

Drivers of Effort : Evidence from Employee Absenteeism

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Motivation

- Practices to encourage employee effort are widespread. Examples of policies:
 - Incentive pay
 - Tournaments
 - Profit sharing
 - Other human resource practices
 - TQM, benchmarking, employee participation in decision making
- These practices are widespread:
 - In the 1990s, 45% of salaried workers in the U.S. had some type of performance pay (Lemieux, McCleod, and Parent, 2009)
 - Black and Lynch (2001) find that other human resource practices are also very common among a representative sample of U.S. firms
- There is scant evidence comparing employee effort **across a representative sample of firms**
 - “The future of the field may be to move away from purely single firm studies to consider a larger number of firms...” (Bloom and Van Reenen, 2011)

This paper

1. Is there variation across firms in the average level of employee “effort”?
2. Is this variation driven by the type of employees who choose to work in each firm or by the incentives provided by the firm?
3. What firm characteristics gives rise to these incentives?
4. Do policies have heterogeneous effect effects on different group of employees? (senior managers vs workers)

This paper

- Measure of individual performance: Absenteeism
 - Pros:
 - Can be consistently computed for all employees in all occupations for a large number of firms in a developed economy
 - Because it is measured at the individual (and not firm) level, can identify firm effect by following movers
 - Cons:
 - It is only one dimension of effort (e.g. does not capture intensity of work when in the office)
 - Can be driven by factors not related to effort (e.g health)
 - Not productivity

Overview of Results

- Show large differences in average absenteeism across firms
 - The difference between firms in the top and bottom decile is 15 days.
 - This variation persists even within industry.
- Using movers we analyze the role played by two broad set of explanations for this difference:
 - *“Incentives” vs “Selection”*
 - *53% of the difference in average days absent is driven by “incentives”.*
 - Results are robust using only absences around national holidays and weekends
- What firm characteristics matter
 - Organizational structure (hierarchy) and family firm status matter for workers’ effort
 - More intense competition discourages managers’ effort

Literature

Two types of studies:

1. Single policy, single firm studies with individual level productivity

- Example: fixed wages to piece rates
 - Lazear (2000): Windshield installers in Safelite Glass Company
 - Bandiera et al. (2007): Managers in a U.K. fruit farm
 - Freeman and Kleiner (2005): Workers in a U.S. shoe manufacturer
 - Shearer (2004): Tree planters in British Columbia

2. Multiple firms and firm level productivity

- Some studies on the associations of policies and firm level productivity (endogeneity issues)
- RCT in developing countries
 - Karlan and Valdivia (2009), Bruhn et. al. (2010), Bloom et al. (2010)

Contribution to Literature

- Know little about the effectiveness of these tools in a representative firm in a developed economy
 - Ichino & Maggi (2000): shirking differentials in a large Italian bank. Since it is one firm they do not have variation in firm characteristics.
- “Selection” vs “incentives”
- Use of movers for identification
 - Movers affected by a different set of firm policies (origin vs destination)
 - As opposed to previous literature, does not require to find changes in firm policies
 - Easier to detect movers than firm policy changes
 - Sidesteps the issue of endogenous policy change - although now need to think about endogeneity of moves
 - Of course, the empirical methodology is not new
 - Neither are the checks for endogenous mobility

Data

Data Sources - Days Absent

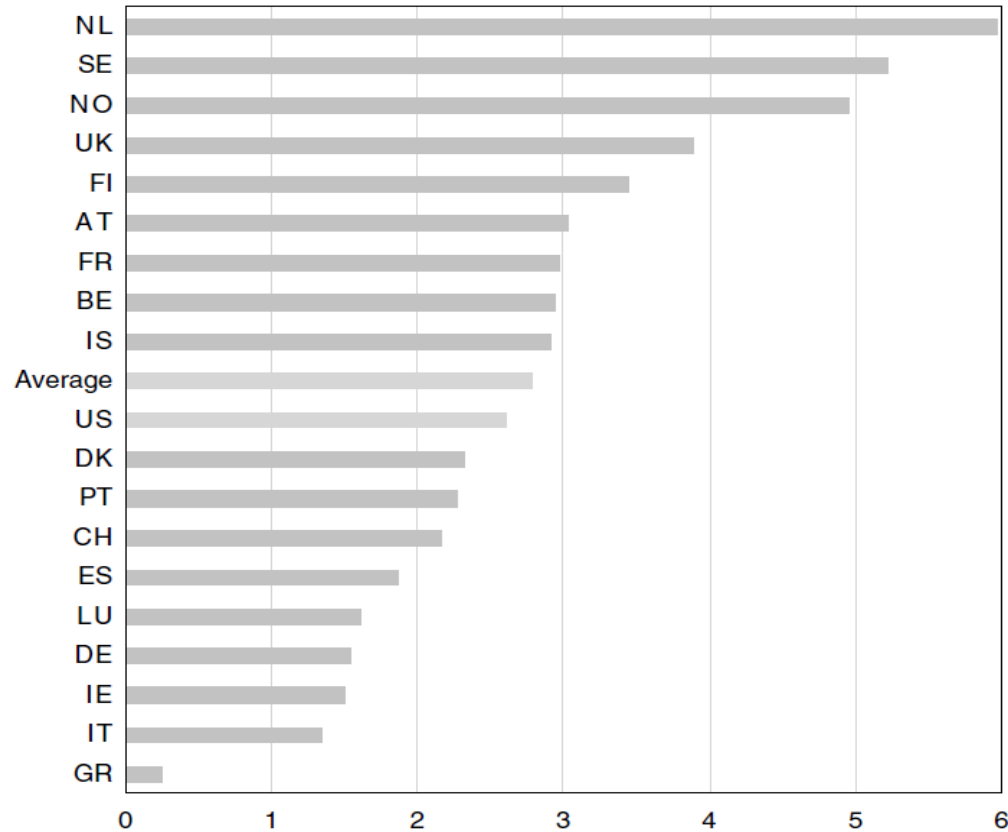
- Survey on Employee Absence by Statistics Denmark
 - Individual data on employee absences: (a) own sickness, (b) child sickness, (c) accident at the workplace.
 - For the private sector absence data are gathered by Statistics Denmark for a sample of 4,140 companies and approximately 665,000 unique employees
 - 60% of employment in the private sector
 - It includes: all firms with more than 250 employees and a sample of firms with 10-250 employees
 - Includes every spell of absence for each employee
 - We focus on full-time employees
 - Years: 2007-2013

Days Absent: Description and Institutional Details

- Employers have a strong incentive to report
 - Firm is required to pay sickness benefits for the first 30 days of sickness
 - Danish Government pays after this initial period
- Easy to report
 - Statistics Denmark developed software that links to firm's payroll system
- Measure of sick days -not vacation time
 - All employees have the right to 5 weeks (25 days) of holidays every year
 - Any adjustments are negotiated with the unions of specific industries and not at the firm level

Sickness Absence Average Across Countries

Figure 2. Average Sickness Absence, 1995–2003
(As a percentage of employment)



Source: Eurostat, *New Cronos Database*.

- Denmark is similar to US
- Just below the 2.8% average

Other Data Sources

- ***Matched employee-employer data (IDA)***
 - Employer ID, employee's position in firm and wage
 - Employee Demographics: Age, gender, education
- ***Hospitalization data from National Patient Registry***
 - Number of days every person spends at the hospital
- ***Financial and management data are from Experian***
 - Audited financial statements
 - Name of all managers and CEOs

Absent days: does it matter for firm/employees?

- It might:
 - Reduces labor supply which is an input of production

- But it might not:
 - Employee might work from home instead
 - Employee might compensate by working more other days

- Direct evidence:
 - Promotions & separations are affected by absences
 - Preliminary evidence on firm performance

- There is additional evidence that absences matter in other settings (education)

Does it matter for employees?

	Promotion		Separation	
	(1)	(2)	(3)	(4)
Days Absent _{t-1}	-0.0003*** (0.0001)	-0.0002*** (0.0001)	0.0005*** (0.0001)	0.0004*** (0.0001)
Observations	925,894	925,894	943,210	943,210
R-squared	0.0597	0.3921	0.0180	0.6925
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Employee Characteristics	Yes	Yes	Yes	Yes
Employee FE	No	Yes	No	Yes
Firm Controls	Yes	Yes	Yes	Yes

- *One additional absence day decreases prob. of promotion by 0.03% (annual prob. of promotion is 6%).*
- *One additional absence day increases prob. of separation by 0.05% (annual prob. of separation is 8%).*

Absent days: does it matter for the firm?

Dependent Variable: Performance	Less than 100 Employees	More than 100 Employees	More than 300 Employees
	(1)	(2)	(3)
Days Absent_{t-1}	0.0000	-0.0008**	-0.0011*
	(0.0007)	(0.0004)	(0.0006)
Firm Age	-0.0079*** (0.0030)	-0.0079*** (0.0015)	-0.0065*** (0.0020)
Firm Assets	0.0004 (0.0029)	-0.0000 (0.0000)	-0.0000 (0.0000)
Constant	0.3120*** (0.0935)	0.3740*** (0.0586)	0.3228*** (0.0815)
Observations	3,499	4,078	1,932
R-squared	0.8058	0.7127	0.7035
Year FE	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
No.firms	1,652	1,236	550

Variation in firm level absenteeism

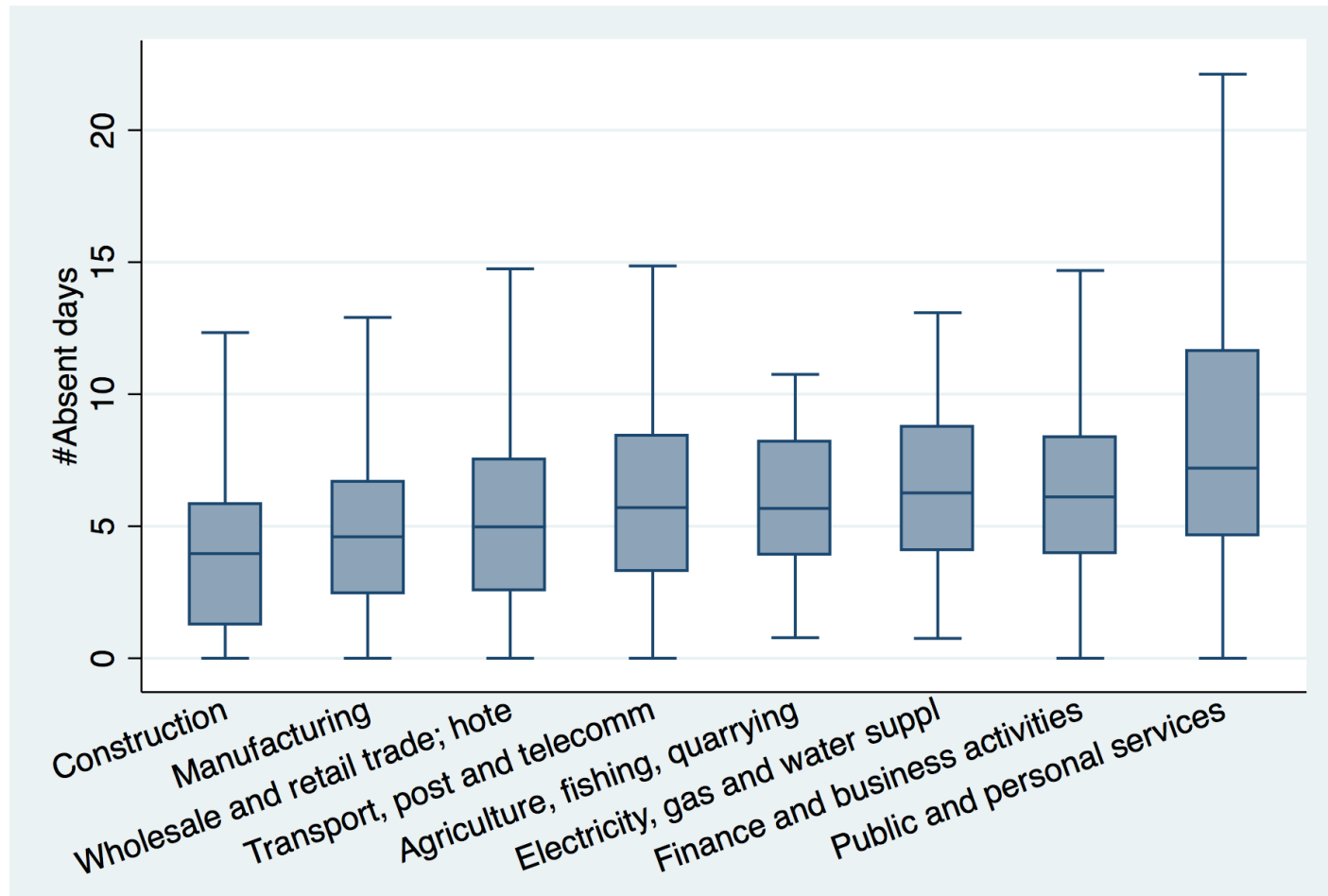
Our measure at
the firm level:

$$\bar{y}_j = \sum_t \frac{1}{N_{jt}} \sum_{i:J(i,t)=j} y_{it}$$

- There are large differences in days absent across firms

	Above/below Median (1)	Top/bottom 25% (2)	Top/bottom 10% (3)	Top/bottom 5% (4)
<u>Difference in days absent:</u>	6.288	10.353	15.656	20.046

Variation in firm level absenteeism



Table

Results

Decomposition into individual and firm components

- Model for employee days absent

$$y_{it} = \alpha_i + \beta x_{it} + \gamma_{J(i,t)} + \mu_t + e_{it}$$

- $\alpha_i + \beta x_{it}$ is the portable component of employee behavior
 - α_i captures time-invariant characteristics motivation, discipline, sense of responsibility ...
 - βx_{it} captures effect of no. children, health status, wage etc
- $\gamma_{J(i,t)}$ captures the effect of the firm on all its employees
 - These firm fixed effect are the main focus of the paper
 - At a later stage we will try to “explain” these γ 's as a function of firm characteristics
- Need [movers](#) to separately identify firm and firm fixed effects
- Aggregating results at the firm level...

Decomposition of Absence Gap

	Above/below Median	Top/bottom 25%	Top/bottom 10%	Top/bottom 5%
	(1)	(2)	(3)	(4)
<u>Difference in days absent:</u>				
Overall	6.288	10.353	15.656	20.046
Due to “incentives”	3.361	5.958	9.416	12.979
Due to “selection”	2.926	4.395	6.240	7.067
Share of difference Due to “incentives”	0.534	0.575	0.601	0.648
	(0.058)	(0.051)	(0.079)	(0.097)
Due to “selection”	0.466	0.424	0.398	0.352

Alternative Tests

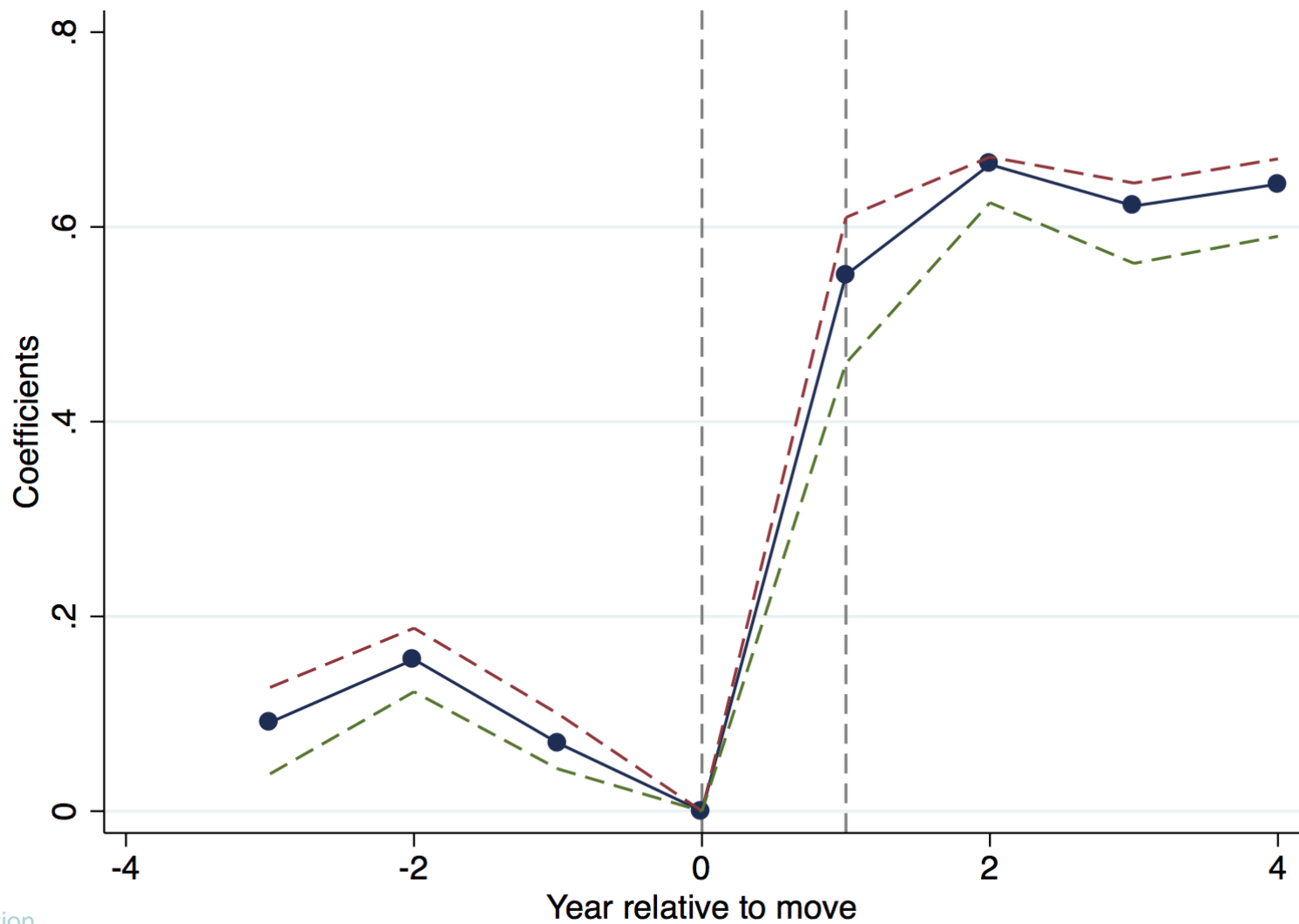
- Isolate absences more likely to be “discretionary” :
 - Obtain similar results when use absence spells that started on *Monday, Friday and around a holiday*
 - *And we were already controlling for health, age, number of kids*

Exogenous mobility

- Unobserved time-varying component of employee behavior that determines move
 - Example:
 - Change in motivation - become lazy
 - Concern:
 - People with decrease in motivation move to firms with high absenteeism
 - Estimation overstates firm fixed effects

- Match-component of employee behavior
 - Example:
 - Specific firm-employee "fit"
 - Concern:
 - Employees move to firm where fit is best

Event Study of Movers



Specification

So far ...

- Large variation in days absent
- Our results show that 53-64% of the variation across firms in can be attributed to workplace environment
- What firm characteristics correlate (explain) with these firm effects?

Explaining the firm fixed effects

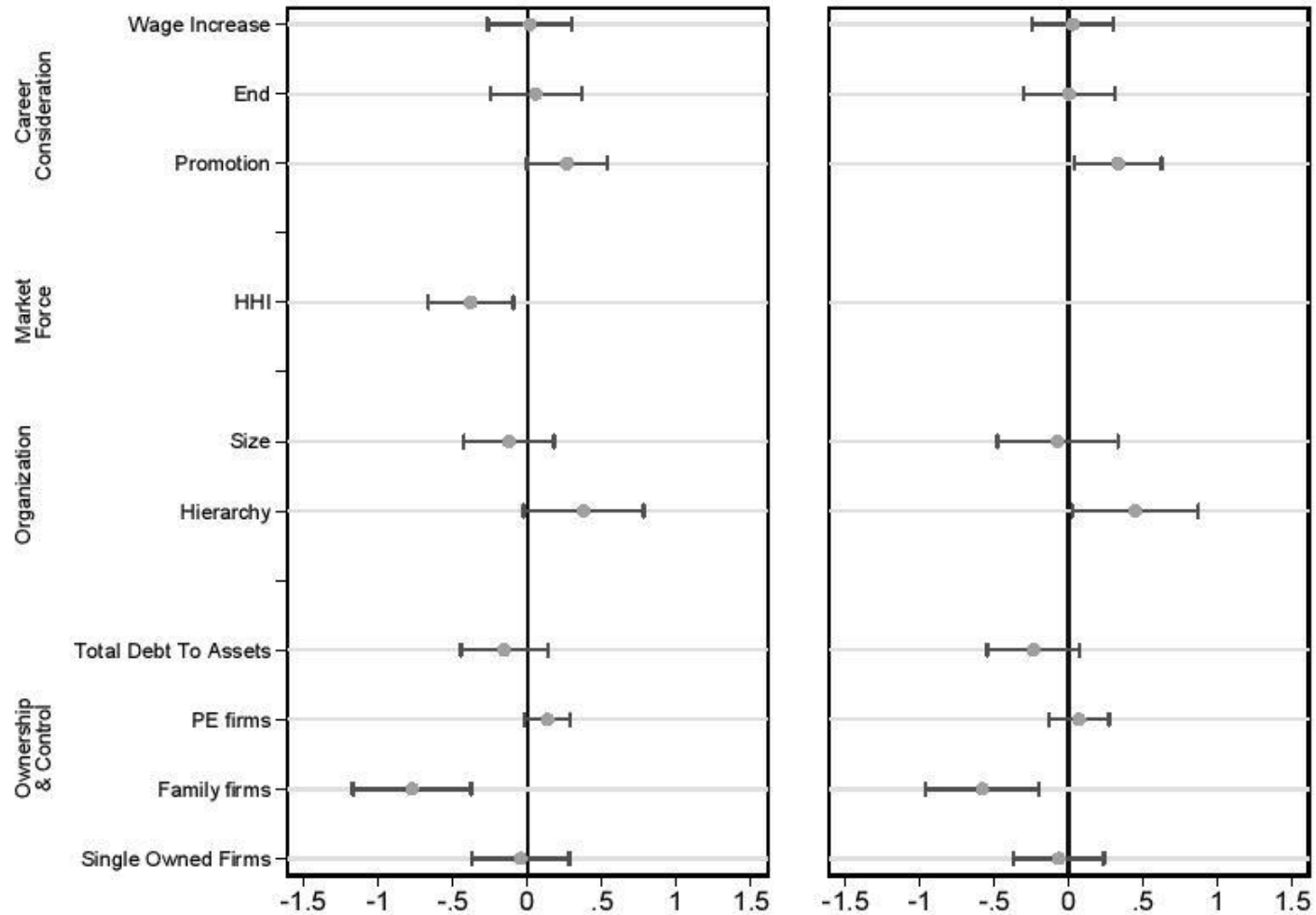
- We run the following cross-sectional regression

$$\gamma_j = \delta z_j + \varepsilon_j$$

where z are firm characteristics

- Note results are not driven by employee selection but **we do not have exogenous variation in z**
- We standardize the covariates to have mean of zero and sd of 1

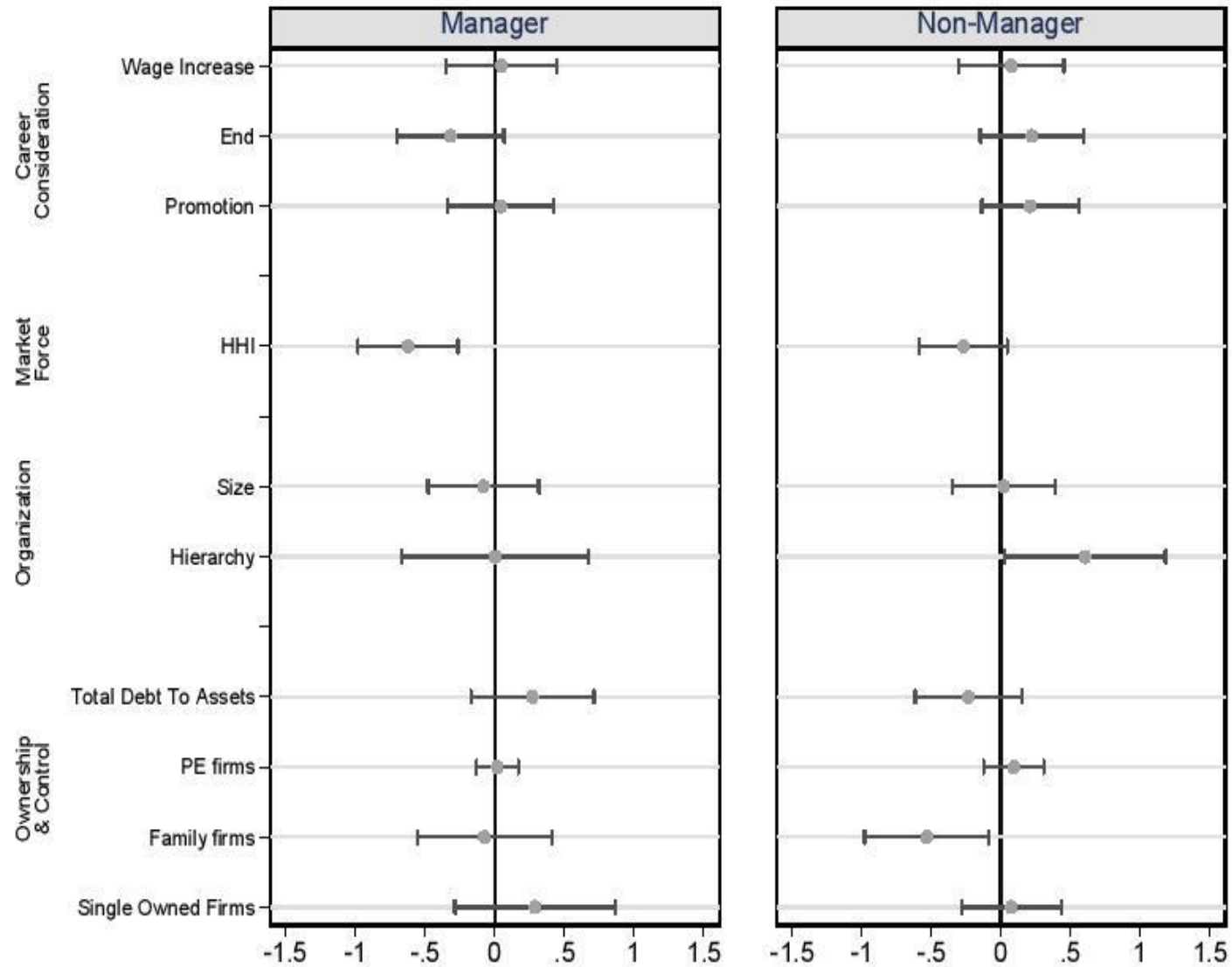
Observable correlates of fixed effects



Firm fixed effects for different types of employees

- We classify employees into 2 groups: managers and workers
- We estimate the model separately on these two groups

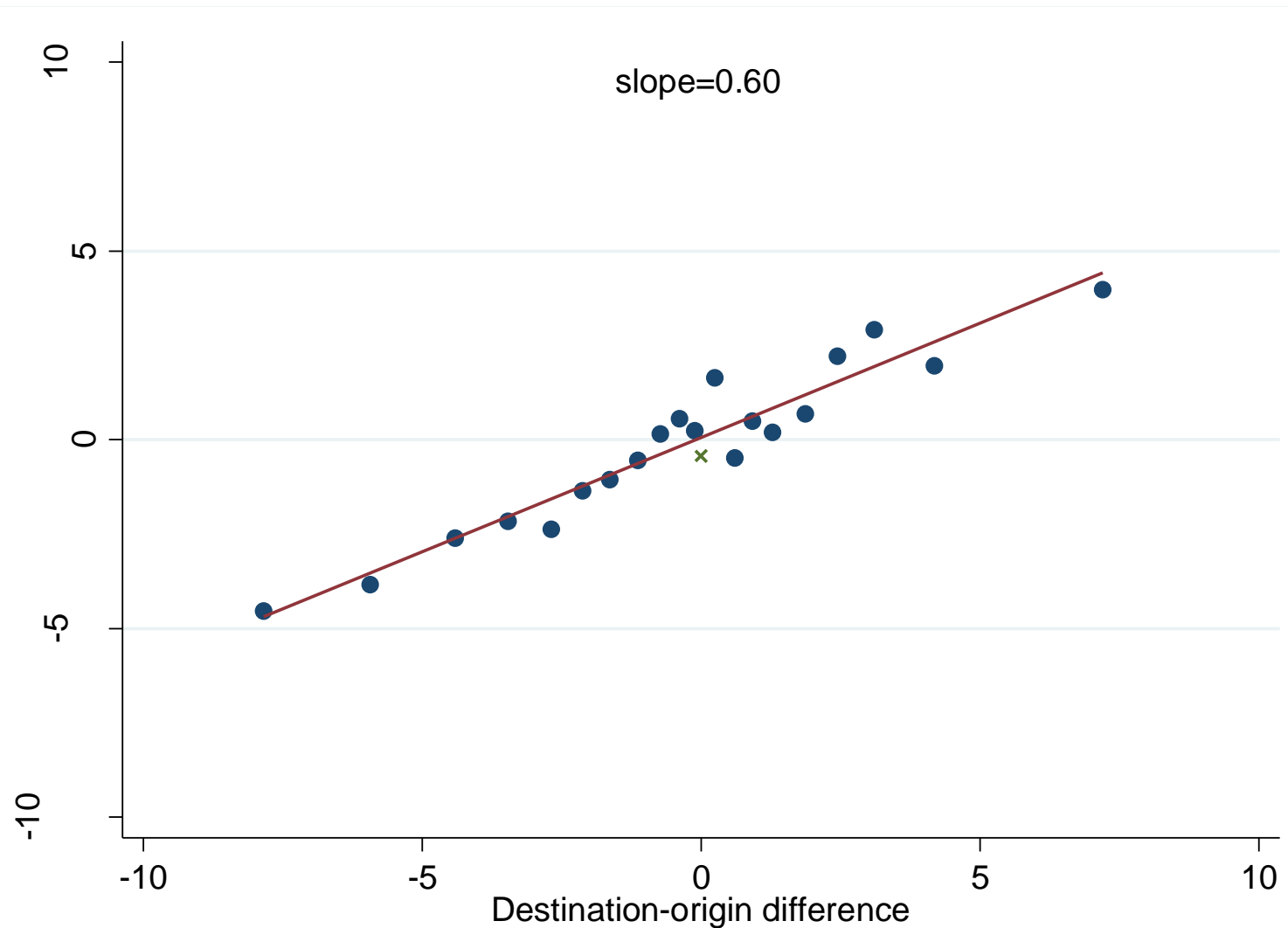
Managers/ Non-Managers



Conclusion

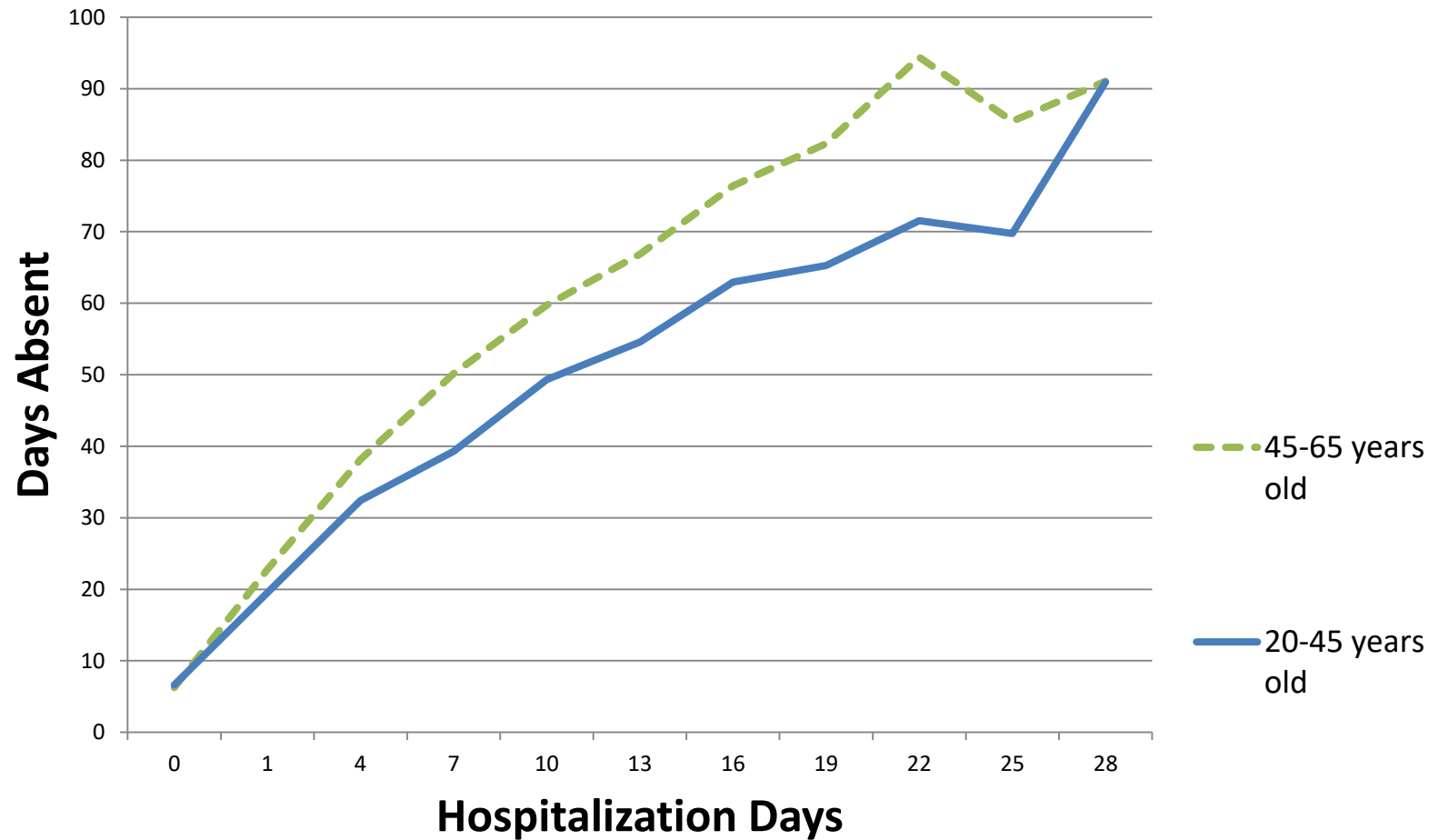
- We use employee level absenteeism to proxy for employee effort
- We find large differences across firms in absenteeism
- We find that 53-63% of the variation in firm average days absent across firms is due to "incentives"
- We find the firm effect to be correlated with
 - Hierarchy- non-managers
 - Family firm status/ownership concentration, specially for non-managers
 - Competition, specially for managers

Change in Days Absent by Size of Move

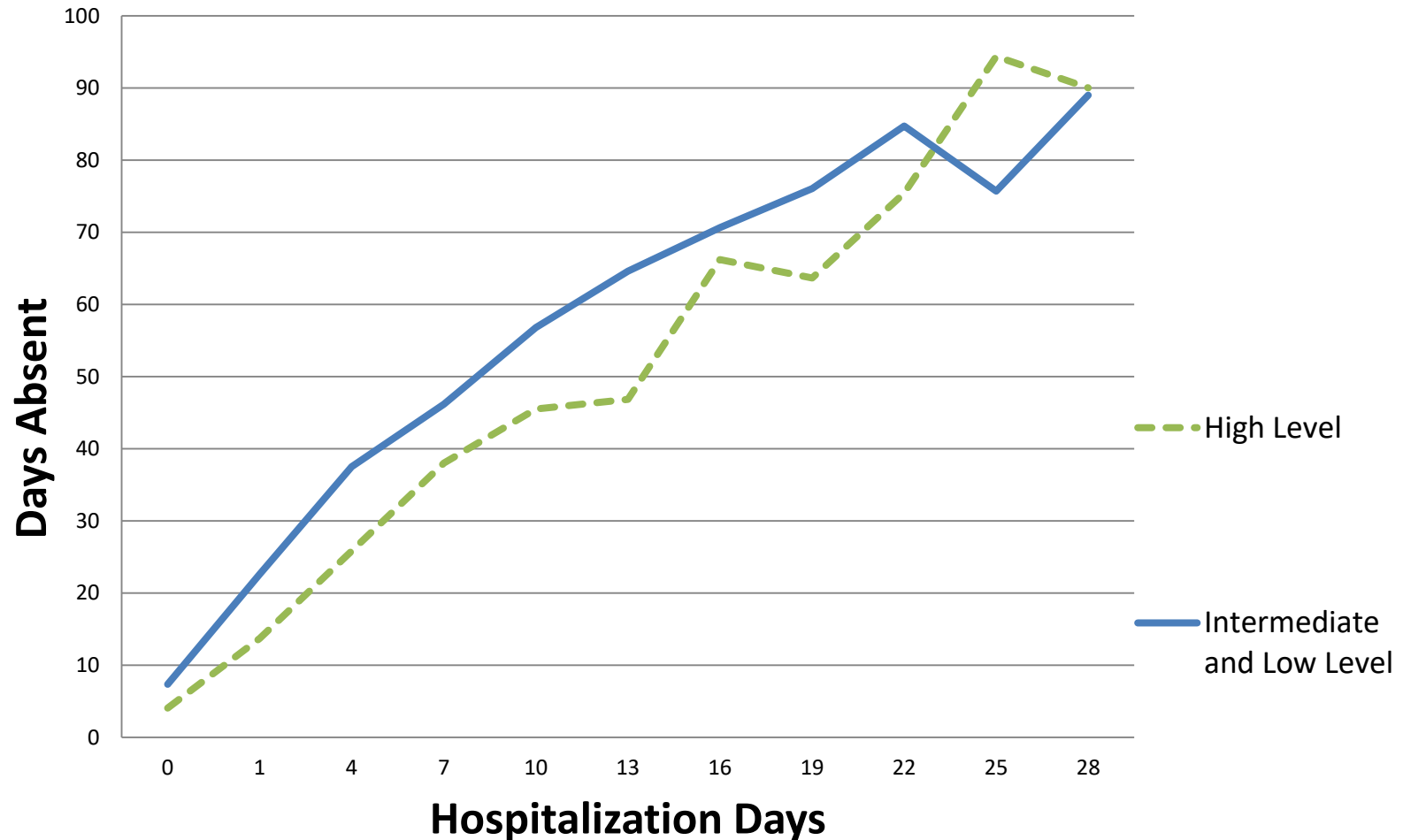


Difference in absence between destination and origin firm

Days absent: does it contain information?



Absent days: is it discretionary?



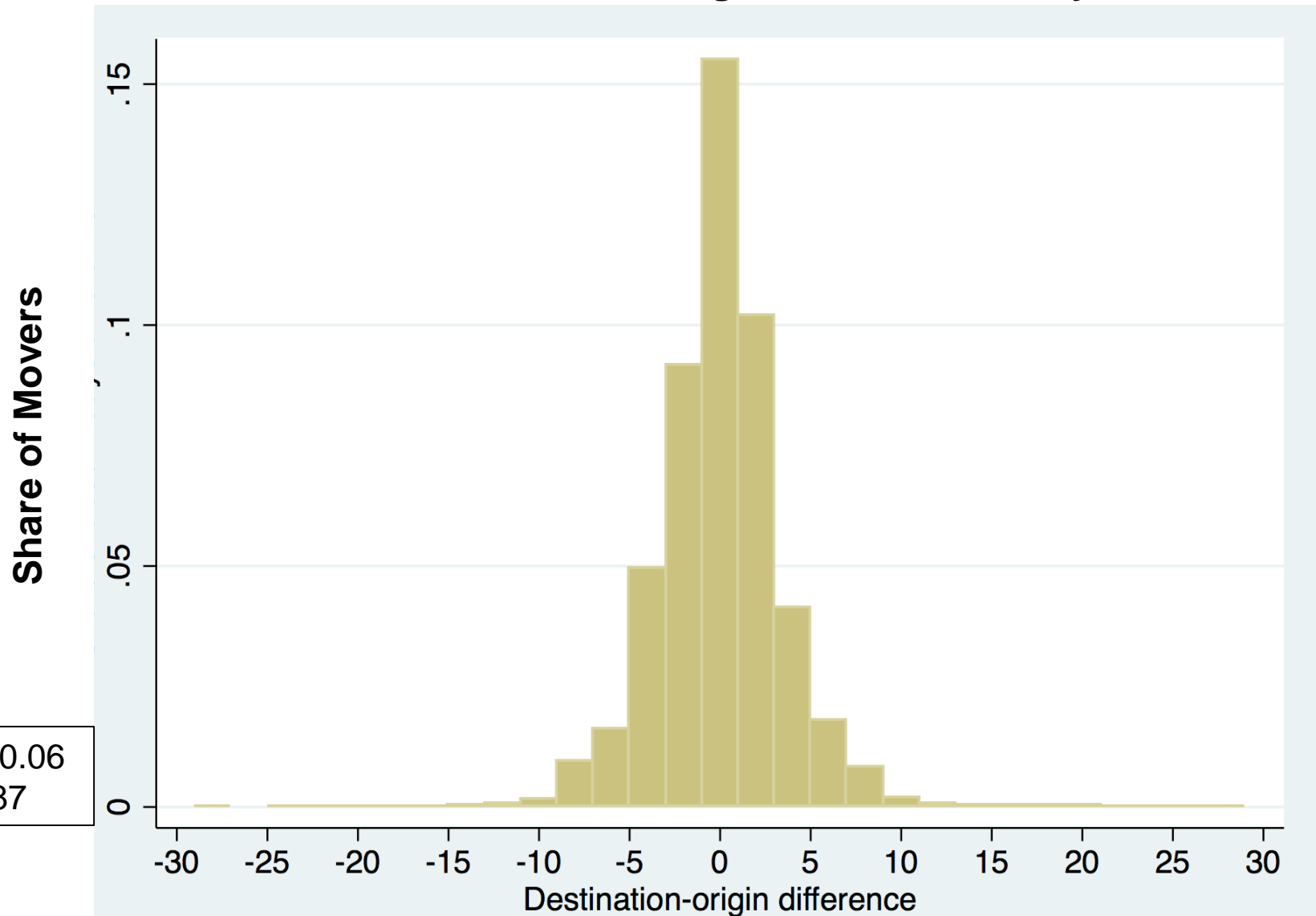
We will also use absent spells that start on Monday or Friday and spells that start around 2 days of a national holiday

Days absent: does it matter for the firm?

Dependent Variable: Performance (OROA)	Less than 100 Employees	More than 100 Employees	More than 300 Employees
	(1)	(2)	(3)
Days Absent	0.0000 (0.0007)	-0.0008** (0.0004)	-0.0011* (0.0006)
Firm Age	-0.0079*** (0.0030)	-0.0079*** (0.0015)	-0.0065*** (0.0020)
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Constant	0.3120*** (0.0935)	0.3740*** (0.0586)	0.3228*** (0.0815)
Observations	3,499	4,078	1,932
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Year FE	Yes	Yes	Yes
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Movers

Distribution of Destination-Origin Difference in Days Absent



Event study

- If we focus only on movers that move only once from origin firm $o(i)$ to destination firm $d(i)$, we can re-write

$$y_{it} = \alpha_i + \beta x_{it} + \gamma_{J(i,t)} + \mu_t + e_{it}$$

as

$$y_{it} = \alpha_i + \beta x_{it} + \gamma_{o(i)} + \mathbb{I}(t > T_i) \underbrace{\frac{\gamma_{d(i)} - \gamma_{o(i)}}{\bar{y}_{d(i)} - \bar{y}_{o(i)}}}_{S_{\text{"incentives"}}} (\bar{y}_{d(i)} - \bar{y}_{o(i)}) + \mu_t + e_{it}$$

We estimate

$$y_{it} = \tilde{\alpha}_i + \beta x_{it} + \theta \mathbb{I}(t > T_i) (\bar{y}_{d(i)} - \bar{y}_{o(i)}) + \mu_t + e_{it}$$

Variation in firm level absenteeism

- The differences are there even if we look within industries

Above/below Median (1)	Top/bottom 25% (2)	Top/bottom 10% (3)	Top/bottom 5% (4)
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Difference in absence:

Manufacturing	5.453	8.894	13.455	17.729
Construction	6.206	10.03	15.225	20.277
Retail, Hotels & Restaurants	6.280	10.089	14.689	18.391
Transportation & Telecommunication	6.473	10.749	16.751	23.007
Finance and Insurance	6.734	11.260	18.514	26.554
Education and Healthcare	10.701	18.099	29.638	41.286

Boxplot

Summary Statistics Firms

	All	All -sample firms	Diff Sample vs All
OROA	0.0757 (0.0007) [257,397]	0.0599 (0.0025) [7,678]	-0.0267*** (0.0026) [257,397]
Net Income/assets	0.0433 (0.0005) [257,392]	0.0349 (0.0022) [7,673]	-0.0087*** (0.0023) [257,392]
Assets	51.8463 (0.8400) [257,432]	364.1203 (9.7585) [7,713]	321.9191*** (9.7870) [257,432]
Ln(Assets)	2.8465 (0.0082) [257,431]	4.9601 (0.0340) [7,712]	2.1789*** (0.0349) [257,431]
No. of employees	38.5082 (0.3553) [257,636]	179.0560 (3.5823) [7,917]	145.0036*** (3.5965) [257,636]
Firm age	22.9027 (0.1416) [256,356]	35.0215 (0.5679) [7,867]	12.5025*** (0.5860) [256,356]

- *Sample firms are larger and older than average firm in Denmark*

Summary Statistics Employees

	All	All -sample firms	Diff Sample vs All
Employee wage	306,750 (3143.6150)	425,184 (8458.332)	147,087*** (8864.1990)
Employee age	38.5200 (.1747)	41.1428 (.2802)	3.2780*** (.3381)
Male	0.6625 (.0041)	0.6207 (.0089)	-0.0523*** (.0100)
Hospitalization Days	0.2512 (.0017)	0.2095 (.0038)	-.0520*** (.0042)
Sickness Absence		7.6321 (.3042)	
No. of Children	1.3843 (.0093)	1.2647 (.0170)	-.1488*** (.0200)

Summary Statistics Movers vs Non Movers

	Non-Mover	Mover
	Mean	Mean
Female	0.4025	0.3705
Bachelor degree	0.3209	0.3647
No. of Children	1.27	1.22
<i>Age</i>		
≤30	0.1879	0.1954
30 - 40	0.2682	0.3133
40 - 50	0.2937	0.2993
50 - 60	0.203	0.1669
Age	41.81	40.48
Absent Days	7.92	7.06
Hospital Event	0.0551	0.0512