Intergenerational Effects of Sick Leave on Child Human Capital

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Research question(s)

- Is the human capital development of children affected by parental take-up of employment protection and income replacement programs?
- More concretely: How does certified, paid sick leave affect school outcomes of children, at the extensive and intensive margins?
- Which mechanisms are at play?

Paper in short:

- We create a sick leave leniency measure using conditional exogenous GP swaps
  - and find large variation especially related to hard-to-verify conditions with unclear benefit from sick leave
- We estimate the effect of a parental swap to a more lenient GP on the child's human capital development
- We investigate whether the timing of the parental swap (age of the child) matters
- We examine an arguably important channel: the effect on the parent's attachment to the labour market and take-up of welfare services
- We conclude that the total effect on children's human capital is negative – both on quality and quantity

Literature

- No(?) literature on possible intergenerational impact of certified sick leave
- Some literature on direct effect of sick leave on workers
  - e.g. Markussen et al. (2012), Fevang et al. (2014), Markussen and Røed (2017), Pichler and Ziebarth (2020), Godøy and Dale-Olsen (2018)
- A number of observational studies of the effect of parental welfare utilization on children
  - Black and Deveraux (2011), Bratsberg & Røed (2015), Bratberg, Nilsen & Vaage (2015), Antel (2021).
- Small but interesting literature on intergenerational transmission of dependence of welfare programs
  - e.g. Dahl et al. (2014), Dahl and Gielen (2021), Hartley et al. (2017)

The GP system and Norwegian sick leave - essentials

- GPs are the first point of contact with the health care system
  - Initial examinations, diagnoses, treatments, prescription of medications, referral to specialists, and sick leave certification
- You will need to get your sick leave certified by a GP if you are away from work more than 3 (8) days
- Sick leaves are 100% compensated from day one
  - Up to 1 year, cap of around 60000 £ per year
- Every GP has a list of patients, every Norwegian has the right to be assigned to a GP's list

GP assignments

- When a GP quits, retires, moves or reduces his/her patient list
  - Often, the entire list is transferred (we don’t use these swaps), but when not:
  - Patients are randomly assigned to a new GP in the municipality, conditional on availability
- There are two important aspects of this process:
  - In the event of list reductions, patients to be removed are randomly drawn
  - When reassigning patients, which patient goes to which new GPs are randomly drawn
- We use this randomization as our source of exogenous variation
  - Also, we provide extensive balance tests to show that this happens in practice
- Patients are allowed to endogenously change GP twice a year.
  - We don’t use these swaps.

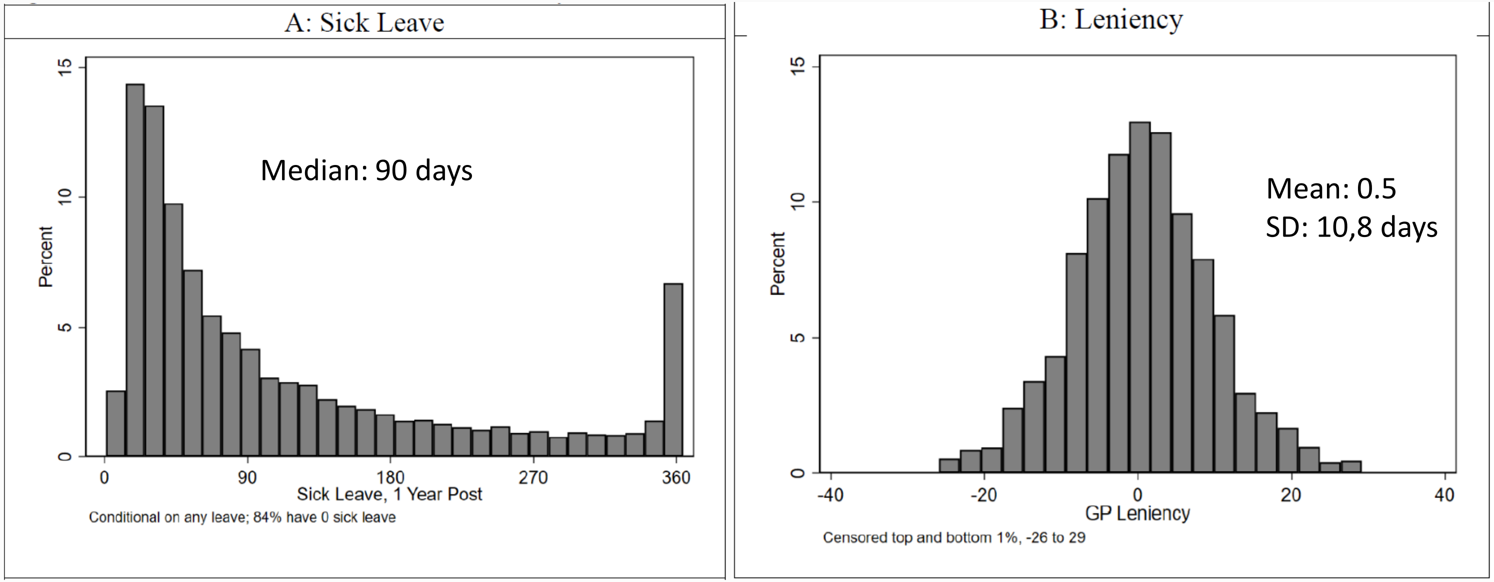
Empirical approach

1. Estimate coefficients of new GP dummy variables - #sickdays 1 year after swap
   - Controlling for previous GP, age at swap, time of swap, gender and sick leave in previous year
2. Construct a continuous standardized measure of leniency (mean:0, SD 1)
3. Regress child/parental outcomes of interest on the standardised leniency measure
   - Controlling for previous GP, age at swap, time of swap, gender and sick leave in previous year

- Leave-one-out design to avoid mechanical effects
- Based on linked administrative register data

Leniency measure

- Raw variation in sick leave and **pre-standardized** leniency



- More heterogeneity related to hard to verify causes

Identification

- Identifying assumption: GP leniency is not correlated with patient characteristics that can affect outcomes of interest
- We regress the GP leniency measure on 20+ different pre-characteristics
  - Health, labour market, education, family situation, partner outcomes
  - Small and non-significant
- We regress the GP leniency measure on all simultaneously
  - Non-significant

- Child outcomes are measured only once, but for parental outcomes we have multiple observations over time
- => apply a diff-in-diff model using within individual variation
  - Gives both qualitatively and quantitatively similar results
- => use this variation in an event study set-up to look at trends in parental outcomes
  - No differences in pre-trends
- Placebo on those 21-25 when shock hits
  - No effects (small and insign.)

Could we be picking up something else about the GPs?

- We correlate the GP leniency measure with:
  - Short- and long-term mortality at the patient level
  - Other GP practice characteristics at the doctor level
  - GP value added
  - Likelihood that the GP conducts check-ups with the patient
  - Inpatient visits and ER visits of the patient
- No correlation => confident that we measure effect of getting assigned a GP that is more lenient in certifying sick leave

Child outcomes

Table 4: Effect on Childhood Educational Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
	GPA, Gr 8-10	GPA, Gr 11-13	Academic Track	HS Grad	Start College	Years of Ed
Leniency SD	-0.013**	-0.014***	-0.000	-0.008***	-0.008***	-0.032***
	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)	(0.009)
Dep Mean	4.139	3.988	0.743	0.653	0.614	12.626
N	312,357	459,004	256,157	322,395	451,122	322,395

Note: * p<0.05, ** p<0.01, *** p<0.001.

The table presents the OLS estimates of the effect of GP sick note leniency. Estimating equation: $w_{ijkt} = \beta LeniencySD_j + \pi_k + \boldsymbol{\theta_{it}} + \varepsilon_{ijkt}$, where w_{ijkt} is the outcome at the top of the column, $LeniencySD_j$ is a standardized continuous measure of GP sick note leniency, π_k are previous GP FE, and $\boldsymbol{\theta_{it}}$ is a vector of controls (sick leave days the year before swap, patient age, and patient sex). Displayed estimates are the coefficient β, the effect of a 1 SD increase in GP sick note leniency.

Standard errors in parentheses clustered at GP level.

Child outcomes, variation by age of exposure (swap)

Table 5: Effect Variation by Age of Exposure, Lower Secondary GPA and Start College

Panel A: Lower Secondary GPA				
	(1)	(2)	(3)	(4)
	Age 3-8	Age 9-11	Age 12-14	Age 15-16
Leniency SD	-0.011	-0.016*	-0.012	-0.020**
	(0.007)	(0.007)	(0.007)	(0.007)
Dep Mean	4.225	4.159	4.125	4.094
N	52,297	72,823	101,885	83,452
Panel B: Start College				
	(1)	(2)	(3)	(4)
	Age 3-8	Age 9-11	Age 12-14	Age 15-16
Leniency SD	-0.010	-0.011*	-0.012**	-0.013**
	(0.007)	(0.005)	(0.004)	(0.005)
Dep Mean	0.504	0.529	0.558	0.571
N	13,759	47,065	78,829	69,166

Note: * $p<0.05$, ** $p<0.01$, *** $p<0.001$.
The table presents the OLS estimates of the effect of GP sick note leniency. Estimating equation: $w_{ijkt} = \beta LeniencySD_j + \pi_k + \boldsymbol{\theta}_{it} + \varepsilon_{ijkt}$, where w_{ijkt} is the outcome at the top of the column, $LeniencySD_j$ is a standardized continuous measure of GP sick note leniency, π_k are previous GP FE, and $\boldsymbol{\theta}_{it}$ is a vector of controls (sick leave days the year before swap, patient age, and patient sex). Displayed estimates are the coefficient β, the effect of a 1 SD increase in GP sick note leniency.
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Parental outcomes 2 years after swap

Table 8: Effect on Own Labor Market and Safety Net Outcomes, 2 Year Post Exposure

Panel A: Labor Market

	(1)	(2)
	Employed	Earnings
Leniency SD	-0.000	-5052.7***
	(0.001)	(1499.6)
Dep Mean	0.970	537203.7
N	205,991	205,991

Panel B: Safety Net

	(1)	(2)	(3)	(4)	(5)	(6)
	Any UI	UI Level	Any DI	DI Level	Any Benefits	Total Benefits
Leniency SD	0.003*	284.364	0.001	235.056	0.006**	2270.762***
	(0.001)	(145.127)	(0.001)	(138.278)	(0.002)	(487.125)
Dep Mean	0.046	3375.965	0.021	3722.960	0.675	54832.837
N	205,991	205,991	205,991	205,991	205,991	205,991

Note: * p<0.05, ** p<0.01, *** p<0.001.
The table presents the OLS estimates of the effect of GP sick note leniency. Estimating equation: $w_{ijkt} = \beta LeniencySD_j + \pi_k + \boldsymbol{\theta_{it}} + \varepsilon_{ijkt}$, where w_{ijkt} is the outcome at the top of the column, $LeniencySD_j$ is a standardized continuous measure of GP sick note leniency, π_k are previous GP FE, and $\boldsymbol{\theta_{it}}$ is a vector of controls (sick leave days the year before swap, patient age, and patient sex). Displayed estimates are the coefficient β, the effect of a 1 SD increase in GP sick note leniency. Standard errors in parentheses clustered at GP level.

Parental outcomes 5 years after swap

Table 9: Long-Run Earnings and Welfare, 5 Year Post Exposure

	(1)	(2)
	Earnings	Total Benefits
Leniency SD	-4893.167*	983.469*
	(1925.122)	(490.540)
Dep Mean	551023.858	51786.526
N	175,967	175,967

Note: * p<0.05, ** p<0.01, *** p<0.001.

The table presents the OLS estimates of the effect of GP sick note leniency. Estimating equation: $w_{ijkt} = \beta LeniencySD_j + \pi_k + \boldsymbol{\theta_{it}} + \varepsilon_{ijkt}$, where w_{ijkt} is the outcome at the top of the column, $LeniencySD_j$ is a standardized continuous measure of GP sick note leniency, π_k are previous GP FE, and $\boldsymbol{\theta_{it}}$ is a vector of controls (sick leave days the year before swap, patient age, and patient sex). Displayed estimates are the coefficient β, the effect of a 1 SD increase in GP sick note leniency.

Standard errors in parentheses clustered at GP level.

Discussion of mechanisms

- Reduced labour market attachment and income + increased take-up of other welfare services
  - In sum: Negative effects on parent’s economic resources
- BUT, the timing of the shock matters – shocks in early years do not seem to give clear/as big negative effects on human capital (measured at age 16+)
- Would expect the effect of reduced labour market attachment and economic resources to be stronger the longer exposed, but no clear signs of this
- Stress, worrying, role modelling - something like that - around the critical measurement time (end of lower secondary school) does likely also play a role

Robustness/sample checks

- Adjustment with shrinkage factor
  - To adjust for potential measurement error
  - Effects increase slightly
- Dropping children with same exogenous swap as parent
  - No difference
- Restrict to parents using sick leave the year before swap
  - To avoid results being affected by never-takers
  - Larger effects

Specification checks

- Leave out each of the controls in turn
- PSM common support
- Random inference P-values
- Leave out one year at the time
- Leave out one county at the time
- Dropping GPs with very few new assigned patients
- => everything seems solid :)

Concluding remarks I

- Employment protection and income replacement programs play an important role not only for the focal workers, but also in their children’s lives.
- We find sizable negative effects of parental sick leave on the child’s human capital development – and that the timing matters
- Sick leave induces parents to be more likely to find themselves outside the workforce, earn lower wages, and become more dependent on the social safety net.
- Also probably a story of increased stress and/or change of role models

Concluding remarks II

- Conventional social protection policies designed to help individual workers can generate important spillovers to their children.
- In our study negative spillovers were bigger than potential positive spillovers
  - Important to investigate the mechanisms and their relative magnitude further
- Our results imply that the cost of these policies is likely larger than previously thought

Thank you!

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