

Mandated Sick Pay: Coverage, Utilization and Welfare Effects

NBER Workshop

Labor Demand and Older Workers

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- *Employer mandates:*
By law, employers have to provide fringe benefits x or y.
- Labor market effects of employer mandates *Gruber 1994, AER?*
 - Using QCEW and SCGM, Picher and Ziebarth (2018, JHR) find no evidence that wages or employment decreased.

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- Presenteeism (“working sick”) important channel for spread of diseases.
- Health effects of the introduction of sick pay in the US:
 - Pichler and Ziebarth (2017, JPubE) find reduction in Google flu rate.
 - Similar results with doctor certified flu data (submitted).

Research Objectives

- Exploit variation in implementation of sick pay mandates across US regions over time.
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- Analyze mechanism and welfare effects using sufficient statistics.

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 - Increase in coverage rates by 13ppt from baseline of 66%.
 - Increase in paid sick hours taken.
 - Increase in sick leave costs per hour.
 - Not much evidence for substitution effects.
- We find that the introduction of sick pay in the US is welfare improving (under some assumptions).

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- Due to imprecise location information we drop job-establishments in counties with treated cities.
(10,000 observations)

Overview of Sick Pay Mandates (only mandates used for identification listed)

Region	Law Passed	Law Effective	Content
Washington, DC	May 13, 2008	Nov 13, 2008	1 hour of paid sick leave for every 43 hours, 90 days accrual period; up to 3 to 9 days depend. on firm size; own sickness or family; no health care or restaurant workers
Connecticut	Dec 18, 2013	Feb 22, 2014	extension to 20,000 temporary workers and tipped employees
	July 1, 2011	Jan 1, 2012	full-time service sector employees in firms > 49 employees (20% of workforce); 1 hour for every 40 hours; up to 5 days; own sickness or family member, 680 hrs accrual period
California	September 19, 2014	July 1, 2015	all employees; 1 hour per 30 hours; 90 days accrual minimum 24 hours; own sickness or family member
Massachusetts	Nov 4, 2014	July 1, 2015	firms > 10 employees; 1 hour per 40 hours; 90 days accrual up to 40 hours; own sickness or family member
Oregon	June 22, 2015	Jan 1, 2016	firms > 9 employees; 1 hour of paid sick leave for every 30 hours; 90 days accrual up to 40 hours; own sickness or family member
Vermont	March 9, 2016	Jan 1, 2017	employees w/ 18 hours/week & > 20 weeks/year in firms > 5 employees; 1 hour every 52 hours; up to 24 hours in 2017, 40 hours thereafter; own sickness or family member; underage employees and firms in first year exempt; some state employees & per diem employees in health care or long-term care facility exempt

Source: several sources, own collection, own illustration.

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 - 90 days initial accrual period.
 - Can accrue up to 7 days per year.
 - Unused days carry over.
 - Right to take unpaid sick leave.

Descriptives: Data at the occupation-establishment level (NCS 2009-2017)

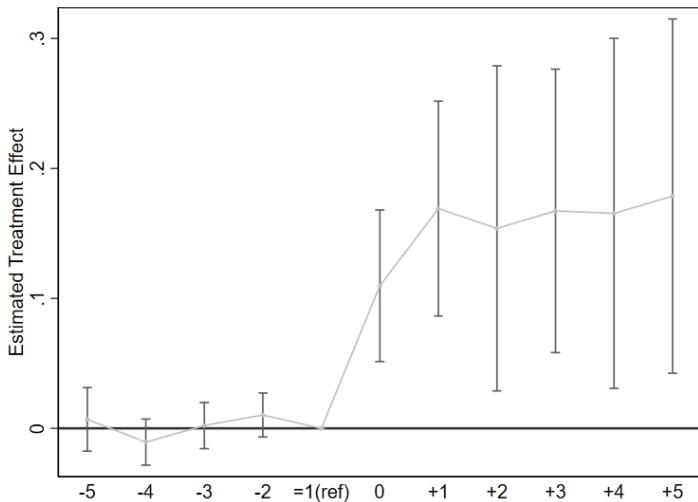
	Mean	Std. Dev.
Outcomes		
Sick leave offered (binary)	0.632	0.482
Paid sick hours taken (hours per year)	15.84	18.72
Unpaid sick hours taken (hours per year)	0.647	4.595
Sick leave costs total (in 2017 \$)	448.5	792.5
Sick leave cost per hour worked (in 2017 \$)	0.251	0.479
Other benefits & characteristics		
Full time employment (binary)	0.739	0.439
Part time employment (binary)	0.261	0.439
Unionized (binary)	0.0861	0.281
Hourly wage (in 2017 \$)	21.69	18.42
Hourly non-production bonus (in 2017 \$)	0.656	5.619
Hourly vacation cost (in 2017 \$)	1.123	1.648
Hourly health insurance cost (in 2017 \$)	2.403	2.427
Annual hours worked	1700.2	468.9
Annual hours paid leave	137.8	101.9
Annual hours paid	1838.1	527.5
Paid vacation days per year	69.58	57.57
Paid national holiday hours per year	44.11	32.91
Paid overtime hours per year	57.2	106.2
Other paid hours per year	7.122	12.53
Medical insurance offered (binary)	0.697	0.709
Life insurance offered (binary)	0.571	0.533
Paid vacation offered (binary)	0.766	0.756
Establishment size	611.7	2,126.90
Observations	399,586	

Empirical Model: Difference-in-Differences

$$y_{ijt} = \phi TreatedEstab_i \times LawEffective_t + \delta_t + \gamma_{ij} + \mu_{ijt} \quad (1)$$

- y_{ijt} : paid sick leave coverage/utilization/other benefits in establishment i and job j in year t .
- $TreatedEstab_i \times LawEffective_t = 1$ for establishments and years with mandate.
- γ_{ij} : establishment-job fixed effects.
- δ_t : year fixed effects.
- μ_{it} : routinely clustered at the state level.
- 6 treatments at different times.

Event Study: Effect on Coverage

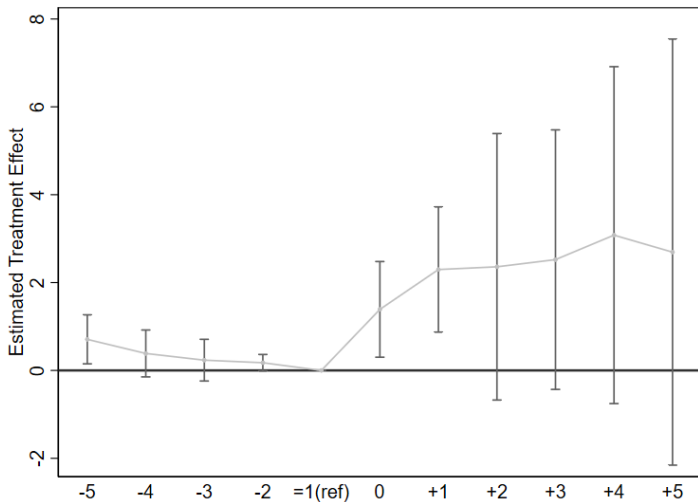


Effect of Mandates on Coverage Rates

Outcome	Sick leave offered (1)
<i>Pretreatment mean:</i>	0.659
Sick leave mandate ($D_C \times T_t$)	0.128*** (0.038)
Year FE	X
Establishment-job FE	X
State Time Trends	X

Source: NCS 2009-2017 NCS, own calculation and illustration. Yearly data at the firm-occupation level. ***, **, and * = statistically different from zero at the 1%, 5%, and 10% level. All models are weighted using NCS weights. Employee Controls: Union, Part Time. Standard errors clustered at the state level and reported in parentheses. All models have 399,586 establishment-job observations.

Event Study: Effect on Paid sick hours taken

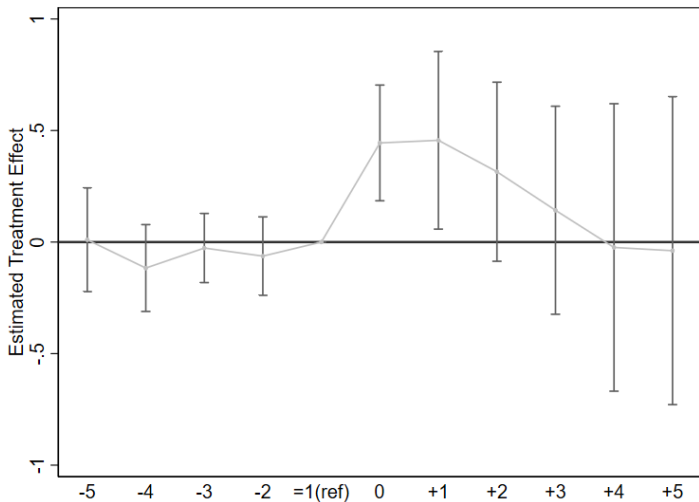


Effect of Mandates on Coverage Rates and Utilization

Outcome	Sick leave offered (1)	Paid sick hours taken (2)
<i>Pretreatment mean:</i>	0.659	17.8
Sick leave mandate ($D_C \times T_t$)	0.128*** (0.038)	1.816** (0.701)
Year FE	X	X
Establishment-job FE	X	X
State Time Trends	X	X

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Event Study: Effect on unpaid sick hours taken

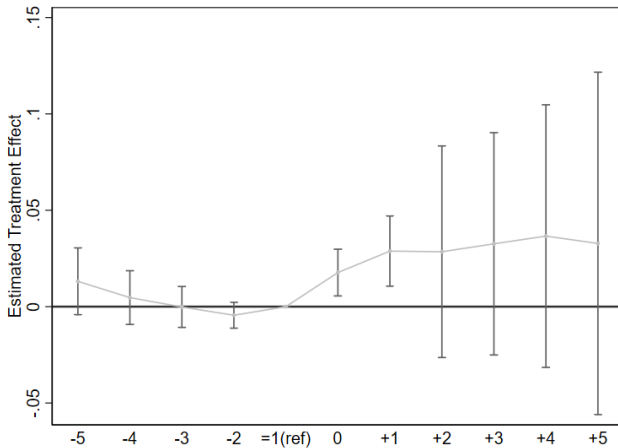


Effect of Mandates on Coverage Rates and Utilization

Outcome	Sick leave offered (1)	Paid sick hours taken (2)	Unpaid sick hours taken (3)
<i>Pretreatment mean:</i>	0.659	17.8	0.541
Sick leave mandate ($D_c \times T_t$)	0.128*** (0.038)	1.816** (0.701)	0.479** (0.193)
Year FE	X	X	X
Establishment-job FE	X	X	X
State Time Trends	X	X	X

Source: NCS 2009-2017 NCS, own calculation and illustration. Yearly data at the firm-occupation level. ***, **, and * = statistically different from zero at the 1%, 5%, and 10% level. All models are weighted using NCS weights. Employee Controls: Union, Part Time. Standard errors clustered at the state level and reported in parentheses. All models have 399,586 establishment-job observations.

Event Study: Sick leave costs per hour



Effect of Mandates on Coverage Rates, Utilization and Labor Costs

Outcome	Sick leave offered (1)	Paid sick hours taken (2)	Unpaid sick hours taken (3)	Sick leave costs total (4)	Sick leave costs per hour (5)
<i>Pretreatment mean:</i>	0.659	17.8	0.541	567.6	0.326
Sick leave mandate ($D_c \times T_t$)	0.128*** (0.038)	1.816** (0.701)	0.479** (0.193)	45.813*** (16.288)	0.027*** (0.008)
Year FE	X	X	X	X	X
Establishment-job FE	X	X	X	X	X
State Time Trends	X	X	X	X	X

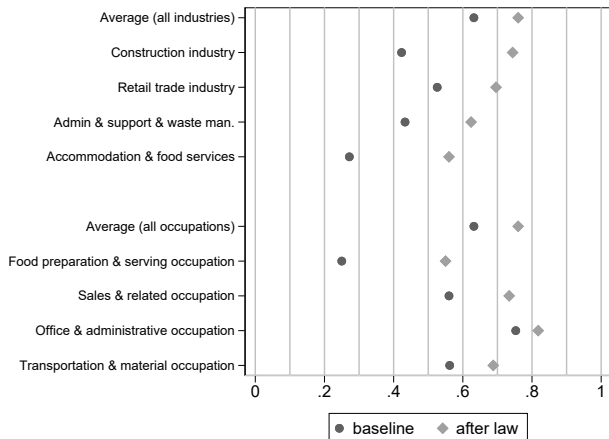
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Effect of Mandates: Effect Heterogeneity

Outcome	Sick leave offered (1)	Paid sick hours taken (2)	Unpaid sick hours taken (3)	Sick leave costs total (4)	Sick leave costs per hour (5)
Panel A: Full-time					
Sick leave mandate ($D_C \times T_t$)	0.258*** (0.062)	1.656*** (0.532)	0.364** (0.154)	18.579** (8.064)	0.019*** (0.006)
Sick leave mandate × full-time	-0.182*** (0.032)	0.223 (0.262)	0.160 (0.184)	38.072*** (12.228)	0.011** (0.005)
Panel B: Union					
Sick leave mandate ($D_C \times T_t$)	0.145*** (0.044)	1.950** (0.798)	0.499** (0.197)	42.864** (18.537)	0.024** (0.010)
Sick leave mandate × union	-0.168*** (0.044)	-1.310 (0.895)	-0.198*** (0.064)	28.874 (24.942)	0.027 (0.018)
Panel C: Small Estab. <50					
Sick leave mandate ($D_C \times T_t$)	0.071** (0.028)	1.640** (0.749)	0.016 (0.110)	47.901** (19.683)	0.024*** (0.008)
Sick leave mandate × small establishments	0.153*** (0.022)	0.464** (0.229)	1.243*** (0.373)	-5.813 (8.830)	0.006*** (0.002)

Source: NCS 2009-2017. ***, **, and * = statistically different from zero at the 1%, 5%, and 10% level. Each column and panel represents one DD model. Standard errors clustered at the state level and reported in parentheses. All models include year and establishment fixed effects, state-time trends, and all three 2-way interactions. All models are weighted with NCS weights. All models have 399,586 establishment-job observations.

Effect Heterogeneity by Occupation and Industry: Effect on Coverage



Effect of Mandates on Non-Mandated Benefits and Type of Sick Leave

	Insurance plans				Disability		Family leave (7)	Paid sick leave	
	health (1)	presc. drug (2)	dental (3)	life (4)	short-term (5)	long-term (6)		fixed (8)	consolidated (9)
<i>Pretreatment mean:</i>	0.698	0.685	0.515	0.531	0.264	0.311	0.119	0.474	0.135
Sick leave mandate ($D_c \times T_t$)	-0.013* (0.006)	-0.009 (0.007)	-0.005 (0.007)	-0.002 (0.005)	0.001 (0.004)	0.004 (0.005)	0.002 (0.002)	0.131*** (0.040)	-0.007 (0.008)
Year FE	X	X	X	X	X	X	X	X	X
Establishment-Job FE	X	X	X	X	X	X	X	X	X
State Time Trends	X	X	X	X	X	X	X	X	X

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Effect of Mandates on Non-Mandated Benefits and Type of Sick Leave

	Costs per hour		Annual hours			Total annual hours		
	health ins. (1)	non-production (2)	vacation (3)	holiday (4)	overtime (5)	worked (6)	paid leave (7)	paid (8)
<i>Pretreatment mean:</i>	0.97	3.591	69.92	46	48.79	1674.2	140	1814.3
Sick leave mandate ($D_c \times T_t$)	0.047 (0.076)	-0.035 (0.023)	0.503 (0.466)	-0.652* (0.388)	1.31 (0.788)	1.462 (1.569)	1.373*** (0.467)	2.825** (1.386)
Year FE	X	X	X	X	X	X	X	X
Establishment-Job FE	X	X	X	X	X	X	X	X
State Time Trends	X	X	X	X	X	X	X	X

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- Increase in sick leave costs per hour by 2.7 cents (about 3% or 30 cents per newly covered with hourly wage of \$10).
- No evidence that paid vacation or holiday hours decreased significantly (marginal employers may not have offered anyway).

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 - First paper to apply this to mandated benefits.

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- For simplicity: No infections in this model.
 - Additional welfare benefits from reduced infections through sick pay (Pichler & Ziebarth 2017).

Illustration: Sick Pay and Sickness Absence

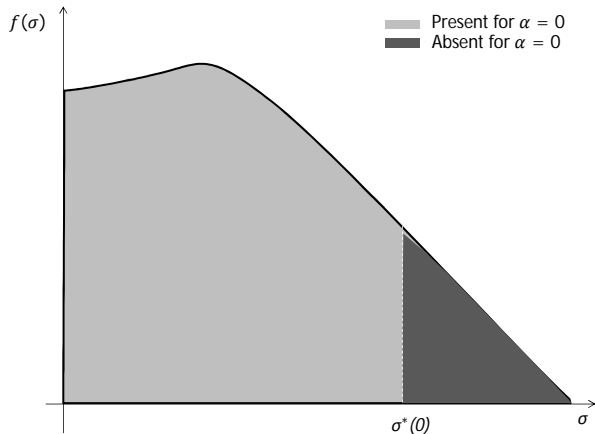
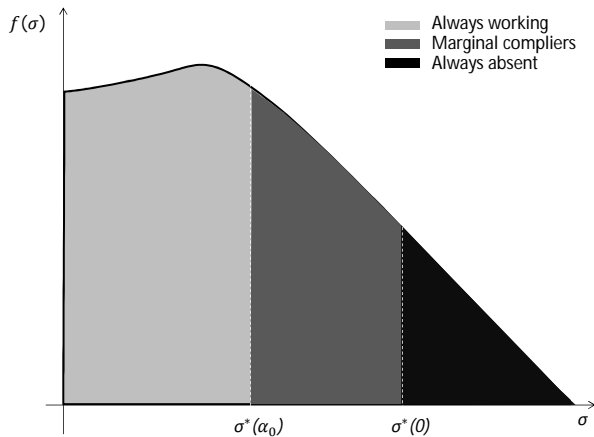


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Total worker utility at population level

p ...exogenous probability to fall sick.

$$U = (1 - p)u(0, w, T - h) + p \int_0^{\sigma_\alpha^*} f(\sigma)u(\sigma, w, T - h)d\sigma \quad (2) \\ + p \int_{\sigma_\alpha^*}^1 f(\sigma)u(\sigma, \alpha w, T)d\sigma,$$

- First term: Utility for healthy workers who work.
- Second term: Utility for sick workers who work ('presenteeism').
- Third term: Utility for workers on sick leave.

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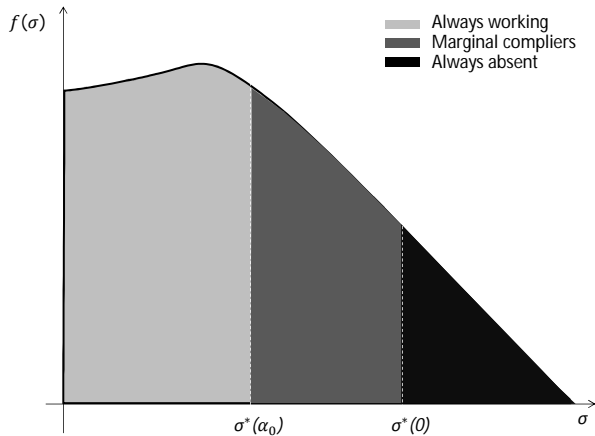
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 - more production per worker (as more sick individuals absent).

Illustration: Sick Pay and Sickness Absence



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- Firms cannot observe worker sickness σ
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- Firms decide upon voluntary sick pay.
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 - higher payments,
 - lower labor supply (more sickness absence),
 - more production per worker (as more sick individuals absent).
- Firm will provide sick pay if the productivity of the marginal workers is low enough.

Model of Optimal Sick Pay: Firms

Total firm profits:

$$\Pi = (1 - p)(\pi(0) - w) + p \int_0^{\sigma_\alpha^*} f(\sigma)(\pi(\sigma) - w)d\sigma - p\alpha w \int_{\sigma_\alpha^*}^1 f(\sigma)d\sigma \quad (3)$$

- First term: Profits from healthy workers who work
- Second term: Profits from sick workers who work ('presenteeism')
- Third term: Losses from workers on sick leave.

How does sick pay affect welfare?

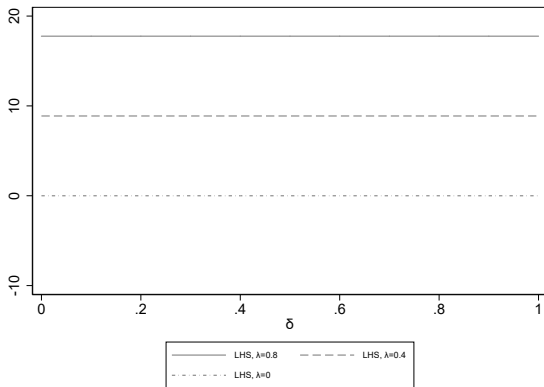
- Social planner takes into account both worker benefits and firms costs and potential benefits.
- Whether more sick leave is welfare improving depends on:
 - The marginal utility of increase in sick pay compared to costs (stylized fact - Summers 1989). (LHS)

How does sick pay affect welfare?

- Social planner takes into account both worker benefits and firms costs and potential benefits.
- Whether more sick leave is welfare improving depends on:
 - The marginal utility of increase in sick pay compared to costs (stylized fact - Summers 1989). (LHS)
 - The costs of reduced labor supply. (RHS)

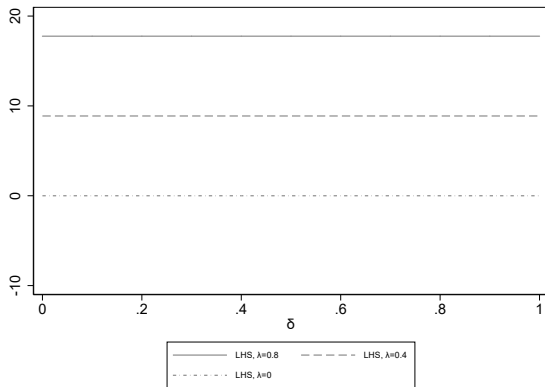
▶ Mathematical formulation

Illustration: Welfare



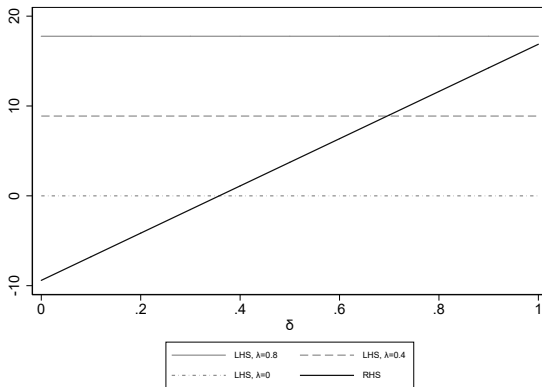
- The LHS shows the mechanical costs vs benefits of sick pay.
- λ captures marginal utility minus costs.

Illustration: Welfare



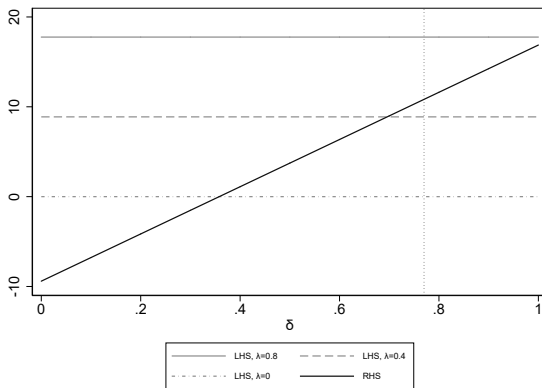
- The LHS shows the mechanical costs vs benefits of sick pay.
- λ captures marginal utility minus costs.
- Polls suggest that 75% of Americans support mandates.
- Value of paid leave $3 \times$ cost (Maestas et al. 2018).

Illustration: Welfare



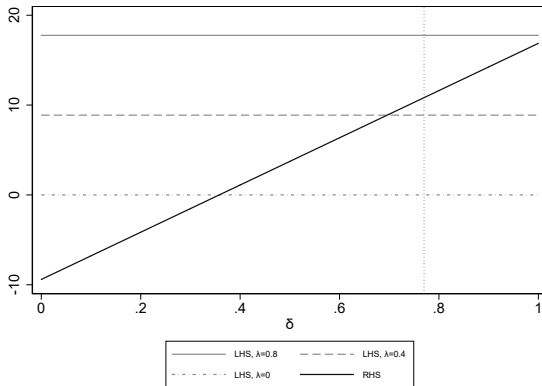
- The RHS shows the costs of reduced labor supply.
- δ captures productivity when sick.

Illustration: Welfare



- The RHS shows the costs of reduced labor supply.
- δ captures productivity when sick (estimated 0.77 in representative survey Maestas et al., 2018).

Illustration: Welfare



- Sick pay has been welfare improving (given estimated elasticities and population averages).

Summary of sufficient statistics

- Mandated sick pay will increase incentives for sick leave.

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Summary of sufficient statistics

- Mandated sick pay will increase incentives for sick leave.
- Firms might provide voluntary sick leave.
- Sick pay improves welfare (under reasonable assumptions).

Conclusion

- Cities and states have implemented mandates in past decade.
- Significant effects on coverage and take up, but no effects on other benefits.
- Combining estimated effects: For most reasonable empirical parameters, mandating sick pay is welfare improving.

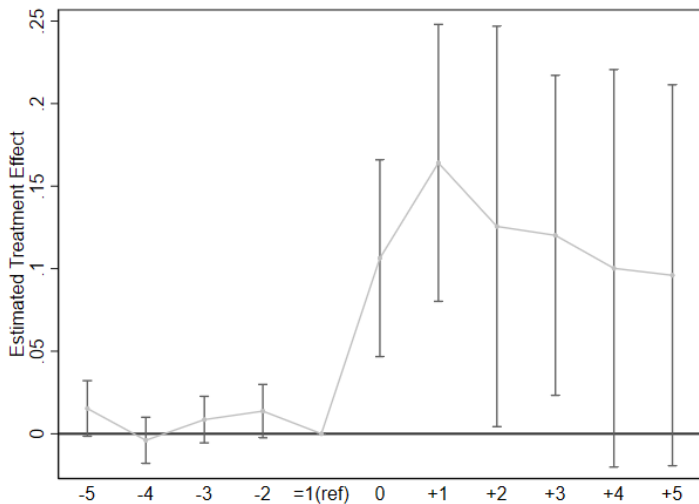
Thanks for inviting me, coming and commenting!

Further questions:

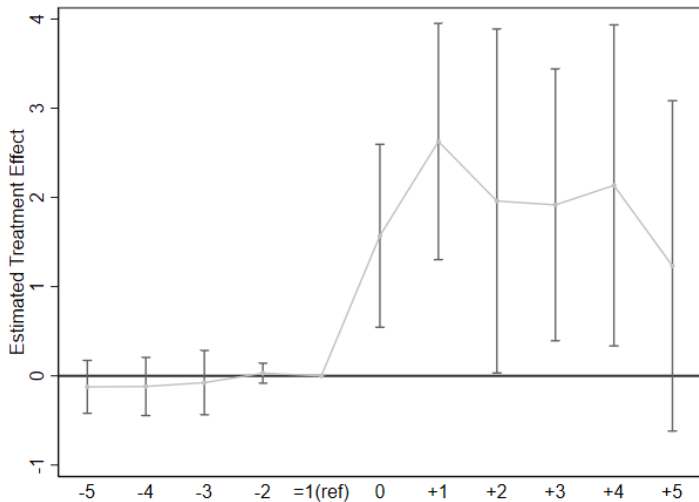
pichler@kof.ethz.ch

Twitter: [@StefanPEcon](https://twitter.com/StefanPEcon)

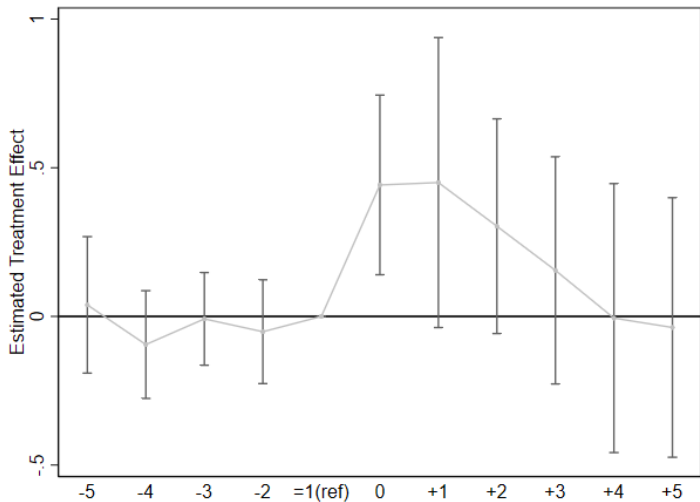
Event Study: Effect on Coverage



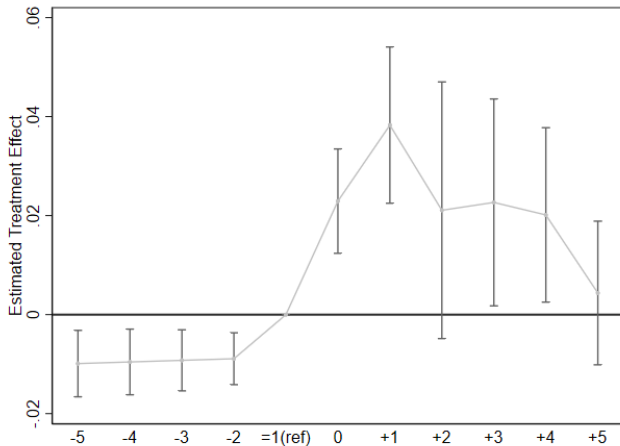
Event Study: Effect on Paid sick hours taken



Event Study: Effect on unpaid sick hours taken



Event Study: Sick leave costs per hour



Effect of Mandates on Coverage Rates, Utilization and Labor Costs

Outcome	Sick leave offered (1)	Paid sick hours taken (2)	Unpaid sick hours taken (3)	Sick leave costs total (4)	Sick leave costs per hour (5)
<i>Pretreatment mean:</i>	0.659	17.8	0.541	567.6	0.326
Panel A					
Sick leave mandate ($D_c \times T_t$)	0.128*** (0.035)	1.983*** (0.610)	0.442** (0.199)	51.566*** (13.564)	0.031*** (0.007)
Year FE	X	X	X	X	X
Establishment FE	X	X	X	X	X
Panel B					
Sick leave mandate ($D_c \times T_t$)	0.129*** (0.034)	2.027*** (0.587)	0.441** (0.199)	52.941*** (13.189)	0.032*** (0.007)
Year FE	X	X	X	X	X
Establishment FE	X	X	X	X	X
Job Controls	X	X	X	X	X
Panel C					
Sick leave mandate ($D_c \times T_t$)	0.130*** (0.041)	2.060*** (0.704)	0.462* (0.243)	54.211*** (15.740)	0.033*** (0.009)
Year FE	X	X	X	X	X
Establishment-job FE	X	X	X	X	X
Panel D					
Sick leave mandate ($D_c \times T_t$)	0.128*** (0.038)	1.816** (0.701)	0.479** (0.193)	45.813*** (16.288)	0.027*** (0.008)
Year FE	X	X	X	X	X
Establishment-job FE	X	X	X	X	X
State Time Trends	X	X	X	X	X

Source: NCS 2009-2017 NCS, own calculation and illustration. Yearly data at the firm-occupation level. ***, **, and * = statistically different from zero at the 1%, 5%, and 10% level. All models are weighted using NCS weights. Employee Controls: Union, Part Time. Standard errors clustered at the state level and reported in parentheses. All models have 399,586 establishment-job observations.

Effect Heterogeneity of Mandates: Industries

Outcome	Sick leave offered (1)	Paid sick hours taken (2)	Unpaid sick hours taken (3)	Sick leave costs total (4)	Sick leave costs per hour (5)
<i>Pretreatment mean:</i>	0.659	17.8	0.541	567.6	0.326
Panel A1: Construction industry					
Sick leave mandate ($D_c \times T_t$)	0.119*** (0.036)	1.790** (0.693)	0.445** (0.189)	46.767*** (16.495)	0.028*** (0.009)
Sick leave mandate × construction	0.202*** (0.038)	0.589*** (0.200)	0.764*** (0.128)	-22.164*** (3.725)	-0.023*** (0.003)
Panel A2: Retail trade industry					
Sick leave mandate ($D_c \times T_t$)	0.121*** (0.040)	1.857** (0.729)	0.561** (0.216)	50.767*** (17.265)	0.029*** (0.009)
Sick leave mandate × retail trade	0.049*** (0.011)	-0.312 (0.234)	-0.605*** (0.204)	-36.583*** (8.792)	-0.017*** (0.003)
Panel A3: Admin & support & waste man. & remed. services					
Sick leave mandate ($D_c \times T_t$)	0.121*** (0.039)	1.864** (0.738)	0.450** (0.219)	49.063*** (17.556)	0.029*** (0.009)
Sick leave mandate × admin services	0.070*** (0.021)	-0.501 (0.399)	0.307 (0.538)	-33.846*** (12.538)	-0.025*** (0.007)
Panel A4: Accommodation & food services					
Sick leave mandate ($D_c \times T_t$)	0.104*** (0.037)	1.676** (0.673)	0.131 (0.096)	48.240*** (17.382)	0.028*** (0.009)
Sick leave mandate × accommodation	0.184*** (0.033)	1.068*** (0.182)	2.679*** (0.758)	-19.134*** (6.301)	-0.011*** (0.003)

Source: NCS 2009-2017 NCS, own calculation and illustration. Yearly data at the firm-occupation level. ***, **, and * = statistically different from zero at the 1%, 5%, and 10% level. All models are weighted using NCS weights. Employee Controls: Union, Part Time. Standard errors clustered at the state level and reported in parentheses. All models have 399,586 establishment-job observations.

Effect Heterogeneity of Mandates: Occupations

Outcome	Sick leave offered (1)	Paid sick hours taken (2)	Unpaid sick hours taken (3)	Sick leave costs total (4)	Sick leave costs per hour (5)
<i>Pretreatment mean:</i>	0.659	17.8	0.541	567.6	0.326
Panel B1: Food preparation & serving occupation					
Sick leave mandate ($D_c \times T_t$)	0.105*** (0.037)	1.685** (0.651)	0.129 (0.095)	48.810*** (17.341)	0.028*** (0.009)
Sick leave mandate × food	0.195*** (0.035)	1.139*** (0.288)	3.034*** (0.820)	-26.013*** (5.823)	-0.015*** (0.003)
Panel B2: Sales & related occupation					
Sick leave mandate ($D_c \times T_t$)	0.122*** (0.039)	1.920** (0.755)	0.548** (0.215)	50.915*** (17.884)	0.029*** (0.009)
Sick leave mandate × sales	0.052** (0.025)	-0.942* (0.503)	-0.630*** (0.204)	-46.357*** (14.033)	-0.024*** (0.007)
Panel B3: Office & administrative occupation					
Sick leave mandate ($D_c \times T_t$)	0.140*** (0.041)	1.998** (0.766)	0.550** (0.213)	50.875*** (18.082)	0.030*** (0.009)
Sick leave mandate × office	-0.075*** (0.014)	-1.145*** (0.390)	-0.447*** (0.116)	-32.035*** (10.853)	-0.019*** (0.006)
Panel B4: Transportation & material occupation					
Sick leave mandate ($D_c \times T_t$)	0.128*** (0.037)	1.776** (0.686)	0.495** (0.201)	44.618** (17.095)	0.025*** (0.009)
Sick leave mandate × transportation	-0.002 (0.018)	0.417* (0.235)	-0.175* (0.089)	12.589 (10.860)	0.021** (0.008)

Source: NCS 2009-2017 NCS, own calculation and illustration. Yearly data at the firm-occupation level. ***, **, and * = statistically different from zero at the 1%, 5%, and 10% level. All models are weighted using NCS weights. Employee Controls: Union, Part Time. Standard errors clustered at the state level and reported in parentheses. All models have 399,586 establishment-job observations.

Effect of Mandates on Benefits I

	Insurance plans				Disability		Family leave (7)	Paid sick leave	
	medical (1)	presc. drug (2)	dental (3)	life (4)	short-term (5)	long-term (6)		fixed (8)	consolidated (9)
<i>Pretreatment mean:</i>	0.698	0.685	0.515	0.531	0.264	0.311	0.119	0.474	0.135
Panel A									
Sick leave mandate ($D_c \times T_t$)	-0.009** (0.005)	-0.004 (0.005)	0.003 (0.006)	-0.006 (0.004)	0.002 (0.005)	0.003 (0.004)	0.002 (0.002)	0.142*** (0.034)	-0.017*** (0.006)
Year FE	X	X	X	X	X	X	X	X	X
Establishment FE	X	X	X	X	X	X	X	X	X
Panel B									
Sick leave mandate ($D_c \times T_t$)	-0.008* (0.005)	-0.003 (0.006)	0.003 (0.006)	-0.005 (0.004)	0.002 (0.005)	0.004 (0.004)	0.002 (0.002)	0.142*** (0.034)	-0.017*** (0.006)
Year FE	X	X	X	X	X	X	X	X	X
Establishment FE	X	X	X	X	X	X	X	X	X
Employee Controls	X	X	X	X	X	X	X	X	X
Panel C									
Sick leave mandate ($D_c \times T_t$)	-0.006 (0.006)	-0.003 (0.007)	0.004 (0.007)	-0.004 (0.005)	0.002 (0.006)	0.005 (0.005)	0.002 (0.002)	0.142*** (0.041)	-0.018** (0.007)
Year FE	X	X	X	X	X	X	X	X	X
Establishment-Job FE	X	X	X	X	X	X	X	X	X
Panel D									
Sick leave mandate ($D_c \times T_t$)	-0.012* (0.006)	-0.009 (0.007)	-0.005 (0.007)	-0.002 (0.005)	0.001 (0.004)	0.004 (0.005)	0.002 (0.002)	0.131*** (0.040)	-0.007 (0.008)
Year FE	X	X	X	X	X	X	X	X	X
Establishment-Job FE	X	X	X	X	X	X	X	X	X
State Time Trends	X	X	X	X	X	X	X	X	X

Source: NCS 2009-2017 NCS, own calculation and illustration. Each column in each panel stands for one DD model as in Equation (2). ***, **, and * = statistically different from zero at the 1%, 5%, and 10% level. All models are weighted using NCS weights. Employee Controls: Union, Part Time. Standard errors clustered at the state level and reported in parentheses. All models have 399,586 observations.

Effect of Mandates on Benefits II

	Costs per hour		Annual hours			Total annual hours		
	health ins. (1)	non-production (2)	vacation (3)	holiday (4)	overtime (5)	worked (6)	paid leave (7)	paid (8)
<i>Pretreatment mean:</i>	0.97	3.591	69.92	46	48.79	1674.2	140	1814.3
Panel A								
Sick leave mandate ($D_c \times T_t$)	-0.036 (0.033)	-0.030* (0.017)	-0.253 (0.431)	-0.818*** (0.234)	0.776 (0.968)	-1.473 (1.310)	0.738 (0.586)	-0.734 (1.514)
Year FE	X	X	X	X	X	X	X	X
Establishment FE	X	X	X	X	X	X	X	X
Panel B								
Sick leave mandate ($D_c \times T_t$)	-0.034 (0.033)	-0.029 (0.018)	-0.05 (0.376)	-0.724*** (0.267)	0.71 (1.108)	1.026 (1.557)	1.101** (0.436)	2.127 (1.293)
Year FE	X	X	X	X	X	X	X	X
Establishment FE	X	X	X	X	X	X	X	X
Employee Controls	X	X	X	X	X	X	X	X
Panel C								
Sick leave mandate ($D_c \times T_t$)	-0.029 (0.041)	-0.024 (0.021)	0.083 (0.446)	-0.699** (0.311)	0.881 (1.086)	0.983 (1.65)	1.266** (0.549)	2.249 (1.363)
Year FE	X	X	X	X	X	X	X	X
Establishment-Job FE	X	X	X	X	X	X	X	X
Panel D								
Sick leave mandate ($D_c \times T_t$)	0.047 (0.076)	-0.035 (0.023)	0.503 (0.466)	-0.652* (0.388)	1.31 (0.788)	1.462 (1.569)	1.373*** (0.467)	2.825** (1.386)
Year FE	X	X	X	X	X	X	X	X
Establishment-Job FE	X	X	X	X	X	X	X	X
State Time Trends	X	X	X	X	X	X	X	X

Source: NCS 2009-2017 NCS, own calculation and illustration. Each column in each panel stands for one DD model as in Equation (2). ***, **, and * = statistically different from zero at the 1%, 5%, and 10% level. All models are weighted using NCS weights. Employee Controls: Union, Part Time. Standard errors clustered at the state level and reported in parentheses. All models have 399,586 observations.

Effect of Mandates at county level

Outcome	Sick leave offered (1)	Paid sick hours taken (2)	Unpaid sick hours taken (3)	Sick leave costs total (4)	Sick leave costs per hour (5)
<i>Pretreatment mean:</i>	0.659	17.8	0.541	567.6	0.326
Panel A					
Sick leave mandate ($D_c \times T_t$)	0.117*** (0.028)	1.385*** (0.478)	0.465*** (0.143)	58.396** (25.291)	0.033*** (0.011)
Year FE	X	X	X	X	X
County FE	X	X	X	X	X
Panel B					
Sick leave mandate ($D_c \times T_t$)	0.119*** (0.026)	1.477*** (0.428)	0.470*** (0.149)	61.853** (24.049)	0.035*** (0.011)
Year FE	X	X	X	X	X
County FE	X	X	X	X	X
Job Controls	X	X	X	X	X
Panel C					
Sick leave mandate ($D_c \times T_t$)	0.149*** (0.021)	1.212*** (0.362)	0.255** (0.120)	40.664*** (14.500)	0.014 (0.010)
Year FE	X	X	X	X	X
County FE	X	X	X	X	X
State Time Trends	X	X	X	X	X

Source: NCS 2009-2017 NCS, own calculation and illustration. Yearly data at the county level. Each column in each panel stands for one DD model as in Equation (2). ***, **, and * = statistically different from zero at the 1%, 5%, and 10% level. All models are weighted using NCS weights. Employee Controls: Union, Part Time. Standard errors clustered at the state level and reported in parentheses. All models have 8,100 county observations.

Effect of Mandates at state level

Outcome	Sick leave offered (1)	Paid sick hours taken (2)	Unpaid sick hours taken (3)	Sick leave costs total (4)	Sick leave costs per hour (5)
<i>Pretreatment mean:</i>	0.659	17.8	0.541	567.6	0.326
Panel A					
Sick leave mandate ($D_C \times T_i$)	0.107*** (0.023)	1.040** (0.394)	0.369*** (0.119)	46.082** (21.549)	0.024** (0.010)
Year FE	X	X	X	X	X
State FE	X	X	X	X	X
Panel B					
Sick leave mandate ($D_C \times T_i$)	0.110*** (0.020)	1.125** (0.440)	0.393*** (0.128)	49.123** (20.303)	0.025** (0.010)
Year FE	X	X	X	X	X
State FE	X	X	X	X	X
Job Controls	X	X	X	X	X
Panel C					
Sick leave mandate ($D_C \times T_i$)	0.127*** (0.027)	0.532 (0.444)	0.173 (0.130)	33.808*** (12.228)	0.009 (0.009)
Year FE	X	X	X	X	X
State FE	X	X	X	X	X
State Time Trends	X	X	X	X	X

Source: NCS 2009-2017 NCS, own calculation and illustration. Yearly data at the state level. Each column in each panel stands for one DD model as in Equation (2). ***, **, and * = statistically different from zero at the 1%, 5%, and 10% level. All models are weighted using NCS weights. Employee Controls: Union, Part Time. Standard errors clustered at the state level and reported in parentheses. All models have 451 state observations.

Effects of change of sick pay on welfare

$$\Phi \begin{matrix} \geq \\ \leq \end{matrix} \varepsilon \frac{\pi(\sigma_\alpha^*) - (1 - \alpha)w}{\alpha} \quad (4)$$

with

$$\Phi = \frac{w \int_{\sigma_\alpha^*}^1 f(\sigma) (u'_c(\sigma, \alpha w, T) - 1) d\sigma}{\int_{\sigma_\alpha^*}^1 f(\sigma) d\sigma}, \quad (5)$$

and

$$\varepsilon = \frac{\partial \int_{\sigma_\alpha^*}^1 f(\sigma) d\sigma}{\partial \alpha} \frac{\alpha}{\int_{\sigma_\alpha^*}^1 f(\sigma) d\sigma} = - \frac{\partial \sigma_\alpha^*}{\partial \alpha} f(\sigma_\alpha^*) \frac{\alpha}{\int_{\sigma_\alpha^*}^1 f(\sigma) d\sigma}. \quad (6)$$

Welfare-Maximizing Optimality Condition

$$w\lambda = \varepsilon \frac{w\delta - (1 - \alpha)w}{\alpha}. \quad (7)$$

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- LHS: Diff. btw. marginal worker utility & marginal firm costs (λ).
- RHS: Diff. btw. work productivity under presenteeism (δ) & difference btw. wage and sick pay, weighted by labor supply elasticity (ε).

Welfare-Maximizing Optimality Condition

$$w\lambda = \varepsilon \frac{w\delta - (1 - \alpha)w}{\alpha}. \quad (7)$$

- LHS: Diff. btw. marginal worker utility & marginal firm costs (λ).
- RHS: Diff. btw. work productivity under presenteeism (δ) & difference btw. wage and sick pay, weighted by labor supply elasticity (ε).
- Equation (7) similar to Bailey formula (1978).
- Here, employer provides sick pay and social planner balances marginal value for employees vs. firm costs.
- Also, sickness continuous and affects productivity.