

We begin documenting the impact of leadership on employee absence by reporting univariate results in Table 6. The average number of absent days for all employees in the public per public unit is 12,3 days.[1] Panel A shows that when a leader is hospitalized one day, the average number of absent days are 13.6 and when the leader is hospitalized 2-4 days the average number of days absent is 12.9. This increase to 13.0 for 5-9 days of hospitalization before lowering slightly for 10-19 days and above 20 days.

Panel B compares mean differences. Comparing average absenteeism between production units where the leaders are 1 day hospitalized vs leaders not hospitalized we see a difference of 0.8 days. Splitting units into 0-4 days and more than 5 days of hospitalization gives a difference of 0.5 days. However, we do not see a mean difference between these two groups when we only focus on production units where leaders are hospitalized at least once during the period from 2010-14. We notice that for smaller hospitalization there seem to be a positive correlation between leaders being absent and employees being absent.

[1] Notice this number differ from the average reported in Table 3. The reason is that Table 3 reports the average across all individuals. In Table 6 we first average within each PU and then average across PUs.

Extracting a clear picture from mean comparison is difficult for two reasons: First, means are affected by a number of individuals with very high absenteeism. For this reason we state the results of comparison of medians in Panel C. We notice that the difference in median absenteeism between units where the leader is hospitalized 1 day and not hospitalized is 2 days and between units where the leader is hospitalized more than 5 days versus 0-4 days is 1.6 days.

Second, absenteeism varies significantly across sectors as we documented in Table 4. Thus, in Table 6, column 2, we provide mean and median comparison for industry adjusted absence days. In both cases we notice in Panel B and C, that there is a strong correlation between hospitalization of leaders and average and median employee absenteeism. For mean comparison the differences between the groups 1 versus 0, 5 versus 0-4 and 5 versus 0-4 event units only are respectively 1.1, 0.8 and 0.6 days. Similar group differences for median comparison are 2.3, 1.9 and 1 days of employee absence.

The univariate analysis provides a clear indication,that there is a higher absenteeism among employees when leaders are not on the job.

IV.3. Leadership hospitalization events and employee absence: Multivariate results

We next analyse the impact of leadership hospitalization events on employee absenteeism focusing on variation within the same pair of leader and production unit. As discussed in the methodology part, the advantages of using hospitalization events is that it is possible to have leader and public unit fixed effects and thus study variation in absenteeism keeping the same leader and unit as counterfactual.

Table 7, Panel A present results for standard OLS regressions. In column 1 we include all public units in the entire public sector and have year and unit fixed effects while we provide control for several unit characteristics. Thus, we investigate the correlation between leader hospital events and employee absenteeism within a single workplace aggregating all leaders that work in the unit. We show that hospital events is correlated

with higher absenteeism, an effect that is statistical significant on a 5 pct level. The coefficient is 1.67 pct. point, that is one day extra of leadership hospitalization increase average absenteeism with 0.2 days, or equivalently, 10 days of leadership hospitalization increase average absenteeism with two days.

In column 2 we do the same analysis but now we replace unit fixed effects with leader fixed effect in stead of unit fixed effects. Thus we now exploit variation the correlation between a leaders hospital event and employee absenteeism for each leader, independently of which public sector unit she works for. The effect of leader hospitalization is identical to Column 1 both in size and statistical importance.

In Column 3, our main specification, we look at the effect of hospitalization events with both public unit and leader fixed effects. Thus, we now measure the effect of leaders being in hospital on average absenteeism keeping the same pair of unit and leader as our counterfactual. For the entire public sector we again get identical results both in economic and statistical significance. Thus, this is consistent with an causal interpretation that leaders absenteeism induce lower employee effort through higher absenteeism. That is, leaders in the public sector has a strong impact on the organizations they lead. The evidence demonstrates that changing managerial supply of effort, resulting from hospitalizations, significantly influences employee effort.

Column 3, 4 and 5 provide the same specification with leader and unit fixed effect but independently for the three main sub sectors of health, education and public administration. The coefficients are slightly lower but the tests lose statistical power.

In Table 7, Panel A, Column 7, we examine the effect of hospital stays of different lengths using indicator variables. Specifically, we use dummy variables that indicate whether the leader had a hospital stay between 1 and 4 days, 5 and 9 days, or 10 or more days. The results confirm that all hospitalization events are correlated with economically and statistically significant effects on employee absenteeism. In Column 8, we introduce lagged hospitalization to investigate if there is any impact of leadership hospitalization on future employee absenteeism. Interesting, it seems that most of the impact comes from the previous year.

Our OLS regression are affected by very long employee absenteeism. It is not

uncommon to have employees that are absent for months and sometime for the majority of a year. The distribution of these long term employees are not correlated with leaders short term hospitalization events and we hypothesize that the less clear results in Columns 4-8 in Table 6, Panel A may be due to this. Thus, we replicate the analysis in Table 8, Panel B, but this time applying a median regression in stead of an OLS.

Consistent with less importance of extreme absenteeism the median regression document a strong impact of leadership hospitalization events on median absenteeism. For the three cases of unit fixed effects, leader fixed effects and unit-leader fixed effects we observe that the coefficient is around 7.5 pct and the effect is now statistically very significant on a 1 pct. level. Economically this means that the median employee in a public entity is sick 0.92 more day for every day a leader is hospitalized.

The median analysis also provide stronger impact of leader hospitalization events in the three main sub sectors. In the health sector we have that one day more hospitalization induce the median employee to be increase self reported sickness with approximately 1.2 days and this effect is statistically very significant at a 1 pct level. The effects is only one third of this in public administration and slightly less statistically significant. We do not find significant impact of hospitalization event on median absenteeism in the education sector. These results are highlighting that the role of a leader may be very different in different parts of the public sector. Thus, when we analyze the correlation between leadership characteristics and employee absenteeism in the following sections, we will focus both on the aggregate public sector and the three main sub sectors.

In Table 7, Panel B, Column 7, we again examine the effect of hospital stays of different lengths using indicator variables but this time using a median regressor. The results confirm that both short, medium and longer hospitalization events has an economic and statistical impact on the median employee absenteeism. The lagged hospitalization events are introduced in Column 8 and we document that hospital events has prolonged impact on median employee effort levels. In this median regression both the current and the lagged events are statistically important and economically large.

To sum up, Table 7 has provided strong evidence on the causal importance of leaders on employee effort. Using median regressions — to avoid the impact of employees that are

absent for very long periods — and unit and leader fixed effects, we documented that short, medium and longer hospitalization spells by leaders induce higher absenteeism in the units they lead. This provide strong evidence for that public leaders are important factors for increasing employee effort in the units they lead.

IV.4. Leadership characteristics and public sector absenteeism

After establishing the importance of absenteeism as a measure of effort and providing causal evidence for that leaders are important factors in inducing effort in the unities they lead, we now investigate the relationship between absenteeism and leadership characteristics. We will classify leadership characteristics into four groups: Personal traits; shocks and use of prescription drugs; incentive structures; and, unit organization.

Our first group of leadership characteristics include personal traits. We are restricted to identify personal traits that we can construct from register data. Thus we focus on age, gender and a proxy of social preferences based on gender composition in the family of leaders. Leadership style may vary across age of leader. Young leaders are creating a reputation where more tenured leaders have a clearer track record. The literature has argued that female leaders may have a different leadership style than male leaders (see for instance Bennedsen et al 2019). Finally, we construct a measure of social values from the gender composition of leaders children. Social preferences have been documented to have strong impact on leadership style (xx citation).

Our second group of leadership characteristics focus on shocks to leaders ability to work. We already highlighted the importance of hospitalization spells and in this group we add additional shocks to leaders ability to work. When leaders use prescription drugs it may affect the ability to lead their unit. We will focus on the consumption of prescription induced opioids and anti-depressant medicine.

The third group covers a large group of variables that are related to leadership policy that provides incentives towards lower absenteeism. Turnover is the sensitivity of absenteeism to separation of employee and unit the following year. Wage increase is the

sensitivity between changes in wages and employee absenteeism. Absence policy is the likelihood that an employees with long term absenteeism is not working in the same unit the next year. We measure wage dispersion both as the standard deviation of wages within the unit and the difference between the top 10 pct and the bottom 10 pct wage earners. Bonus hours measures the frequency of giving out bonus and bonus rate provide the amount that is given.

Finally, organizational structure including size and hierarchical structure. Whereas individual leaders do have a say in organizational structure of a public unit, we recognize that such elements partly are determined by the type of the unit and the sub-sector it belongs to.

In Table 9 and Figure 4 and 5 we analyze the correlation between leadership characteristics and employee absenteeism. In Table 9 Column a, we present the result of a multivariate analysis where we add all the characteristics and control for year. In column B, we also control for sectors. Figure 4 present the multivariate analysis in Table 3 Column A but where we have normalized the variables and depicted a 95 pct confidence interval around the mean. This figure does not include sector controls. In Figure 5 we do the same exercise but introduce Lasso regression analysis procedures to highlight the relative importance of our leadership characteristic variables.

Table 9 and Figure 4 documents that there are many leadership characteristics that are correlated with higher absenteeism. These include female leadership, hospitalization events of leaders, leaders use of anti-depressant drugs. More surprisingly it also include incentive structures such as increased sensitivity of wages to absenteeism, wage dispersion and bonus rate. However increased difference between top and bottom earners and the frequency of bonus hours are correlated with less absenteeism. Finally, we notice that a more hierarchical organizational structure is positively correlated with absenteeism. Obviously, we do not claim a causal relationship between absenteeism and all these variables. For instance, the sign of bonus hours reverse when we control for sectors in Table 9, Column 2. Absenteeism is also positively correlated with the likelihood that long term absent are separated from the firm the following year. Again, leaders may introduce a stricter policy on long term absenteeism exactly in units with

higher absenteeism.

When we introduce the LASSO regression analysis procedures we reduce the number of leadership characteristic systematic correlated with absenteeism. Again we notice for the entire public sector that gender hospitalization and use of anti-depressant medicine is correlated with higher absenteeism. However, now we notice that leaders use of opioids - which happens as frequent as leaders use of anti-depressant medicine - is also positively correlated with higher absenteeism. On the incentive factors we notice again that wage sensitivity to absenteeism, long term absent policy and wage dispersion are all important correlates as is the hierarchical structure.

In Figure 5, we also notice importance differences when we dis-aggregate the correlations into the three main sub sectors of health, education and public administration. The correlation pattern in for the health sector is similar to the pattern for the entire public sector. However, in education we notice that only female leadership, long term absent policy and hierarchy are the same. In Education we notice the use of opioids increase absenteeism marginally but statistically significant and that wage dispersion decrease absenteeism. In the public administration leaders age increase absenteeism but not the gender of the leader. Wage dispersion is not important nor is use of prescription medicine, but the difference between the top and bottom earners is negatively correlated with absenteeism.

In this section we have documented that leaders have a strong causal impact on labor productivity - measured through employee absenteeism - in the public sector. We have also shown that a number of leadership characteristics and leadership policies are strongly correlated with variation in employee absenteeism. Finally, we documented that these correlations vary across the three main sector of health, education and public administration.

V. Decomposing production unit and selection effects of leadership

We now proceed to decompose the overall correlations in two important dimensions. First, we separate two broad groups of mechanisms. Leadership characteristics have a direct impact on the type of employees that arrive and exit the entity, the extensive margin. We denote this selection effects. However, leadership also affect the effort level of the current set of employees in a particular entity, the intensive margin. We denote this incentive effects. We separate the impact of leadership on these two dimension by estimating a model of absenteeism as a function of time, individual and public sector unit effects, following the seminal model of Abowd, Kramarz and Margolis (1999). Following Finkelstein (2018 and 2019) and Bennedsen et al 2019 we aggregate the individual effects to the entity level.

The methodology we apply is based on job movers. Table 10 shows the number of movers in our sample. A mover is an employee that across time shows up in at least two different production units within our sample. In Panel A we include the private sector to see how much movement there is within the public and private sectors and how much movement there is across the two sectors. It is interesting to see that we have very little movement across the two sectors. In total we have almost 200.000 movers within the public sector. In Panel B we show there is a significant movement with the three sub-sectors health, education and public administration and much less movement across the sub-sectors.

Simple mean decomposition

Our first indication of the relative size of the selection and incentive effects is given by Figure 6. In this figure we focus on all movers. On the horizontal axis we measure the difference between average absenteeism between start and end unit for each move. On the horizontal axis is the difference between before and after move absence days for the employee. We aggregate moves into 30 bins according to the average net difference

between units. If the slope of the figure is 1, we say the change in individual behaviour is the same as the average difference between the units, that is the variation in absenteeism is entirely explained by incentives effects. On the other hand if the curve is horizontal there is no correlation between the differences in the units and the individuals around the move. Thus, all variation in absenteeism around moves are explained by selection effects.

For the entire public sector the slope of the curve is 0.65. It is consistent with that the incentive effects explain the majority of the variation in absenteeism around moves. We also notice that the slope is steeper in the health sector and lower in education and in public administration. Thus, incentive effects seem to be more important in the health sector and selection effects are relatively more important in education and public administration.

AKM decomposition

Table 11 reports the result of the full decomposition from estimating the AKM model described in the methodology section. Panel A reports for the entire public sector, where as the remaining three panels report for the three main sub sectors. Within each panel we report the results first without personal controls and then with personal controls.

For the entire public sector comparing above and below mean absenteeism in Panel A.1, we observe that the difference in absenteeism is 13.65 days. Out of these 9.21 days or 69 pct are due to production unit effects and 4.44 or 32 pct are due to individual effects. Thus we see that the incentive effects are domination. Most variation in absenteeism is explained by the production unit characteristics and policies and only one third is due to selection of employees with certain absenteeism behaviour.

When we decompose the difference between top and bottom 25 pct, 10 pct and 5 pct, we observe a slight increase from 68 pct to 73 pct in the share of variation due to incentives. In Panel A.2 we introduce person controls; however, the results are very similar to the decomposition without personal controls.

Panel B, C and D do the same decomposition exercise but for each of the three main

sub-sectors health, education and public administration. It is worth noticing that for all three sectors the public unit effects are slightly higher than when we estimate the model for the entire public sector. Comparing the three sectors we observe that the selection effect is highest in the public administration and lowest in the health sector even though the differences are small.

Event study

A fundamental premise for an unbiased estimation of the AKM model is that the decision to move is uncorrelated with individuals absenteeism behaviour.

Our first evidence for this premise is given in Figure 7. We show the distribution of the difference between average absenteeism in the destination unit and the origin unit for each move. We notice that the distribution for the entire public sector is normally distributed around mean 0. Thus, there do not seem to be any systematic pattern in where employees move from and where they move too. The normal distribution around mean is also very clear in the health sector, but a little more skewed towards negative in the education and public administration.

An alternative way of decomposing into unit and individual effects is to use event-study methodology for movers. We present the result of event-studies in Figure 3. We have normalized the average absenteeism in the original public unit to zero and the average absenteeism in the destination public unit to one. We control for time varying and individual characteristics. Thus, we interpret the coefficient in the event-study as the fraction of the difference between origin and destination unit that an individual close before under and after the move, which takes place in year 0.

For the entire public sector we observe that there is very little change in absenteeism before the move. The year of the move the mover adapt around 55 pct of the differences between the units. In the following year, the mover has adapted close to two thirds of the difference and seem to stay there for year 3. Very similar behaviour are documented for the three sub-sectors health, education and public administration in the other panels. Thus we

VI. Drivers of individual and production unit effects

In Section 4.4 we investigate the relationship between absenteeism and the four dimension of leadership characteristic. Nevertheless, the results of the regression analysis of days absent with leadership characteristics does not highlight if the correlations are generated by individual or unit effects. In this section, we analyze separately how individual employee fixed effects and public unit fixed effects correlate with leadership characteristics.

Correlates of employee fixed effects

Our main analysis showed that around one third of the variation in absenteeism is due to the selection effect. The goal of this section is to analyze the correlation between leadership characteristics selection effects to shed light on which types of public sector units are more successful at attracting low-absenteeism employees. Because we include public unit fixed effect in the model, incentive does not drive our results. However, we do not use exogenous variation in individual moves and hence cannot rule out bias in the estimates coming from correlated unobserved characteristics.

We use the same four leadership dimensions as above, including leader traits; shocks and use of prescription drugs; incentive policies and unit organization. We present both the results of multiple regression and the results from a post-lasso estimation. Given that we estimate one fixed effect by person, the covariates are averaged at the unit-employee pair.

We present the results of the multivariate analysis in Figure 9. It is interesting to notice how many leadership characteristics that are correlated with selections effects. We see that female leaders and having more leaders with more female children is positively correlated with attracting individuals with higher absenteeism. In the second group we

notice that leaders' hospitalization and use of anti-depressant drugs are both correlated with attracting employees with higher absenteeism. We also notice that the units where the sensitivity of absence to labor turnover and wages and which have a stronger long term absence policy, higher bonus rate and higher wage dispersion also attract employees with higher absenteeism. However, units where the top bottom earners are very far from each other and that have more bonus hours are correlated with attracting employees with lover absenteeism.

The next three panels show the same correlations for the three sub sectors of health, education and public administration. Where the correlates in the health sector in general follow the pattern noticed in the entire public sector, we highlight a few differences between the three sectors. Older leaders in the health sector are correlated with individuals with higher absenteeism but not in the two other sectors. The correlate for female leadership is smaller in the public administration.Leaders on anti-depressant medicine and opioids in the health and public administration sector are weakly correlated with attracting employees with higher absenteeism, whereas leaders taking opioids in the educational sector is correlated with attracting employees with lower absenteeism. Similar, whereas high wage dispersion attracts employees with higher absenteeism in health and public administration it is correlated with attracting employees with lower absenteeism in the educational sector.

In Figure 10 we study the correlates between individual effects and leadership characteristics again but this time using a post-lasso procedure that are able to highlight which of the correlates that seem to be more important in explaining variation in individual effects.

In the entire public sector analysis we notice that both traits, drugs and incentives seem to be important to explain variation in selection effects. Again, female leaders and leaders with more female offspring correlates with higher selection effects of absenteeism. The same do leaders use of anti-depressant drugs and opioids. Increasing he likelihood that long term absents are separated from their job is correlated with attracting more individuals with higher absenteeism, a correlate that easily is explained by reverse causality: environments that attract many high absent employees may

introduce tougher policy on long term absenteeism. Finally, a more hierarchical organizational structure is correlated with attracting employees with less absenteeism.

The rest of the panels provide results of the post-lasso analysis for each of our three main sub sectors. Again we notice that the health sector seem to behave very similar to the entire public sector. For the educational sector we notice a positive correlation for female leaders and a negative correlation for wage dispersion. For the public administration we find a smaller correlate for female leadership and a positive correlate with high standard deviation for leaders use of opioids.

Correlates of public unit fixed effects

We next examine observable leadership characteristics that correlate with the public unit fixed effects This approach is a cross-sectional regression of firm fixed effects on firm covariates. The covariates are calculated as the average across all sample years for each firm. Again, we include individual effects in the regressions, so our results are not driven by selection. However, we do not use external variation so we cannot rule out that our results are partly explained by omitted - unobservable - variables.

The correlates between incentive effects and leadership characteristics are presented in Figure 11xx. For the entire public sector we do not see a strong correlation to the personal trait group. In the incentive group, we notice that higher sensitivity between absenteeism and turn over is correlated with less absenteeism. On the other hand, higher sensitivity between absenteeism and remuneration and wage dispersion in general are correlated with higher absenteeism. Larger firm seem to be correlated with less absenteeism as is firms with less hierarchical structures.

The health sector is similar to the picture from the entire public sector with a few interesting deviations. Older leaders are correlated with lower absenteeism through the incentive constraint. Remember above we noticed that older leaders are attracting more absent employees. So it looks like older leaders attract more absent employees but are able to reduce their absenteeism more after they start working. In the education sector, we notice that leaders taking prescription opioids are correlated with less absenteeism

through the incentive effects.

Figure 12xx provide the results from the post-LASSO regression analysis. In general we see a similar picture for the entire public sector and for the health sector. However, the post-Lasso regression do not report any important covariates between incentive effects and leadership characteristics for the educational sector nor for the public administration.

VII. Conclusion

We propose a new methodology to measure the impact and role of leaders in the public sector. By relying on a common metric - employee absenteeism - that can be measure for all individuals, in all public sector units, in the entire public sector, we can compare the role of leaders and leadership characteristics across different sub sectors in the public sector.

We have established that leaders in the public sectors have an important impact on the organizations they lead. We proved a causal impact on leadership absenteeism on employee absenteeism, a methodology that allowed us to estimate the impact of leaders on their organization using both public unit and employee fixed effects. In addition, we have documented how four leadership dimensions are correlated with employee behaviour.

Focusing on movers, we have decomposed the variation in employee absenteeism and documented how leadership characteristics correlates with both incentive and selection effects.

Our methodology allows future research to develop best practices for leadership in the public sector and better understand how different leadership characteristics may reduce public sector absenteeism.

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VIII. Tables

Table 1: Number of production unit and employees

The sample consists of all public employees in all sectors. The table provides average number per year of Production Units, Employees and Employees per Unit for the entire public sector and the three largest sub sectors.

	Production Unit	Employee	Employee per Unit
Public	15114	531029	24
Health	9201	264233	20
Education	2909	115271	30
PublicAdmin	1244	105740	57

Notes: Presented in the table are average values between 2010 -2016

Table 2: Personal Characteristics of Leaders

	Entire Public	Health	Education	Public Admin
No leaders	234744	117931	63624	32391
No leaders per PU	2.40	1.88	3.29	3.95
Age	49.32	48.97	50.14	49.71
	(7.86)	(8.07)	(6.93)	(6.80)
Wage	440827	403971	507414	583924
	(135348)	(105997)	(124477)	(200404)
Female	0.70	0.82	0.52	0.47
	(0.40)	(0.35)	(0.37)	(0.38)
Tenure	3.90	3.89	4.04	3.70
	(1.77)	(1.81)	(1.57)	(1.66)
Hospitalization Day	0.24	0.24	0.21	0.28
	(1.62)	(1.70)	(1.21)	(2.01)
No of Daughter	0.92	0.92	0.96	0.89
	(0.84)	(0.84)	(0.86)	(0.85)
Antidepressant	0.12	0.13	0.10	0.09
	(0.44)	(0.46)	(0.35)	(0.32)
Opioid	0.10	0.11	0.09	0.11
	(1.35)	(1.34)	(1.68)	(1.28)

Notes: Presented in the table are average values between 2010 -2016

Table 3: Personal Characteristics of Employees

The sample consists of all public sector employees in the 7 years from 2010 to 2016, ...

	Entire Public				Health			
	Total	Mover	Non-mover	Ttest	Total	Mover	Non-mover	Ttest
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Observation No	2694621	1949934	744687	.	1356674	985924	370750	.
Age	45.84	47.07	45.37	1.70***	45.95	47.01	45.56	1.45***
	(10.41)	(10.32)	(10.41)	(0.00)	(10.43)	(10.32)	(10.45)	(0.00)
Wage	371638	383854	366973	16881***	341427	364766	332651	32115***
	(131944)	(141617)	(127749)	(0.00)	(133298)	(157998)	(121577)	(0.00)
Female	0.72	0.70	0.72	-0.02***	0.87	0.85	0.87	-0.02***
	(0.45)	(0.46)	(0.45)	(0.00)	(0.34)	(0.36)	(0.33)	(0.00)
Absent Days	9.49	9.35	9.54	-0.18***	10.78	10.69	10.82	-0.13***
	(15.87)	(15.71)	(15.93)	(0.00)	(17.10)	(16.78)	(17.21)	(0.00)
No of Children	1.71	1.71	1.71	-0.00	1.79	1.77	1.80	-0.03***
	(1.09)	(1.08)	(1.10)	(0.10)	(1.08)	(1.08)	(1.08)	(0.00)
Hospitalization	0.09	0.09	0.09	-0.00	0.09	0.10	0.09	0.00
	(0.28)	(0.28)	(0.28)	(0.22)	(0.29)	(0.29)	(0.29)	(0.26)
Antidepressant	0.14	0.14	0.14	0.01***	0.16	0.16	0.15	0.00***
	(0.57)	(0.60)	(0.57)	(0.00)	(0.61)	(0.63)	(0.60)	(0.00)
Opioid	0.11	0.12	0.10	0.02***	0.12	0.14	0.12	0.02***
	(1.30)	(1.49)	(1.22)	(0.00)	(1.40)	(1.67)	(1.29)	(0.00)
	Education				Public Admin			
	Total	Mover	Non-mover	Ttest	Total	Mover	Non-mover	Ttest
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Observation No	609579	357443	190192	.	539378	404333	135045	.
Age	45.90	47.05	45.37	1.67 ***	44.80	46.90	44.10	2.79***
	(10.27)	(10.38)	(10.19)	(0.00)	(10.41)	(9.99)	(10.45)	(0.00)
Wage	404326	408325	402512	5812***	416360	407317	419379	-12061***
	(115161)	(112248)	(116413)	(0.00)	(129919)	(123564)	(131835)	(0.00)
Female	0.64	0.60	0.65	-0.05***	0.50	0.51	0.49	0.02***
	(0.48)	(0.49)	(0.48)	(0.00)	(0.50)	(0.50)	(0.50)	(0.00)
Absent Days	8.18	7.56	8.45	-0.89***	8.04	8.59	7.86	0.73***
	(14.53)	(14.14)	(14.70)	(0.00)	(14.04)	(14.77)	(13.79)	(0.00)
Hospitalization	0.08	0.08	0.08	-0.00***	0.08	0.08	0.08	0.00
	(0.27)	(0.27)	(0.27)	(0.00)	(0.27)	(0.27)	(0.27)	(0.52)
No of Children	1.74	1.71	1.75	-0.03***	1.52	1.60	1.50	0.10***
	(1.08)	(1.07)	(1.08)	(0.00)	(1.09)	(1.07)	(1.09)	(0.00)
Antidepressant	0.13	0.13	0.13	0.00	0.11	0.13	0.10	0.03***
	(0.54)	(0.54)	(0.54)	(0.67)	(0.52)	(0.57)	(0.50)	(0.00)
Opioid	0.08	0.09	0.08	0.01***	0.08	0.11	0.08	0.03***
	(1.22)	(1.26)	(1.19)	(0.00)	(1.14)	(1.28)	(1.09)	(0.00)

Notes: Presented in the table are average values between 2010 -2016

Table 4: Difference in Average Absent Days

Hello, Description goes here!

	Above/Below Median	Top/Bottom 25%	Top/Bottom 10%	Top/Bottom 5%
	(1)	(2)	(3)	(4)
Entire Public Sector	8.3	13.6	20.4	25.7
Health	8.4	13.9	21.0	26.6
Education	6.3	10.2	14.9	18.9
Public Admin	7.0	11.7	18.4	24.7

Notes: Presented in the table are average values between 2010 -2016

Table 5: Promotion and separation with absence

	Promotion	Promotion	Separation	Separation
	(1)	(2)	(3)	(4)
Days Absent$_{t-1}$	-0.0004***	-0.0004***	-0.0000	-0.0001***
	(0.0000)	(0.0000)	(0.0001)	(0.0000)
Observations	1,616,270	1,616,270	2,243,427	2,243,427
R-squared	0.0085	0.3083	0.1195	0.3422
Sample	All PUs	All PUs	All PUs	All PUs
Industry FE	Yes	Yes	Yes	Yes
Employee Characteristics	Yes	Yes	Yes	Yes
Employee FE	No	Yes	No	Yes
PU Controls	Yes	Yes	Yes	Yes
No.PUs	16495	16495	18874	18874

Standard errors in parentheses

* p 0.1, ** p 0.05, *** p 0.01

Table 6: Number of Days of Hospital Stay and Firm Performance: Table of Means

	PU-Years	Days Absent	Ind. Adj.Days Absent
All PU-years	89258	9.8353	0.0003
	.	(0.0359)	(0.0340)
Panel A. By length of hospital stay			
0 days	75392	9.7958	-0.0774
	.	(0.0388)	(0.0369)
1 day	6276	10.1158	0.4578
	.	(0.0895)	(0.0870)
2-4 days	4732	9.9727	0.3365
	.	(0.0939)	(0.0906)
5-9 days	1889	10.2141	0.6224
	.	(0.1428)	(0.1383)
10-19 days	623	9.8285	0.3403
	.	(0.2602)	(0.2507)
At least 20 days	346	9.4149	0.0429
	.	(0.3093)	(0.3004)
0-4 days, all PUs	86400	9.8288	-0.0159
	.	(0.0364)	(0.0346)
0-4 days, event PUs	42209	12.4701	0.8458
	.	(0.1610)	(0.148)
At least 5 days	2858	12.7637	0.8008
	.	(0.1826)	(0.1772)
Panel B. Differences of means			
1 vs. 0 days	81668	0.3200 ***	0.5352***
	.	(0.0922)	(0.0901)
At least 5 vs. 0-4 days	89258	0.2045*	0.5067***
	.	(0.1210)	(0.1168)
At least 5 vs. 0-4 days, event PUs	45067	0.0996	0.2590**
	.	(0.1208)	(0.1169)
Panel C. Median analysis			
1 vs. 0 days, median	81668	0.9167***	1.1333***
	.	(0.0959)	(0.0908)
At least 5 vs. 0-4 days, median	89259	0.8000***	1.0428***
	.	(0.1317)	(0.1317)
At least 5 vs. 0-4 days, median, event PUs	45068	0.3000***	0.4134***
	.	(0.1118)	(0.1113)

Standard errors in parentheses

* p 0.1, ** p 0.05, *** p 0.01

Table 7: The Impact of CEO Hospitalization Event on Employee Absenteeism, Mean Analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Absent days	Absent days	Absent days	Absent days	Absent days	Absent days	Absent days	Absent days	
N days at hospital, t	0.0215***	0.0116*	0.0106	0.0091	0.0212	0.0072	-0.0129	0.0086	
	(0.0059)	(0.0063)	(0.0082)	(0.0086)	(0.0152)	(0.0140)	(0.0095)	(0.0096)	
N days at hospital, t-1								0.0103	
								(0.0078)	
N days of hospital stay btw 1 and 4									0.0584
									(0.0984)
N days of hospital stay btw 5 and 9									0.0093
									(0.1742)
N days of hospital stay at or above 10									0.2957
									(0.2848)
Observations	89,235	89,235	89,235	89,235	56,784	17,377	7,262	71,529	89,235
Sector	Entire Public	Entire Public	Entire Public	Entire Public	Health	Education	Public Admin	Entire Public	Entire Public
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PU/CEO FE	None	PUs	CEO	PUs-CEO	PUs-CEO	PUs-CEO	PUs-CEO	PUs-CEO	PUs-CEO
PU Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No.firms	20038	20038	20038	20038	13260	3634	1948	17398	20038

Table 8: The Impact of CEO Hospitalization Event on Employee Absenteeism, Mean Analysis for two samples

Panel A. Below Median

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Absent days	Absent days	Absent days	Absent days	Absent days	Absent days	Absent days	Absent days	
N days at hospital, t	0.0384***	0.0147***	0.0143***	0.0138**	0.0103	0.0147*	0.0122*	0.0143**	
	(0.0050)	(0.0046)	(0.0053)	(0.0056)	(0.0129)	(0.0088)	(0.0067)	(0.0063)	
N days at hospital, t-1								0.0053	
								(0.0065)	
N days of hospital stay btw 1 and 4									0.0245
									(0.0566)
N days of hospital stay btw 5 and 9									0.0774
									(0.1205)
N days of hospital stay at or above 10									0.3511**
									(0.1733)
Observations	44,611	44,611	44,611	44,611	25,051	10,214	4,400	34,985	44,611
Sector	Entire Public	Entire Public	Entire Public	Entire Public	Health	Education	Public Admin	Entire Public	Entire Public
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PU/CEO FE	None	PUs	CEO	PUs-CEO	PUs-CEO	PUs-CEO	PUs-CEO	PUs-CEO	PUs-CEO
PU Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No.firms	16360	16360	16360	16360	10286	3122	1595	13672	16360

Panel B. Above Median

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Absent days	Absent days	Absent days	Absent days	Absent days	Absent days	Absent days	Absent days	
N days at hospital, t	-0.0861***	-0.0113	-0.0064	-0.0057	0.0034	-0.0137	-0.0171	-0.0110	
	(0.0107)	(0.0105)	(0.0138)	(0.0146)	(0.0206)	(0.0363)	(0.0219)	(0.0157)	
N days at hospital, t-1								-0.0105	
								(0.0123)	
N days of hospital stay btw 1 and 4									-0.1972
									(0.1543)
N days of hospital stay btw 5 and 9									-0.3096
									(0.2622)
N days of hospital stay at or above 10									0.2240
									(0.5053)
Observations	44,624	44,624	44,624	44,624	31,733	7,163	2,862	36,544	44,624
Sector	Entire Public	Entire Public	Entire Public	Entire Public	Health	Education	Public Admin	Entire Public	Entire Public
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PU/CEO FE	None	PUs	CEO	PUs-CEO	PUs-CEO	PUs-CEO	PUs-CEO	PUs-CEO	PUs-CEO
PU Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No.firms	15291	15291	15291	15291	10709	2510	1254	13455	15291

Table 9: The Effect of CEO Hospitalization Event on Employee Absenteeism, Median Analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Absent days	Absent days	Absent days	Absent days	Absent days	Absent days	Absent days	Absent days	Absent days
N days at hospital, t	0.0347***	0.0135***	0.0119***	0.0104**	0.0228**	0.0068	-0.0122	0.0093	
	(0.0059)	(0.0053)	(0.0034)	(0.0047)	(0.0113)	(0.0090)	(0.0084)	(0.0073)	
N days at hospital, t-1								0.0110**	
								(0.0051)	
N days of hospital stay btw 1 and 4									0.0770**
									(0.0348)
N days of hospital stay btw 5 and 9									0.0495
									(0.1164)
N days of hospital stay at or above 10									0.3207*
									(0.1801)
Constant									
Observations	89,235	89,235	89,235	89,235	56,784	17,377	7,262	71,529	89,235
Sector	Entire Public	Entire Public	Entire Public	Entire Public	Health	Education	Public Admin	Entire Public	Entire Public
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PU/CEO FE	None	PUs	CEO	PUs-CEO	PUs-CEO	PUs-CEO	PUs-CEO	PUs-CEO	PUs-CEO
PU Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No.firms	20038	20038	20038	20038	13260	3634	1948	17398	20038

Table 10: Absence Regressions, Univariate

	Absent days (1)	Absent days (2)
Leader Age	-0.0365***	-0.0343***
	(0.0119)	(0.00674)
Leader Female Share	3.282***	2.055***
	(0.182)	(0.122)
Leader Child Female Share	-0.00194	0.0530
	(0.0945)	(0.0663)
Leader Family Shock	-0.406***	-0.216***
	(0.0930)	(0.0698)
Leader Hospitalization	-0.0769	-0.0406
	(0.0607)	(0.0568)
Leader Antidepressant Use	0.760***	0.243**
	(0.125)	(0.0979)
Leader Opioid Use	0.0147	-0.0142
	(0.0584)	(0.0377)
Turnover	-0.00212	-0.00537
	(0.00511)	(0.00440)
Wage Inc	0.00000199	0.000000110
	(0.00000282)	(0.00000260)
Absence Policy (10d)	0.0537	0.0177
	(0.152)	(0.127)
Wage Dispersion (sd)	-3.868***	-3.971***
	(0.200)	(0.165)
Wage Diff Top/Bottom 10%	-1.967***	-2.054***
	(0.105)	(0.0740)
Bonus Hour	-0.112	-0.0265
	(0.140)	(0.116)
Bonus Rate	-14.31	4.113
	(37.91)	(31.21)
Production Unit Size	.00000350***	0.00000134**
	(0.000000729)	(0.000000562)
Hierarchy	-0.510***	-0.363***
	(0.0652)	(0.0416)
Year FE	Yes	Yes
Industry FE	No	Yes

Standard errors in parentheses

* p 0.1, ** p 0.05, *** p 0.01

Table 11: Absence Regressions, Multivariate

	Absent days (1)	Absent days (2)
Leader Age	-0.00447	-0.0134**
	(0.00767)	(0.00586)
Leader Female Share	2.526***	1.316***
	(0.166)	(0.126)
Leader Child Female Share	-0.122	-0.0464
	(0.0776)	(0.0600)
Leader Family Shock	0.0569	0.0241
	(0.0793)	(0.0617)
Leader Hospitalization	0.0622	0.0261
	(0.0746)	(0.0500)
Leader Antidepressant Use	0.458***	0.121
	(0.129)	(0.0965)
Leader Opioid Use	0.00696	-0.0153
	(0.0496)	(0.0360)
Turnover	-0.00672	-0.00556
	(0.00488)	(0.00472)
Wage Inc	0.00000159	0.000000948
	(0.00000290)	(0.00000280)
Absence Policy (10d)	0.169	0.221**
	(0.139)	(0.106)
Wage Dispersion (sd)	-1.345***	-1.183***
	(0.284)	(0.244)
Wage Diff Top/Bottom 10%	-0.718***	-1.017***
	(0.147)	(0.112)
Bonus Hour	-0.367*	-0.245
	(0.211)	(0.214)
Bonus Rate	36.89	31.98
	(55.79)	(60.55)
Production Unit Size	0.00000302***	0.00000195**
	(0.00000105)	(0.000000900)
Hierarchy	-0.331***	-0.312***
	(0.0413)	(0.0278)
Year FE	Yes	Yes
Industry FE	No	Yes

Standard errors in parentheses

* p 0.1, ** p 0.05, *** p 0.01

Table 12: Number of Movers Between Sectors

Hello, Description goes here!

Panel A: Movers Between Private and Public Sectors

		After	
		Private	Public
Before	Private	108640	6624
	Public	5458	154994

Panel B: Movers Between Major Industries in the Public Sector

		After			
		Public Admin	Education	Health	Others
Before	Public Admin	23560	387	927	2574
	Education	500	33550	2490	369
	Health	1198	3205	74079	1456
	Others	945	524	758	8472

Table 13: Decomposition of Employee Absence

Hello, Description goes here!

Panel A.1 Entire public Sector Base				
	Above/below Median	Top/bottom 25	Top/bottom 10	Top/bottom 5
	(1)	(2)	(3)	(4)
Difference in absence				
Overall	8.00	13.14	19.50	24.41
Production unit	4.12	7.04	11.13	14.73
Individual	3.87	6.10	8.36	9.68
Production unit share	0.52	0.54	0.57	0.60
	(0.01)	(0.01)	(0.01)	(0.01)
Individual share	0.48	0.46	0.43	0.40

Panel A.2 Entire public Sector with Person Control				
	Above/below Median	Top/bottom 25	Top/bottom 10	Top/bottom 5
	(1)	(2)	(3)	(4)
Difference in absence				
Overall	8.00	13.15	19.52	24.44
Production unit	3.99	6.80	10.73	14.30
Individual	4.01	6.34	8.79	10.14
Production unit share	0.50	0.52	0.55	0.59
	(0.01)	(0.01)	(0.01)	(0.01)
Individual share	0.50	0.48	0.45	0.41

Panel B.1 Health Sector Base				
	Above/below Median	Top/bottom 25	Top/bottom 10	Top/bottom 5
	(1)	(2)	(3)	(4)
Difference in absence				
Overall	8.81	14.52	21.49	26.54
Production unit	5.51	9.13	14.78	19.79
Individual	3.30	5.39	6.71	6.75
Production unit share	0.63	0.63	0.69	0.75
	(0.01)	(0.01)	(0.02)	(0.02)
Individual share	0.37	0.37	0.31	0.25

Panel B.2 Health Sector with Person Control				
	Above/below Median	Top/bottom 25	Top/bottom 10	Top/bottom 5
	(1)	(2)	(3)	(4)
Difference in absence				
Overall	8.82	14.54	21.51	26.55
Production unit	5.32	8.84	14.36	19.29
Individual	3.50	5.70	7.15	7.26
Production unit share	0.60	0.61	0.67	0.73
	(0.01)	(0.01)	(0.02)	(0.02)
Individual share	0.40	0.39	0.33	0.27

Table 13-Continued: Decomposition of Employee Absence

Hello, Description goes here!

Panel C.1 Education Sector Base	Above/below Median	Top/bottom 25	Top/bottom 10	Top/bottom 5
	(1)	(2)	(3)	(4)
Difference in absence				
Overall	8.05	13.14	19.48	25.52
Production unit	5.12	8.52	13.07	18.07
Individual	2.93	4.62	6.41	7.45
Production unit share	0.64	0.65	0.67	0.71
	(0.03)	(0.02)	(0.02)	(0.02)
Individual share	0.36	0.35	0.33	0.29

Panel C.2 Education Sector with Person Control	Above/below Median	Top/bottom 25	Top/bottom 10	Top/bottom 5
	(1)	(2)	(3)	(4)
Difference in absence				
Overall	8.05	13.15	19.50	25.55
Production unit	4.98	8.21	12.48	17.30
Individual	3.08	4.94	7.02	8.25
Production unit share	0.62	0.62	0.64	0.68
	(0.03)	(0.02)	(0.02)	(0.02)
Individual share	0.38	0.38	0.36	0.32

Panel D.1 Public Admin Sector Base	Above/below Median	Top/bottom 25	Top/bottom 10	Top/bottom 5
	(1)	(2)	(3)	(4)
Difference in absence				
Overall	9.20	15.22	23.63	33.37
Production unit	6.58	10.72	18.02	26.82
Individual	2.62	4.50	5.61	6.55
Production unit share	0.72	0.70	0.76	0.80
	(0.03)	(0.03)	(0.03)	(0.03)
Individual share	0.28	0.30	0.24	0.20

Panel D.2 Public Admin Sector with Person Control	Above/below Median	Top/bottom 25	Top/bottom 10	Top/bottom 5
	(1)	(2)	(3)	(4)
Difference in absence				
Overall	9.18	15.22	23.61	33.34
Production unit	6.41	10.48	17.70	26.33
Individual	2.77	4.74	5.91	7.01
Production unit share	0.70	0.69	0.75	0.79
	(0.03)	(0.03)	(0.03)	(0.03)
Individual share	0.30	0.31	0.25	0.21

IX. Figures

Figure 1: Hospitalization and Absence

Hello, Description goes here!

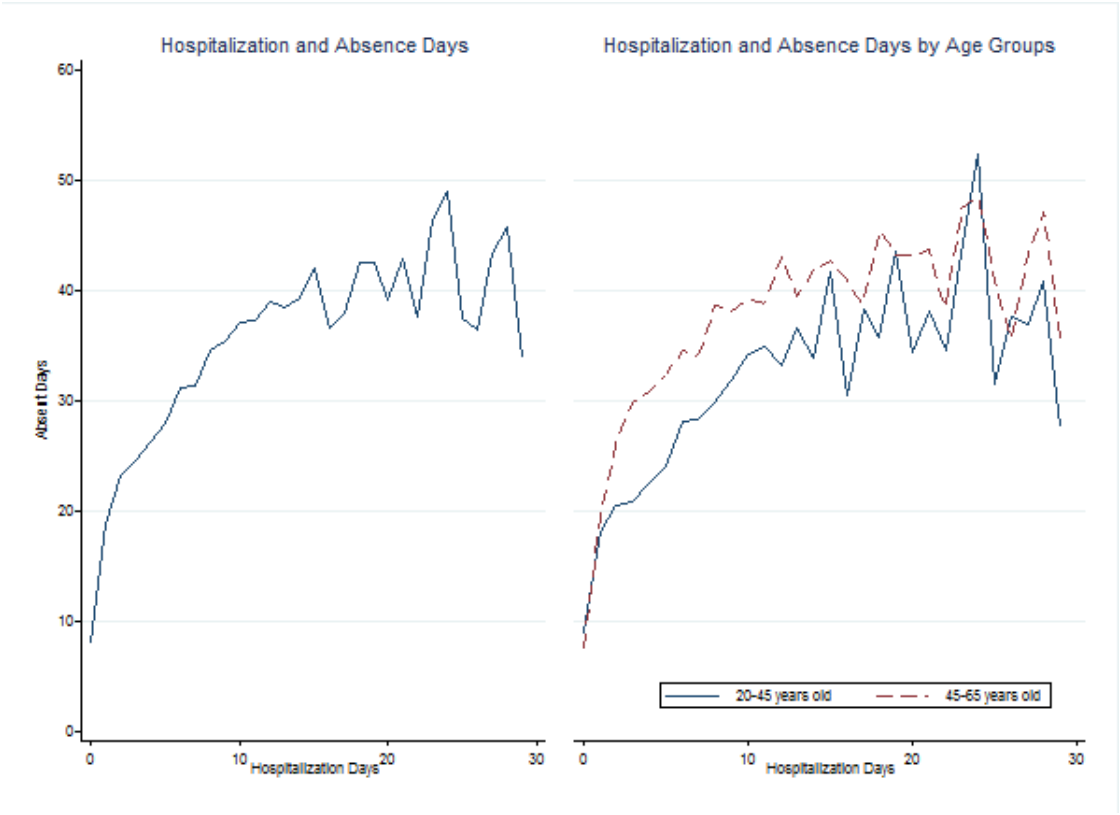
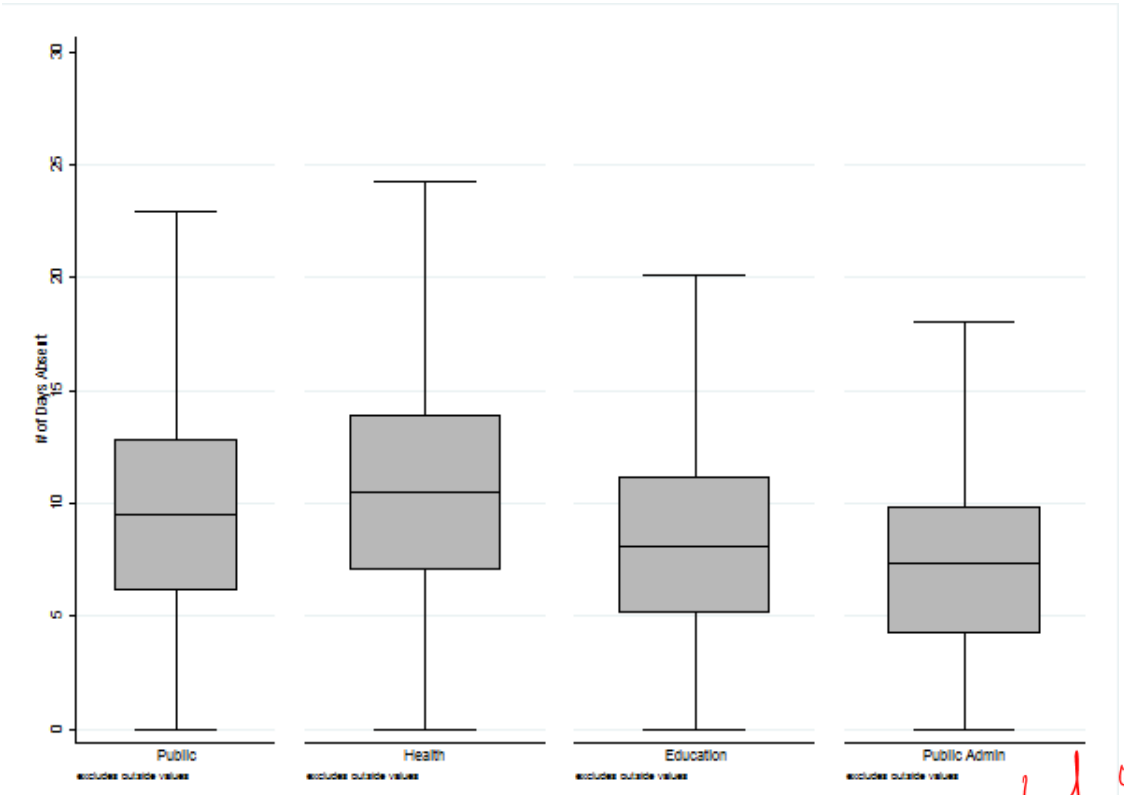


Figure 2: Average absence by category

Hello, Description goes here!



There is a lot of variation to explain!

Figure 3: CEO Hospitalization and employee absenteeism

Hello, Description goes here!

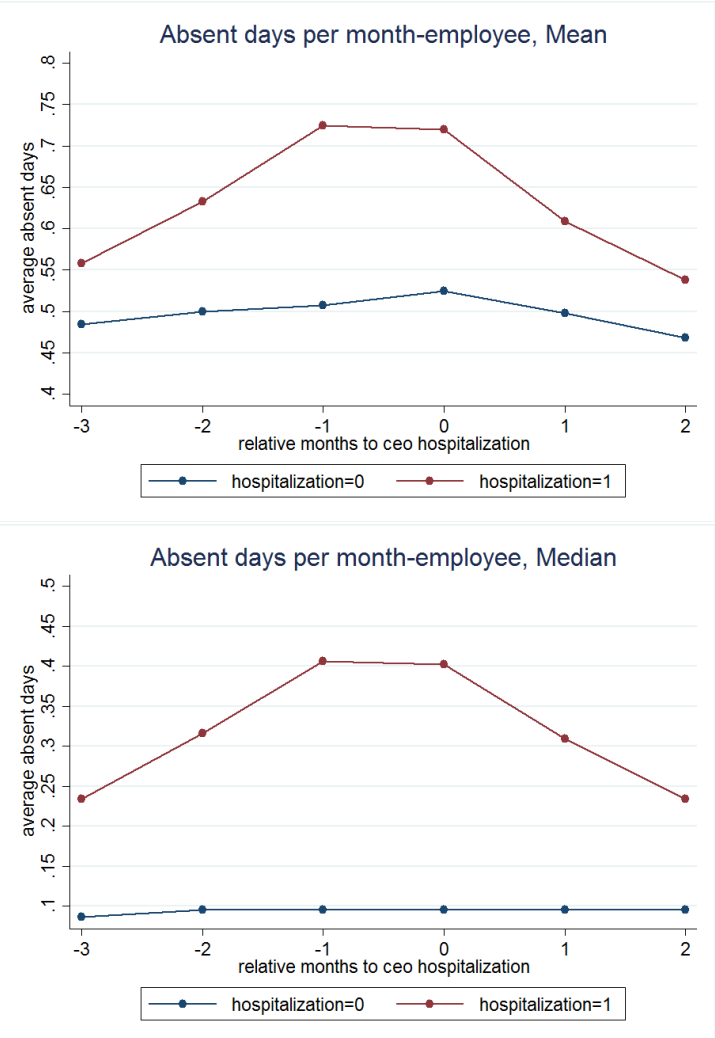


Figure 4: CEO Hospitalization and CEO absenteeism

Hello, Description goes here!

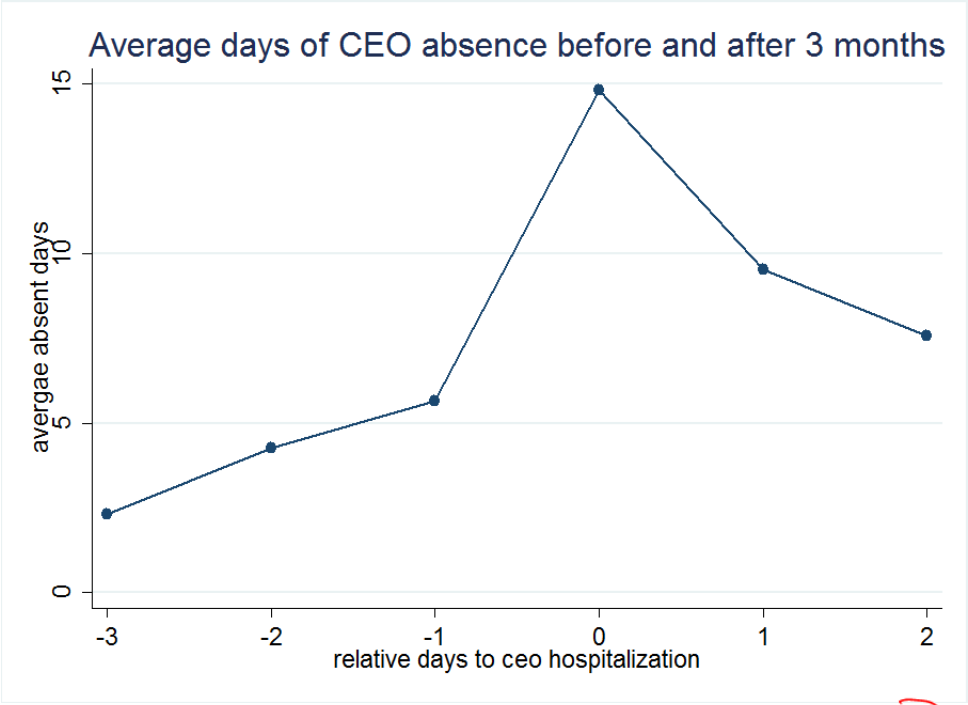


Figure 5: Firm Characteristics and Average Absence - Total Absence

Hello, Description goes here!

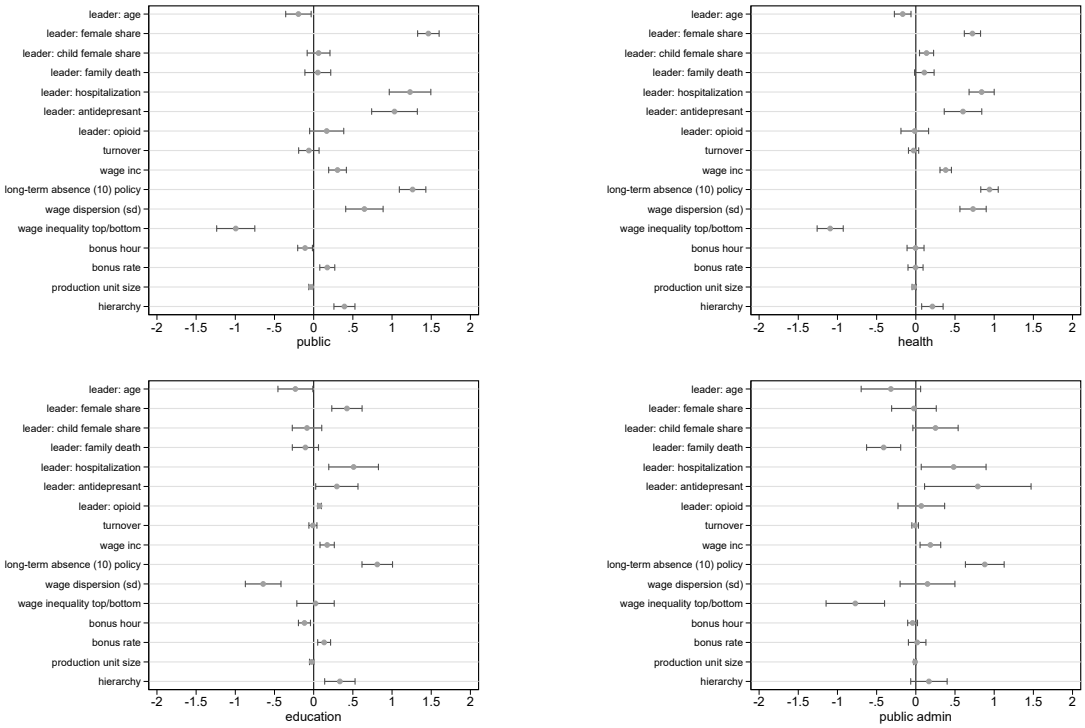


Figure 6: Change in Absent Days

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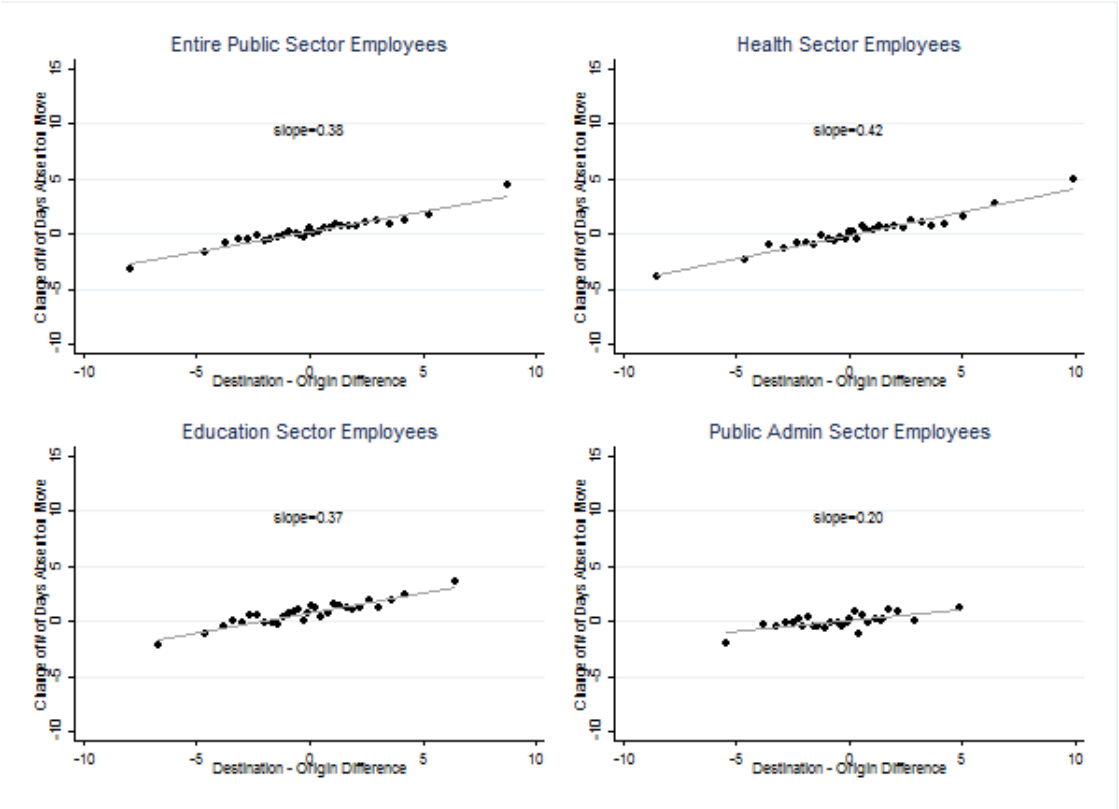

Figure 7: Distribution of difference in average days absent between destination firm and origin firm

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Figure 8: Event Study

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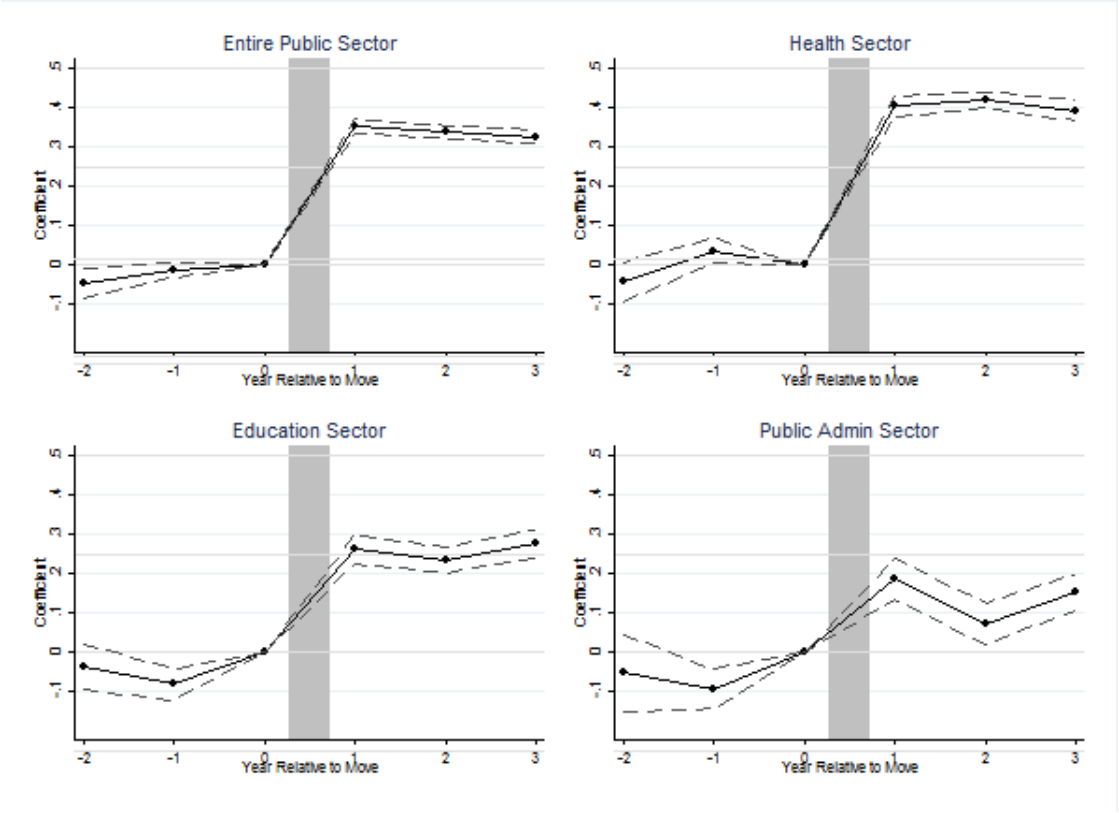

Figure 9: Firm Characteristics and Average Absence - Individual share

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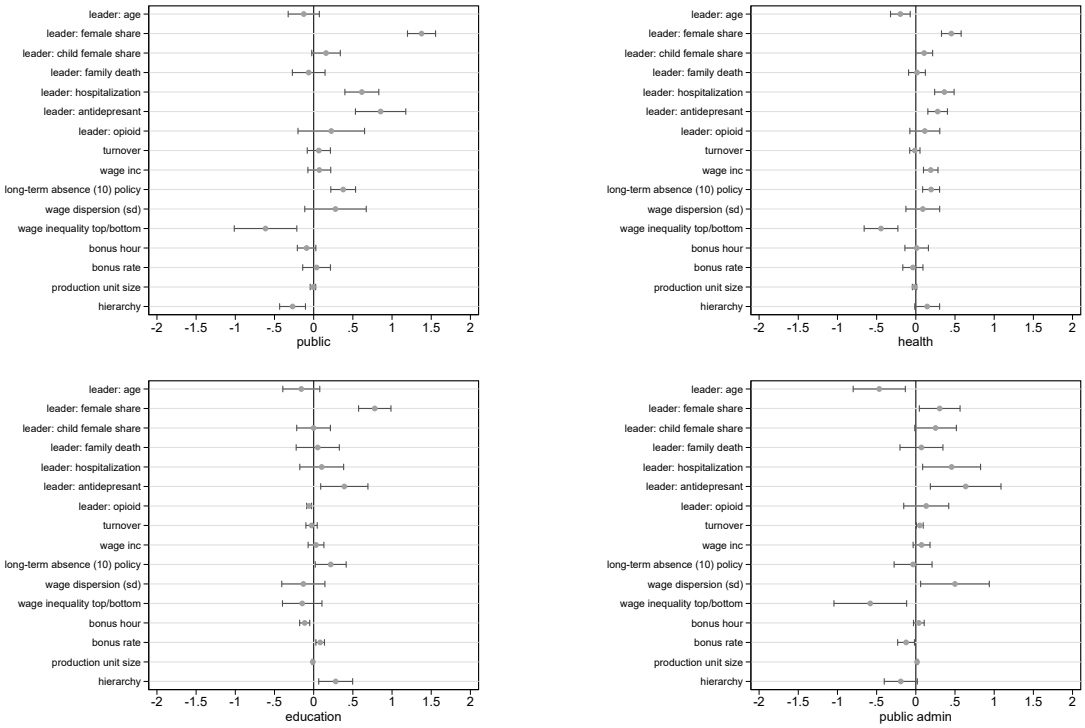

Figure 10: Firm Characteristics and Average Absence - Production Unit share

Hello, Description goes here!