Reskilling and Resilience

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This Paper

Motivation

Losing work can lead to psychological and social decline

→ Rising deaths of despair (Case and Deaton 2015; Pierce and Schott 2020)

→ Falling marriage market values (Autor et al. 2019)

→ Adverse effects on children (Schaller and Zerpa 2019)

Yet, little is known about what could mitigate these consequences

Question

Reskilling programs promise to help workers adapt—can they ease the psychosocial toll, too?

Strategy

1. Use work accidents as shocks to worker ability
2. Exploit institutional differences in access to reskilling
3. Study mental health and family outcomes

Findings

Reskilling after loss of ability...

1. Protects mental health: Prevent 1 depression for every 5 reskilled
2. Prevents partner decline: Effect on partner depression nearly as large
3. Shields children: Avoid 1 ADHD diagnosis for every 12 parents reskilled

Mental health and family benefits are economically substantial:

$\rightarrow$ Adds $\sim$ 50% to reskilling gains beyond labor earnings

Roadmap

Data

Identification Strategy

Results

Cost-Benefit Analysis

Conclusion

Data

We link comprehensive admin data from Denmark (1995 to 2017) on

Work accidents

- ⋆ Characteristics of accident, earning capacity loss, ...

Human capital investments

- ⋆ Degrees and courses (six-digit): enrollment, completion

Health outcomes

- ⋆ Diagnoses, drug prescriptions, hospitalizations, doctor's visits

Family members

- ⋆ Comprehensive register of partners and children links

Work Accidents

Sudden accident at the workplace, employer must report within 14 days

Each year, 0.6% of workers experience a work injury ($\approx$ mass layoff)

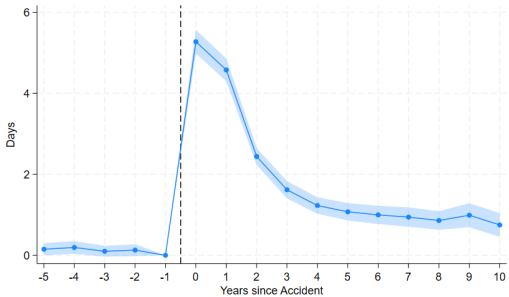
Table: Occupations with Highest Accident Rates

Occupation	Injuries/ 1000 FTEs	Most Common Injury	
		Event	Body Part
Carpenters	15.54	Fall Injury	Back, incl. spine
Elementary workers, n.e.c.	15.51	Fall Injury	Back, incl. spine
Joiners and carpenters, n.e.c.	15.08	Fall Injury	Back, incl. spine
Heavy truck and lorry drivers	13.47	Fall Injury	Back, incl. spine
Plumbers and pipe fitters	13.43	Fall Injury	Back, incl. spine

Main sample: Workers from physical jobs with earning capacity loss

Worker Outcomes around Work Accidents (Diff-in-Diff)

Days in Hospital



Labor Income



Workers are matched (one-to-one) on age, gender, education, occupation, and industry in year -1

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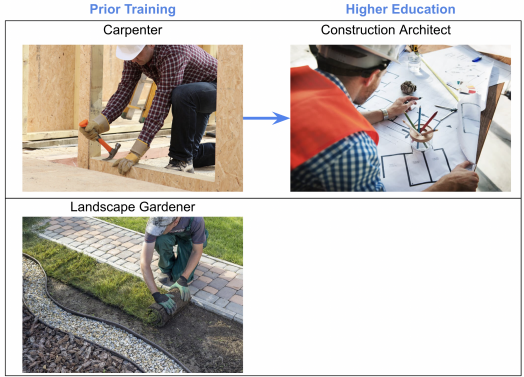
Cost-Benefit Analysis

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Identifying the Effects of Reskilling

Strategy (Humlum et al. 2024)

In Denmark, some vocational degrees give access to higher education, but others don't



Humlum et al. (2024). *Changing Tracks: Human Capital Investments after Loss of Ability*

Placebo Checks

Identifying assumption

Similar outcomes after accidents if not for different access to education

Validity checks

Affected workers (Humlum et al., 2024)

- ✓ Similar severity of accidents
- ✓ Similar before accident
- ✓ Similar if not hit by accidents
- ✓ Similar after temporary injuries
- ✓ Similar outcomes for oldest workers who do not reskill

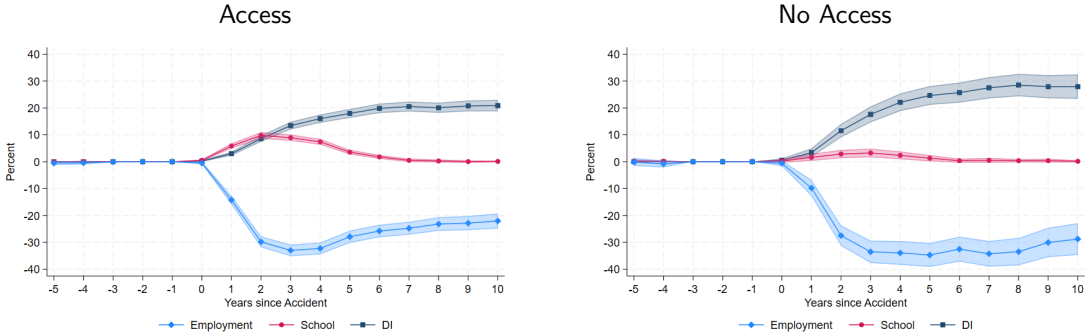
Family and mental health (FMH)

- ✓ Similar FMH before accidents
- ✓ Similar FMH if not hit by accidents
- ✓ Similar FMH after temporary injuries
- ✓ Similar FMH for oldest workers who do not reskill

Humlum et al. (2024). *Changing Tracks: Human Capital Investments after Loss of Ability*

Setting the Stage (Humlum et al., 2024)

Labor Supply around Work Accidents (Diff-in-Diff)

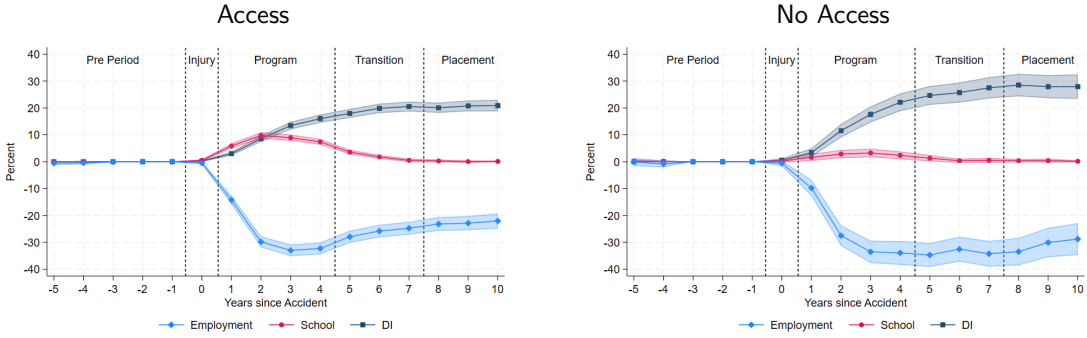


Notes: First-stage effect on reskilling is 10 percent.

Humlum et al. (2024). *Changing Tracks: Human Capital Investments after Loss of Ability*

Setting the Stage (Humlum et al., 2024)

Labor Supply around Work Accidents (Diff-in-Diff)

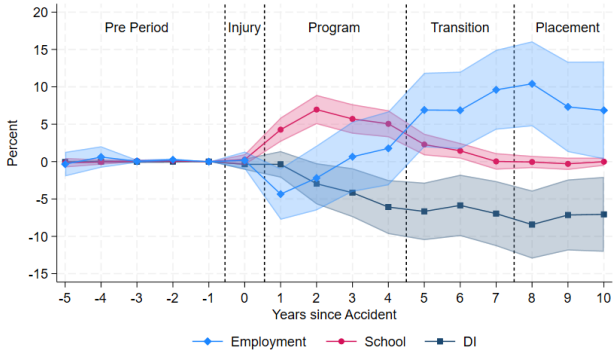


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Humlum et al. (2024). *Changing Tracks: Human Capital Investments after Loss of Ability*

Setting the Stage (Humlum et al., 2024)

Labor Supply around Work Accidents (Triple Difference)



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Humlum et al. (2024). *Changing Tracks: Human Capital Investments after Loss of Ability*

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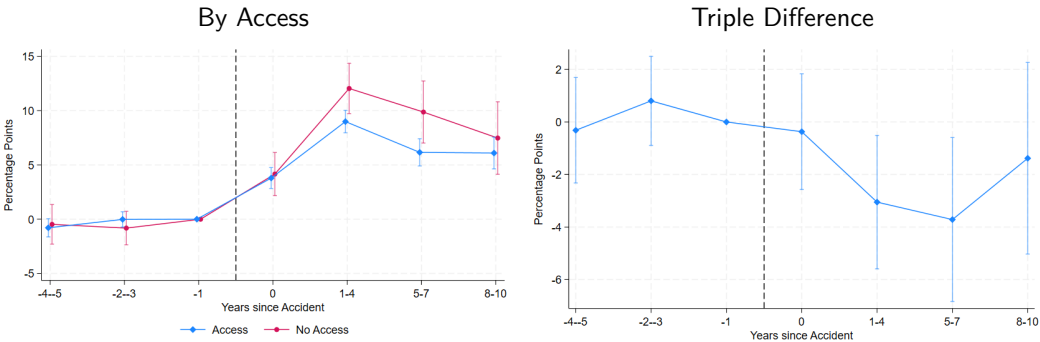
Results

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Reskilling Mitigates Depression after Accidents

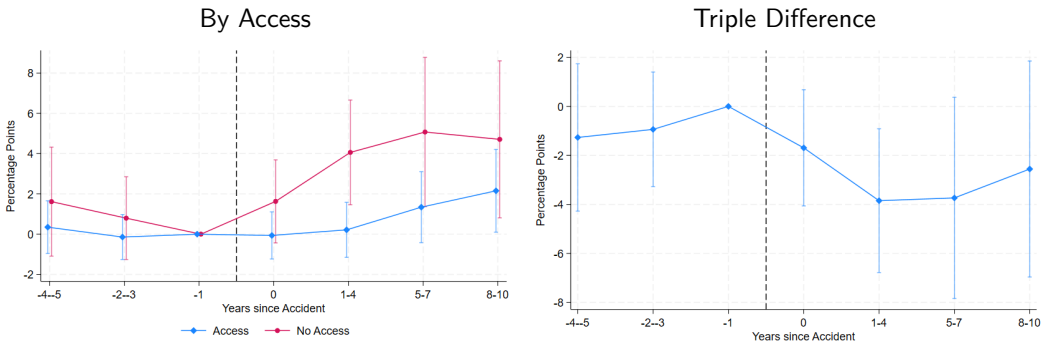
Antidepressant Prescription



Notes: First-stage effect on reskilling is 10 percent.

... Protecting Partners in the Downfall

Antidepressant Prescription of Pre-Existing Partner

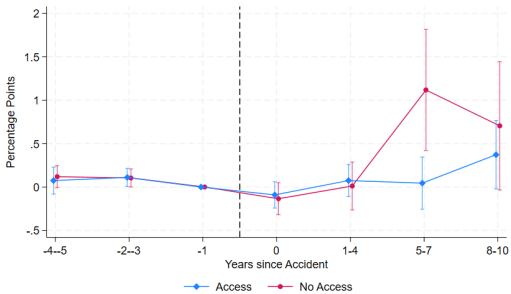


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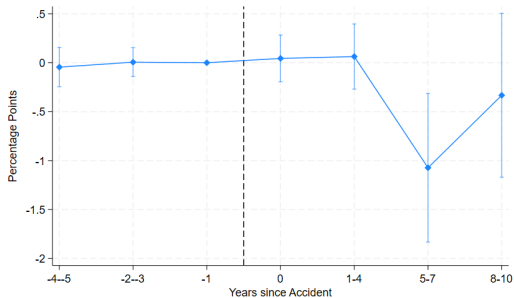
... and Shielding Children from Adverse Consequences

ADHD Drug Prescriptions of Pre-Existing Children

By Access



Triple Difference

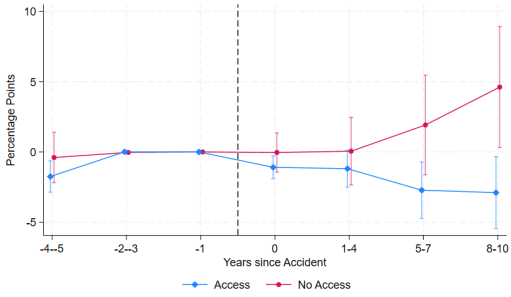


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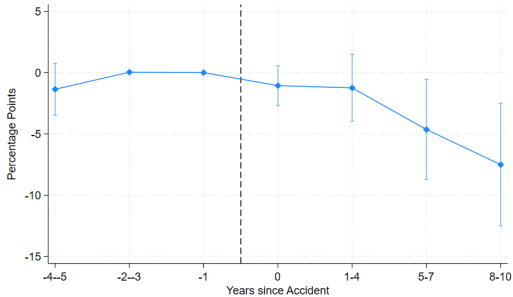
Partners Do *Not* Jump Ships

Staying with Pre-Existing Partner

By Access



Triple Difference



Notes: First-stage effect on reskilling is 10 percent.

▸ Levels

The Dogs that Didn't Bark

Reskilling does not mitigate adverse impacts on

1. Long-term labor supply of partners
2. Labor supply of children
3. Lifestyle-related physical health of affected worker
4. Lifestyle-related physical health of partner

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Putting the Pieces Together

Taking stock: Reskilling after loss of ability...

1. Protects mental health: Prevents 1 depression for every 5 workers reskilled
2. Prevents partner decline: Reduces partner depression by nearly same magnitude
3. Shields children: Prevents 1 ADHD diagnosis for every 12 parents reskilled

Questions:

1. What are the economic significance of these health and family effects?
2. How do they compare to the direct effects on labor earnings?

Strategy: Apply QALY loss estimates to causal effects on mental health outcomes

Putting the Pieces Together

Costs and Benefits of Reskilling (PDV for Compliers)

	Per reskilled worker ($)	Per dollar of education	Percent of total
Education costs	-70,297	-1.0	-21.8
Earnings gains	269,470	3.8	83.6
Mental health effects	123,197	1.8	38.2
Workers	*51,503*	*0.7*	*16.0*
Partners	*50,963*	*0.7*	*15.8*
Children	*18,868*	*0.3*	*5.9*
Government	*1,862*	*0.0*	*0.6*

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Motivation: Losing work can lead to psychological and social decline

This paper: Reskilling can mitigate adverse consequences

- $\rightarrow$ Protecting mental health
- $\rightarrow$ Preventing partner decline
- $\rightarrow$ Shielding children

These indirect benefits are economically meaningful

- $\rightarrow$ Adds $\sim$ 50% to reskilling gains beyond labor earnings

THANK YOU

References I

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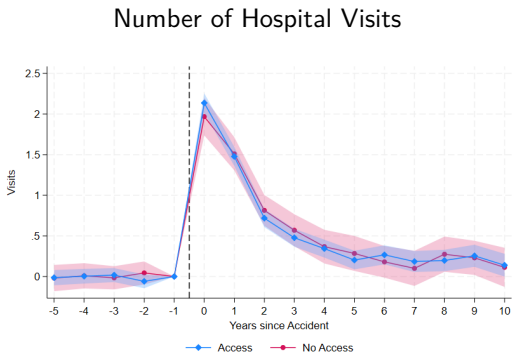
Acknowledgements and Disclosure Statement

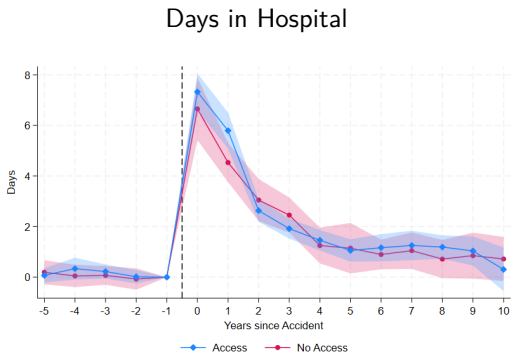
This project received financial support from the Rockwool Foundation Research Unit. We do not have any other financial relationships or other potential conflicts of interest to disclose.

Roadmap

Appendix

Injury Severity by Access to Education (Humlum et al., 2024)

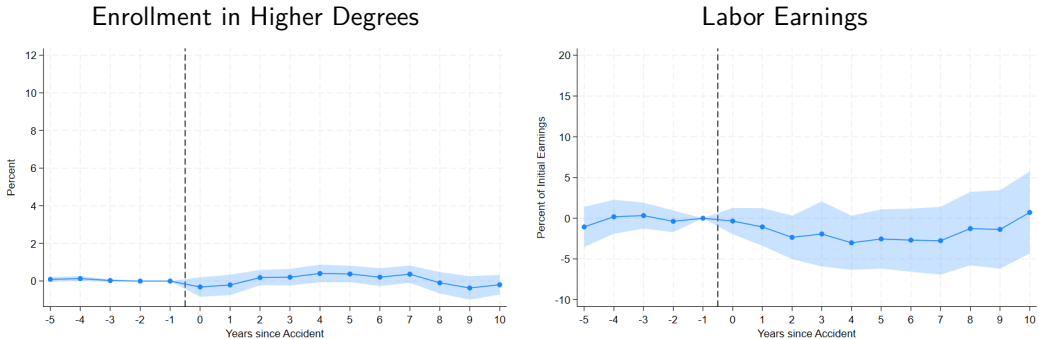




Return

Similar Labor Supply If Not Hit by Accidents (Humlum et al., 2024)

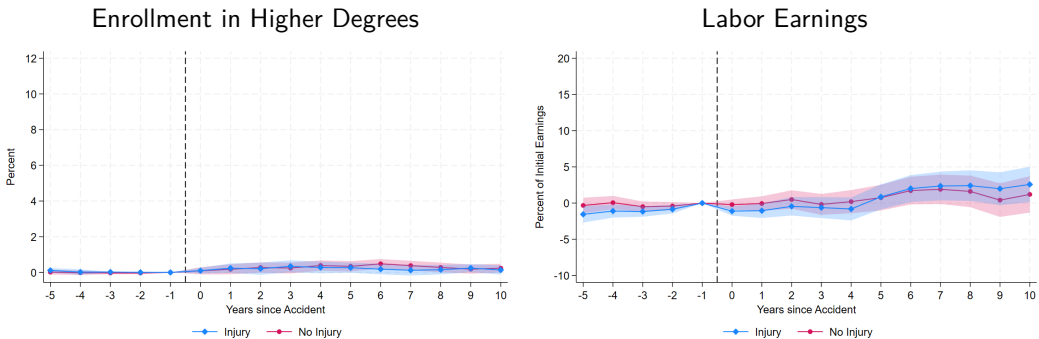
Figure: Outcomes of Match Workers around Placebo Events
("Access" – "No Access")



Return

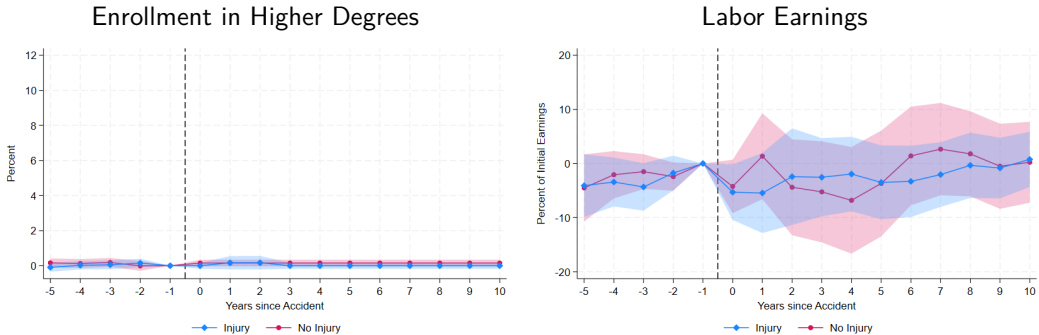
Placebo Test on Temporary Injuries (Humlum et al., 2024)

Figure: Outcomes around Temporary Work Injuries
("Access" – "No Access")



Placebo Test on Older Workers (Humlum et al., 2024)

Figure: Outcomes around Work Accidents of Workers Age 55+
("Access" – "No Access")



Return

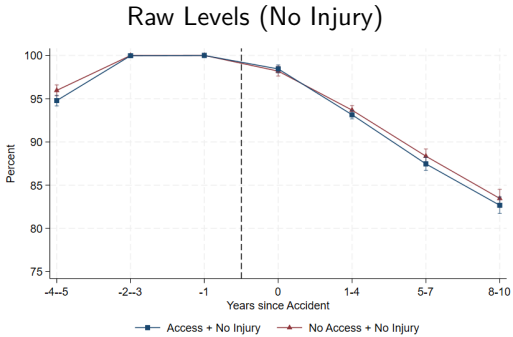
Similar FMH in Year Before Accident

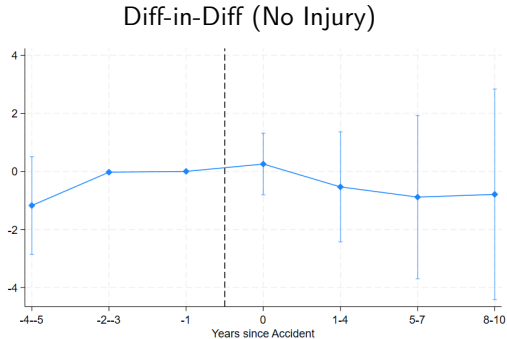
	Injured worker			Partner			Children		
	Access	No Access - IPW	Std. Diff.	Access	No Access - IPW	Std. Diff.	Access	No Access - IPW	Std. Diff.
Panel A. Demographics									
Age	41.87	42.16	-2.8%	42.42	41.56	9.2%	17.52	17.04	4.5%
	(11.12)	(10.10)		(9.57)	(8.99)		(10.64)	(10.47)	
Female	2.44	11.76	-36.9%	97.55	88.38	0.0%	42.68	41.82	1.7%
	(15.43)	(32.22)		(15.46)	(32.06)		(49.47)	(49.33)	
Panel B. Education									
Years of Schooling	14.42	14.33	25.0%	12.93	13.01	-3.4%	7.05	6.44	9.4%
	(0.16)	(0.48)		(2.35)	(2.38)		(6.47)	(6.43)	
Primary	0.00	0.00	0.0%	18.24	16.31	5.1%	23.58	23.42	0.4%
	(0.00)	(0.00)		(38.63)	(36.96)		(42.45)	(42.36)	
Vocational	100.00	100.00	0.0%	28.70	34.19	-11.8%	19.06	15.42	9.6%
	(0.00)	(0.00)		(45.24)	(47.45)		(39.28)	(36.12)	
Secondary	0.00	0.00	0.0%	2.33	2.06	1.8%	6.96	6.53	1.7%
	(0.00)	(0.00)		(15.09)	(14.21)		(25.45)	(24.71)	
Post-Secondary	0.00	0.00	0.0%	50.73	47.44	6.6%	6.45	6.37	0.3%
	(0.00)	(0.00)		(50.00)	(49.95)		(24.56)	(24.42)	
Panel C. Employment									
Labor income (1000DKK)	400.05	401.91	-1.5%	248.15	259.32	-10.1%	110.92	96.87	8.6%
	(118.81)	(123.59)		(110.93)	(110.78)		(166.61)	(161.12)	
Full-time (%)	100.00	100.00	0.0%	88.62	88.00	1.9%	31.09	27.47	8.0%
	(0.00)	(0.00)		(31.76)	(32.51)		(46.29)	(44.64)	
Hours worked	1669.19	1690.80	-3.6%	1616.86	1636.80	-4.8%	521.56	448.81	9.7%
	(647.86)	(547.08)		(421.44)	(402.17)		(770.78)	(731.03)	
Hourly wage (1000DKK)	254.44	248.04	4.2%	147.71	154.56	-15.9%	83.17	75.68	3.1%
	(163.95)	(140.58)		(43.78)	(42.25)		(205.02)	(267.02)	
Labor market experience	21.11	20.42	7.3%	18.29	17.49	9.1%	3.02	2.66	7.5%
	(9.57)	(9.29)		(8.77)	(8.84)		(4.98)	(4.86)	
Union (%)	91.62	93.32	-6.4%	87.81	89.19	-4.3%	31.33	28.21	6.8%
	(27.71)	(24.97)		(32.72)	(31.06)		(46.39)	(45.01)	
Panel D. Occupation									
Physical ability requirement (std.)	1.10	0.73	43.5%	0.18	0.22	-3.3%	0.33	0.24	9.3%
	(0.87)	(0.83)		(1.11)	(1.09)		(1.04)	(0.93)	
Cognitive ability requirement (std.)	-0.32	-0.55	30.9%	-0.24	-0.31	7.5%	-0.28	-0.39	12.6%
	(0.76)	(0.75)		(0.86)	(0.88)		(0.83)	(0.86)	
Panel E. Drug consumption (%)									
Anti-depressants	4.95	5.61	-2.9%	7.11	5.90	4.9%	2.40	2.19	1.4%
	(21.70)	(23.01)		(25.70)	(23.56)		(15.30)	(14.64)	
ADHD	0.20	0.00	6.3%	0.07	0.21	-3.7%	0.21	0.10	2.9%
	(4.42)	(0.08)		(2.69)	(4.60)		(4.62)	(3.14)	
Panel F. Injury									
Year of Injury	2005.24	2005.48	-5.0%	2005.24	2005.48	-5.0%	2005.29	2005.47	-3.8%
	(4.89)	(4.89)		(4.89)	(4.89)		(4.95)	(4.86)	
Observations	2746	2251		1674	1383		4670	4414	

▸ Return

Similar FMH if not hit by accidents

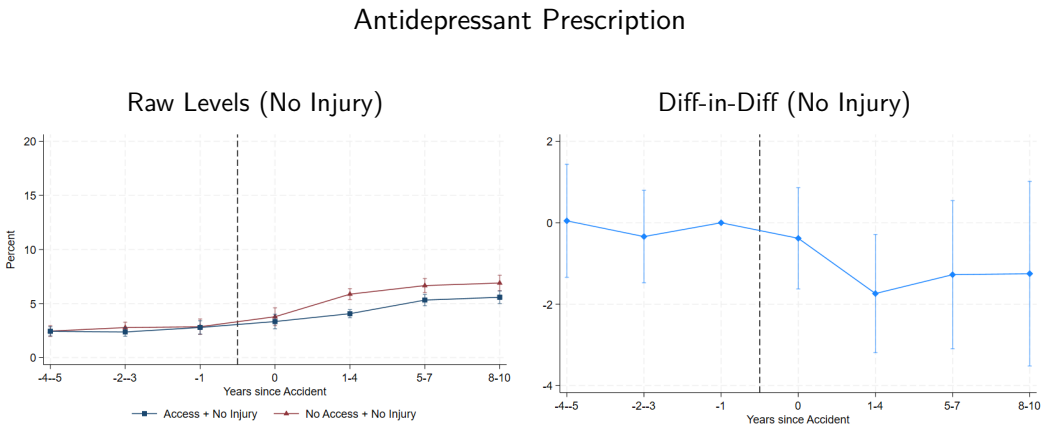
Staying with Pre-Existing Partner





Return

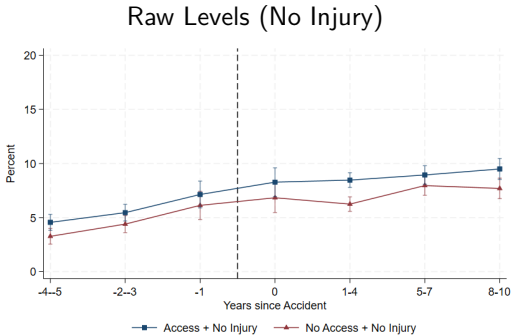
Similar FMH if not hit by accidents

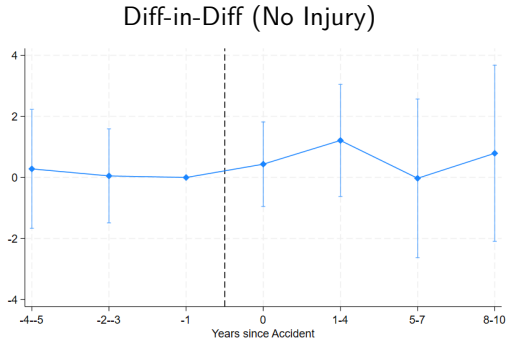


▸ Return

Similar FMH if not hit by accidents

Antidepressant Prescription of Pre-Existing Partner

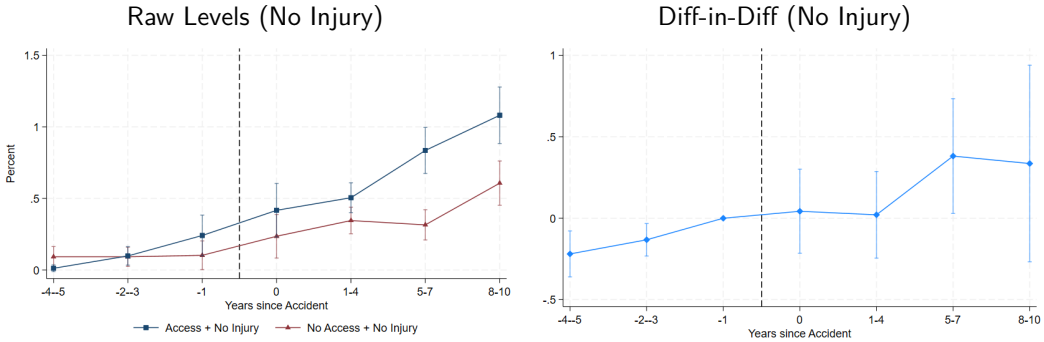




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Similar FMH if not hit by accidents

ADHD Drug Prescriptions of Pre-Existing Children

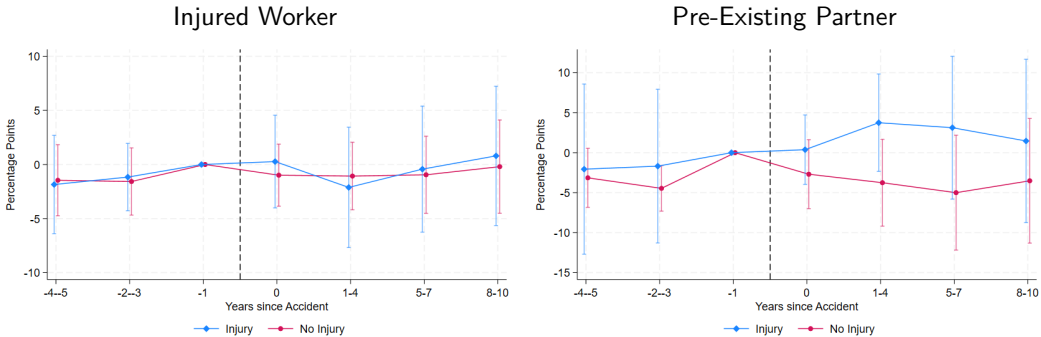


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Similar FMH for oldest workers (Age $>$ 55)

Antidepressant Prescription

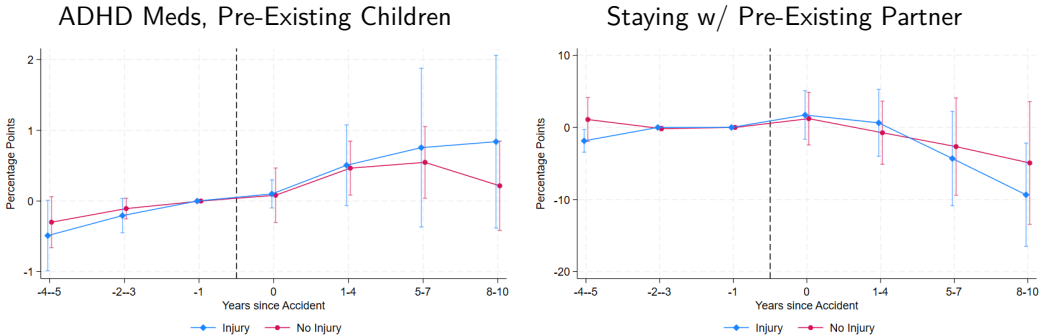
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Similar FMH for oldest workers (Age $>$ 55)

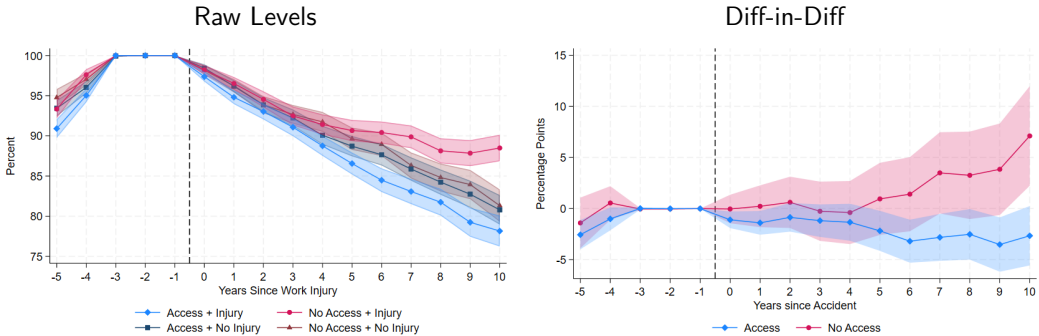
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Return

Partners Do *Not* Jump Ships

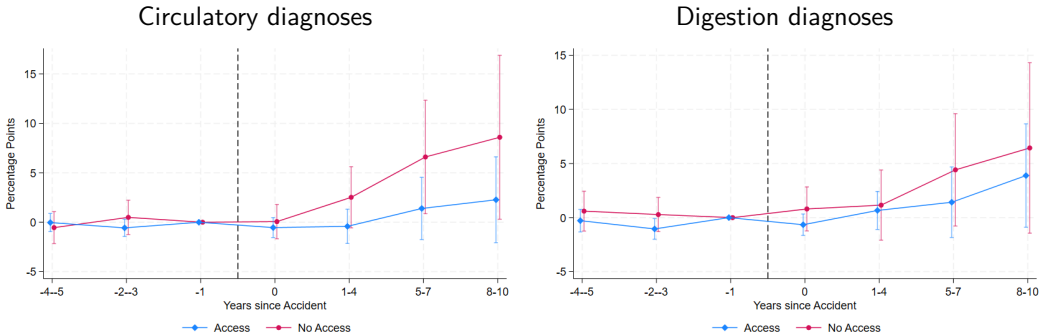
Staying with Pre-Existing Partner



▸ Return

Lifestyle-related physical health of partner

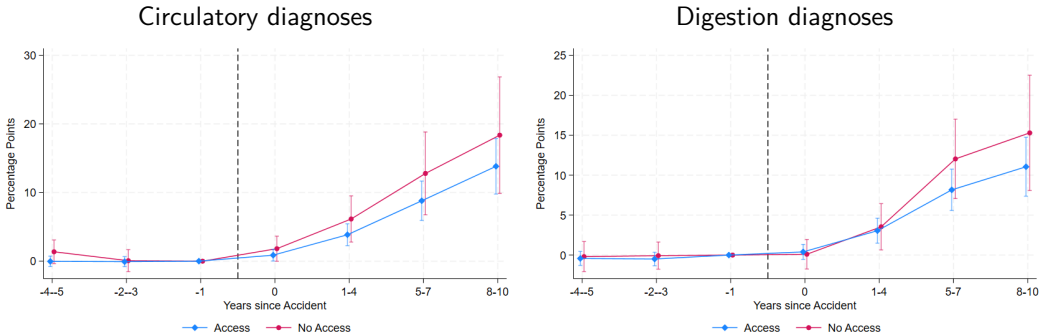
Physical health around work accidents (lifestyle diagnoses)



▸ Return

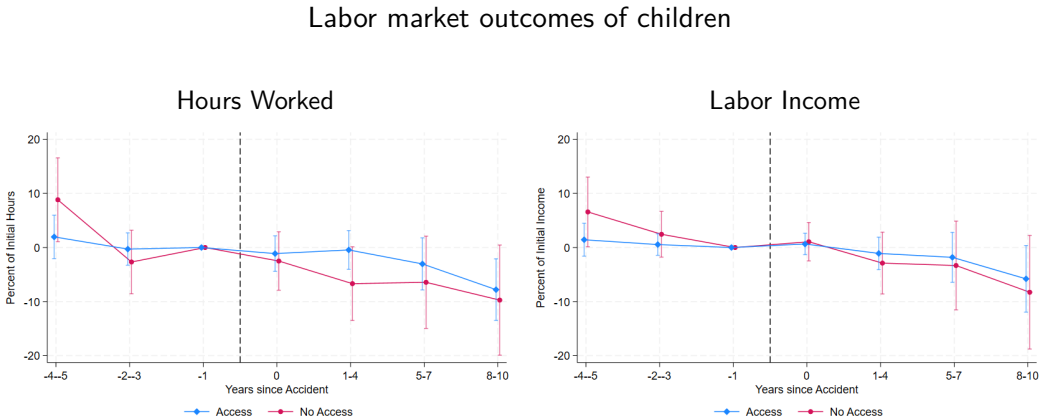
Lifestyle-related physical health of affected worker

Physical health around work accidents (lifestyle diagnoses)



▸ Return

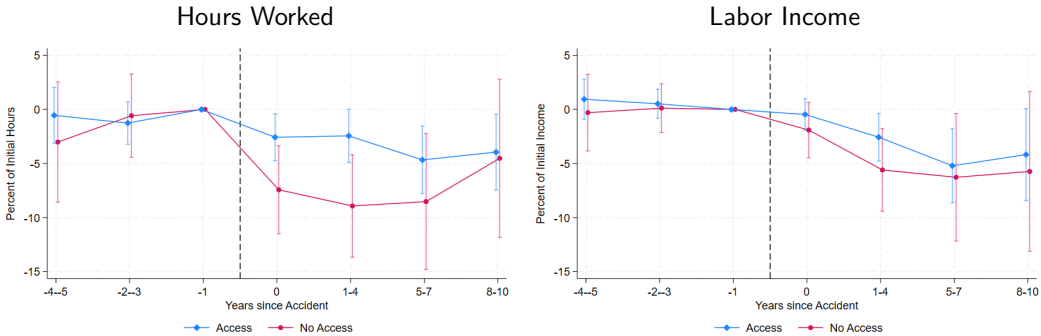
Similar labor supply of children



Return

Similar long-term labor supply of partners

Labor market outcomes of partners



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Valuing the Mental Health Benefits of Reskilling

1. We account for the effects of depression in injured workers and their partners, as well as ADHD in children. Our estimates include both the cost of medication (government subsidies and co-pays) and the loss of Quality-Adjusted Life Years (QALYs).
2. We use dynamic triple-difference estimates and extrapolate the final estimates ("Placement") to the retirement age of 65.
3. We scale family member estimates by their relative prevalence: 61% of injured workers have partners, and the average injured worker has 1.7 children.
4. We assume an annual QALY loss of 20% for depression and ADHD, based on Jia et al. (2015) and Thai et al. (2023)
5. We assign a QALY value of $100,000, which falls within the mid-range of estimates in the literature Neumann et al. (2014)

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