

Hiring discrimination against young workers

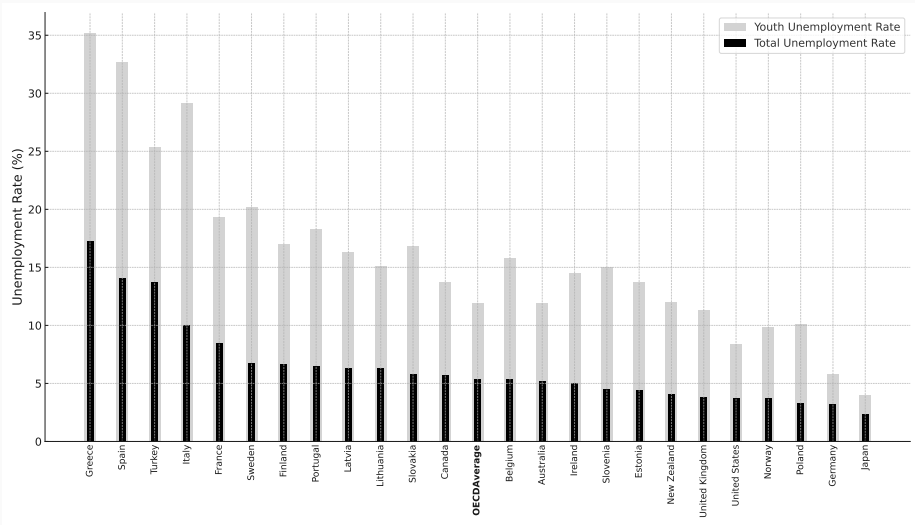
Jan Sauermann (IFAU)

with Sebastian Butschek (University of Innsbruck) *and* Louis-Pierre Lepage (Stockholm University)

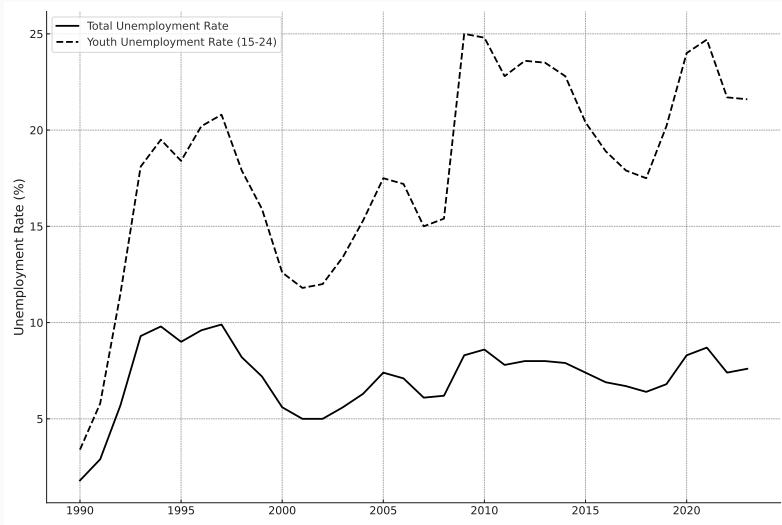
COPE Trondheim, May 2025

Motivation

Motivation: (Youth) unemployment 2019



Motivation: (Youth) unemployment in Sweden over time



- Youth unemployment important policy issue
- We also know that unemployment at young age can turn into long-term disadvantages
- Why are young adults not hired in the same way as older age groups?
 - Lower skills and human capital (e.g., on the job training)
 - Lower rung of the job ladder (e.g., Haltiwanger et al., 2018)
 - What role do **employer perceptions** play?
 - **Stereotyping of young workers** and whether/not young workers are suitable for certain jobs
 - Little work on **youth discrimination**, even less on its causes

Illustration: Perceptions about young generations

Year: 1990



Illustration: Perceptions about young generations

Year: 2013



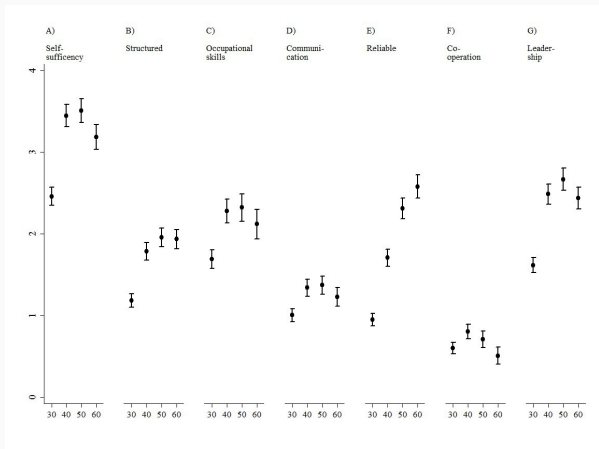
Illustration: Perceptions about young generations

Year: 2023



Employer survey (Carlsson & Andersson; 2019)

"Suppose that you are **recruiting a new employee to a typical position** in your workplace. To what extent do you think that an average employee at age 30, 40, 50, and 60 would have the following characteristics?" N = 1336.



What we do in this paper

- Propose a **test of discrimination** drawing from the employer learning literature
- Key idea: employers are
 - (1) uncertain about the productivity of a worker characteristic (e.g. age) and
 - (2) imperfectly observe productivity at hiring

⇒ Discrepancy between expected and realized productivity ⇒ shock
- Key question: **does experienced discrepancy affect future hiring behavior?**
- Implement test using linked employer-employee data from Sweden
 - Observed and unobserved (military tests) worker characteristics at hiring
 - Observe firms' hiring history with workers of different ages
 - Rich data to investigate robustness and heterogeneity
- Fall 2025: manager survey to further test mechanisms

Preview of findings (so far) and contributions

- Document striking pattern of hiring discrimination
 - Decreased (increased) hiring following unexpectedly bad (good) young hires
 - Spillover from outcomes with individual hires to outcomes with their group
 - No such pattern for prime age workers
- This hiring pattern broadly holds
 - Across time as well as variable and sample definitions
 - Within-firm and establishment
 - Across different types of jobs

Remainder of the presentation

Empirical specification and data

Results

Summary and outlook

Empirical specification and data

- Key idea: focus on establishments' first experience with age group j
 - Example
 - Suppose a firm's first young hire is less productive than expected.
 - Does this firm shy away from hiring young people as a consequence?
 - If so, is this behaviour unique to the hiring of young workers?
 - Compare responses to quality of first hire across age groups.
- Implementation:
 - Restrict sample to the universe of all newly established firms
 - Classify first experience with each age group as negative (positive) shock.
 - Estimate age group-specific link between quality of first experience and subsequent hiring behavior.

Estimating equation

How do negative (positive) initial experiences affect future hiring?

$$Hireshare_{ejtg} = \beta_0 + \beta_1 Shock_{ejg} + \beta_{2,g} Shock_{ejg} * \phi_g + \phi_g + \delta_{jtg} + \varepsilon_{ejtg}$$

Key variables:

- Outcome
 - $Hireshare_{ejtg}$ - age group g 's share of hires in event e of firm j in month t
- Controls
 - $Shock_{ejg}$: share neg. (pos.) shock in firm j 's first hiring event with group g
 - ϕ_g : age group fixed effects
 - δ_{jtg} : county, industry, and quarter fixed effects interacted with age groups

How do we define productivity shocks?

- How we define $Shock_{ejg}$
 - Average of cog. and non-cog. test military test scores taken at age 18
 - Residualize using age, year, 2-digit industry, and education field
 - Negative (positive) shock if residualized composite score is below p25 (above p75)
 - (Alternative residualizations and raw scores as robustness)
- Limits shock measure to
 - Male hires
 - Swedish born hires

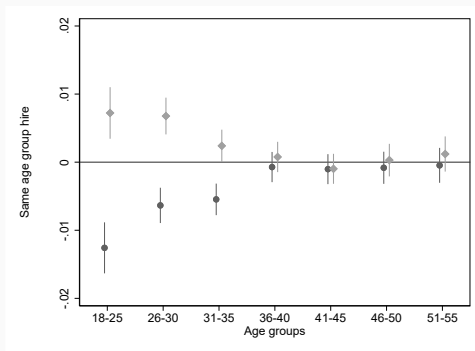
- Use **Swedish employee-employer matched register data** from 1990-2021
 - Universe of establishments and workers
 - Detailed demographic and labor market information
 - Can characterize each establishment's hiring history using employment spells
- Establishments of **newly founded firms**
- **Measure of productivity unobserved by employers at hiring**
 - Military enlistment scores (formerly mandatory for men)
 - Index of cognitive (crystallized intelligence) and non-cognitive (psych. fitness)
 - Restrict to years and age groups with good coverage/overlap of military test scores

▸ coverage

Results

Hiring discrimination against young workers: main result

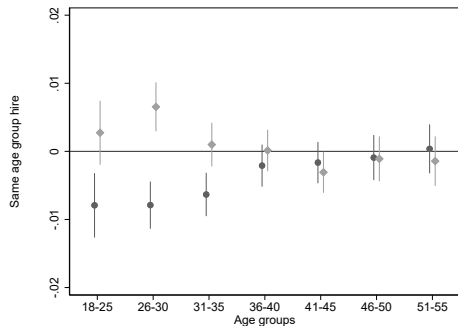
- **Treatment:** establishment experiences positive (grey) or negative (black) productivity surprise in initial hiring of age group g
- **Outcome:** dummy whether firm hires again from same age group g (in three following hiring events)



- **Spillover:** initial positive (negative) surprises have consequences
- Effects more muted towards older age groups
- Not different from zero from $g=[35,40]$

Hiring discrimination against young workers: types of establishments

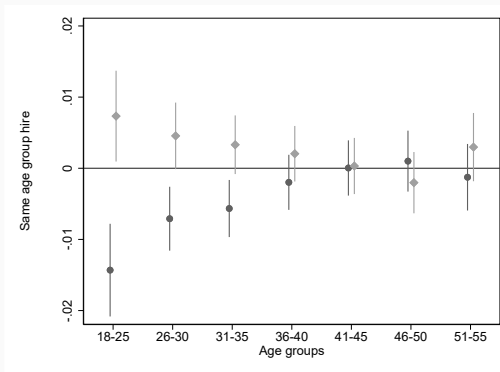
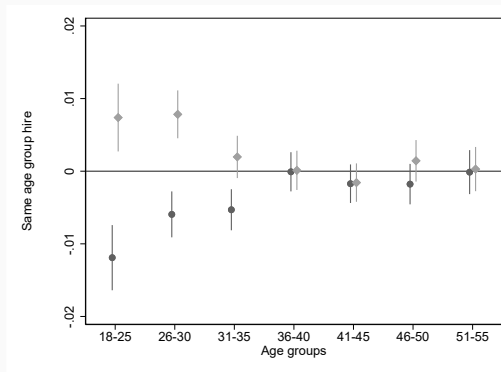
- Are these effects purely **mechanical**, e.g. due to differences between establishments?
- **Are establishments hiring young and old workers just different?**
- Example: young age groups more often hired for service sector jobs (e.g., sales)
- (1) Estimate model with establishment FEs



- Effects muted (esp. for positive experiences)
- But spillovers from initial experiences persist

Hiring discrimination against young workers: types of establishments

- Are establishments hiring young and old workers just different?
- (2) Industries typically hiring young (left) vs old workers (right)



Hiring discrimination against young workers: types of establishments

- Are establishments hiring young and old workers just different?
- (3) Results are robust when limiting estimation sample to
 - Seasonal jobs
 - Including student workers
 - Private vs public sector

▶ robustness table
- Results are also robust to alternative definitions
 - Test scores used
 - Residualization used
 - Age bucketing

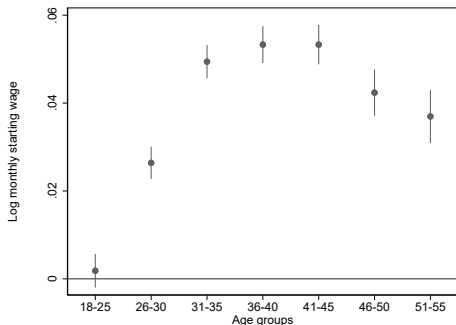
▶ robustness table
- If results are persistent and robust, what could be mechanisms behind it?

Hiring discrimination against young workers: potential mechanisms

- Potential mechanisms and related questions
 - Is the value of test scores the same for different age groups?
 - But: effects are quite similar for sectors with mainly young/old hires
 - Are establishments equally good in assessing worker quality of different age groups?
 - Next slide

Potential mechanism: can firms assess worker quality?

- Are establishments able to predict the quality of new hires?
- Figure: residualized test scores and starting wages in establishments
- Positive values: firms can predict quality of new hires and pay higher wages



- Young hires: higher quality does not result in higher starting wages
- Suggests that establishments are not able to predict quality
- Can do so for older workers

Conclusion

Conclusion

- New way to document differences in hiring dynamics across age groups
- Document striking differences:
 - Reduced hiring of young workers after bad first young hire
 - Increased hiring of young workers after good first young hire
 - No such dynamics for prime-age and older workers.
- Other results so far rule out simple compositional effects and are consistent with spillovers from individuals to groups
 - The pattern holds within-firm (or establishment).
 - The pattern is present in different types of jobs and industries.
- Next steps:
 - Dynamics and updating in stereotypes
 - Manager survey (experiment) to learn more about mechanisms

Appendix

Conceptual framework: productivity surprises (1)

- Productivity of hire i

$$y_i = \gamma_1 s_i + \gamma_2 q_i + \gamma_3 z_i + \eta_i$$

- s_i is observed by employer and researcher (e.g. age, education)
- q_i is observed by employer but not researcher (e.g. interview)
- z_i is observed by researcher but not employer (e.g. enlistment test scores)
- η_i is not observed by either (e.g. career intentions)

- Employer surprise in the productivity of hire i

$$E[y_i | s_i, q_i] - y_i = \gamma_3 (E[z_i | s_i, q_i] - z_i) + (E[\eta_i | s_i, q_i] - \eta_i)$$

- Want to predict surprise using information on z_i
 - Residualize z_i from s_i , \tilde{z}_i
 - Classical lit assumption: surprise is independent of $q_i \rightarrow$ use deviations from the mean

Conceptual framework: productivity surprises (2)

- If employers know the weights on each productivity component (γ)
 - Surprise won't lead to any updating by the employer

- If employers are uncertain about γ_1 , then the surprise is given by

$$E[y_i|s_i, q_i] - y_i = (E[\gamma_1|s_i, q_i] - \gamma_1)s_i + \gamma_3(E[z_i|s_i, q_i] - z_i) + (E[\eta_i|s_i, q_i] - \eta_i)$$

- Can still (noisily) predict the surprise using \tilde{z}_i
 - Assume it is independent of $E[\gamma_1|s_i, q_i] - \gamma_1$
 - We know it is due to \tilde{z}_i , but the employer does not
 - Employer updates about γ_1
- Given repeated hiring decisions
 - Surprise with i affects the expected productivity of worker j with $s_i = s_j$
 - Diminishing impacts given additional hires with the same s

Appendix: Military test score coverage

Start	End	Observ.	Avg.	18-22	23-27	28-32	33-37	38-42	43-47	48-52	53-57	58-62	63-67	68-80
1990	1994	1432936	.5514	.8762	.8721	.8168	.8179	.7199	.0552	00000	00000	00000	00000	00000
1995	1999	1944062	.6394	.7984	.8336	.8246	.7636	.7877	.6754	.0501	00000	00000	00000	00000
2000	2004	2337473	.6329	.6484	.7404	.7765	.7776	.7143	.7681	.6354	.0396	00000	00000	00000
2005	2009	2615649	.5704	.4457	.5743	.6496	.7111	.7372	.6927	.7550	.6494	.0427	00000	00000
2010	2014	2902267	.4363	.1444	.3638	.4797	.5789	.6585	.7084	.6803	.7445	.6488	.0443	00000
2015	2021	4448104	.2960	00000	.0720	.2395	.3684	.4728	.5837	.6590	.6728	.7007	.7052	.1063

► back

Appendix: Robustness

	Base (1)	No season. (2)	No stud. (3)	Private (4)	1 hire (5)	50/50 (6)	Cog (7)	Noncog (8)	Firm (9)	Men-only (10)	Ext.-marg. (11)
Age <36 × Share neg.	-0.0073 (0.0011)	-0.0069 (0.0014)	-0.0059 (0.0011)	-0.0061 (0.0012)	-0.0061 (0.0012)	-0.0061 (0.0009)	-0.0080 (0.0011)	-0.0036 (0.0011)	-0.0070 (0.0012)	-0.0075 (0.0012)	-0.0098 (0.0014)
Share neg.	-0.0008 (0.0006)	-0.0017 (0.0008)	-0.0013 (0.0006)	-0.0012 (0.0006)	-0.0008 (0.0007)	-0.0005 (0.0005)	0.0004 (0.0006)	-0.0013 (0.0006)	-0.0007 (0.0007)	-0.0005 (0.0007)	0.0021 (0.0009)
Age <36 × Share pos.	0.0052 (0.0011)	0.0037 (0.0013)	0.0049 (0.0011)	0.0048 (0.0012)	0.0043 (0.0012)	0.0061 (0.0009)	0.0068 (0.0011)	0.0050 (0.0011)	0.0058 (0.0012)	0.0043 (0.0012)	0.0073 (0.0014)
Share pos.	0.0002 (0.0006)	0.0008 (0.0008)	0.0004 (0.0006)	0.0002 (0.0007)	-0.0001 (0.0007)	0.0005 (0.0005)	-0.0011 (0.0006)	0.0005 (0.0006)	0.0001 (0.0007)	0.0001 (0.0007)	-0.0019 (0.0009)
Outcome mean	0.165	0.163	0.163	0.154	0.152	0.165	0.164	0.162	0.160	0.163	0.248
Units × age groups	2,386,150	1,486,162	2,333,933	1,852,084	1,792,630	2,386,150	2,372,834	2,244,535	1,843,112	1,859,902	2,386,150
Units	372,328	305,383	365,603	305,546	333,895	372,328	371,003	359,769	298,837	336,298	372,328
Clusters (firm)	307,123	258,602	301,699	261,211	283,614	307,123	306,028	296,705	298,837	278,932	307,123
Adjusted R ²	0.107	0.097	0.091	0.100	0.079	0.107	0.107	0.106	0.092	0.098	0.097

Notes: Baseline is main result: establishment level, first experience, 3-event horizon, avg. of cog and noncog, resid by age, industry, year, education field, 7 lp bucket age groups. Clustered standard errors in parentheses.

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