When it hurts the most:
Timing of parental job loss and a child's education

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Abstract

We investigate the stages of childhood at which parental job loss is most consequential for their child's education. Using Danish administrative data linking parents experiencing plant closures to their children, we compare end-of-school outcomes to matched peers and to closures hitting after school completion age. Parental job loss disproportionally reduces test taking, scores, and high school enrolment among children exposed during infancy (age 0-1). Effects are largest for low-income families and low-achieving children. The causal chain from job loss to education likely works through reduced family income. Maternal time investment partially offsets the effect of reduced income.

Introduction

- Broad consensus that early stages are crucial for child's human capital (Almond and Currie, 2011).
- However, "early stages" are not clearly defined (Almond et al., 2018).
  - There may be "windows of opportunity" for interventions (Attanasio et al., 2022).
- A common shock that can affect child's learning is parental job loss.
  - Mixed findings from a number of contexts (e.g., Rege et al., 2011; Hilger, 2016; Mork et al., 2020; Britto et al., 2022).
  - Little evidence on children exposed to parental unemployment in early childhood.
→ At which stages of childhood is parental job loss most consequential for child's education?

Data and background

- Matched employer-employee registers: universe of Danish jobs in 1980-2017.
  - Flexible hiring and firing + generous safety nets ("flexicurity"; Kreiner and Svarer, 2022).
- End-of-school examinations (age 16): universe of Danish students in 2002-2018.
- Plant closures ≡ YoY ≠ in firm, location, industry, or employees (Browning and Heinesen, 2012).
- Although relatively exogenous job-loss events, Hilger (2016) shows selection into plant closures.
- Control group of children with similar parental working history before "placebo" closure.
→ $51,002$ closures in 1986-2017 (around $1,500$ per year).
→ $131,214$ treated-control (T-C) pairs with same age at real or placebo closure (age 0-22).

Research design

- Design difference-in-differences (DiD) comparisons around school completion (age 16).
  - T-C diff if aged > 16 at closure controls for age-invariant selection into treatment.
  - Id. assumption: absent parental plant closure, constant T-C diff across age at closure.
  - Improve on papers exploiting variation either in exposure or timing.
- Estimate comparisons by childhood stage ($a(i) \equiv$ age at parental job loss) (Carneiro et al., 2021).

$$Y_i = \delta_0 + \delta_1 T_i + \sum_{s \in \{I,E,M,L\}} \delta_s T_i \cdot \mathbb{1}[a(i) \in s] + \phi_{a(i)} + \psi X_i' + \eta_i$$

  - $I \equiv a(i) \leq 1$: "infancy".
  - $E \equiv 2 \leq a(i) \leq 5$: "early childhood".
  - $M \equiv 6 \leq a(i) \leq 11$: "mid childhood".
  - $L \equiv 12 \leq a(i) \leq 16$: "adolescence".

Results

- Children exposed to parental plant closure have lower achievement at age 16.
  - Likelihood of taking end-of-school tests decreases by 0.5 p.p.
  - Achievement in mathematics conditional on test taking decreases by $0.01 - 0.02\sigma$.
- Negative achievement effects are largest if exposed in infancy (age 0-1, 0.05σ).
  - Impacts on test-taking monotonically decrease with age at closure.
  - Little achievement effects if exposed in early (age 2-5) or mid (age 6-11) childhood.
  - Milder achievement effects if exposed in adolescence (age 12-16, 0.02σ).

Impacts of parental job loss on end-of-school outcomes
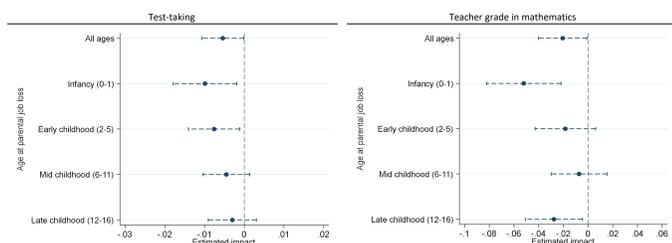
Additional results

- Negative impacts are more pronounced among children with family income below median.
- Children exposed in infancy are less likely enroled in upper-secondary education at age 17.
- Largest negative impacts in infancy for both paternal and maternal job loss, impacts of the latter are relatively more persistent throughout childhood.
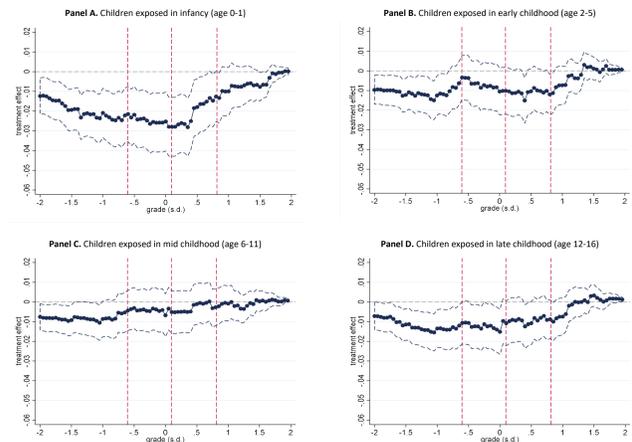
Distributional impacts

- Are treatment effects concentrated in specific parts of the achievement distribution?
  - Build 80 indicator variables = 1 if achievement is at least x (0.05σ bins in the $\pm 2\sigma$ interval).
  - Estimate the main model with each of the 80 indicators as dependent variable.
  - Plot estimated coefficients against achievement level by childhood stage.
    → This combines results on test taking + achievement level (dep. var. = 0 if test not taken).
- Largest negative impacts among children exposed in infancy throughout the achievement distribution.
- Largest negative impacts in the bottom half of the distribution.

Distributional impacts on teacher grades in Mathematics

Mechanisms

- Treatment effects mirror predicted job loss impacts on family income for children exposed by age 5.
  - Estimate individual-level job loss impacts using T-C pairs.
  - Split the sample using predicted job loss impacts based on predetermined covariates.
- Potential parental time investment (proxied by unemployment duration) compensates large income losses.

Impacts on teacher grades in mathematics by quintile of predicted job loss effect on family income
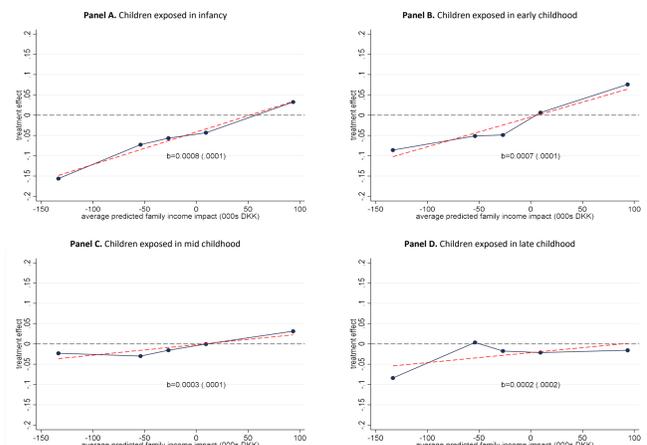
Impacts by tercile of predicted unemployment spell – children in top tercile of predicted family income loss
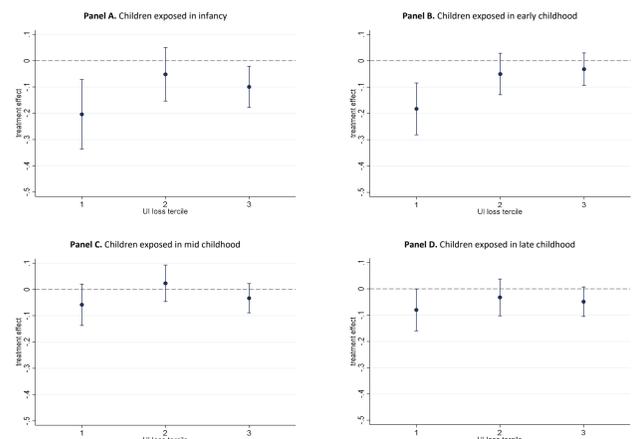
Additional results

- Negative impacts in infancy only when the main earner is displaced, regardless of main earner's gender.
- Compensatory effects of unemployment spells are more pronounced for maternal plant closures.

Discussion

- Parental job loss decreases end-of-school achievement in mathematics, especially if child is < 2 years old.
- Treatment effects at early stages closely reflect family income losses.
- Non-linearities in age at parental job loss cannot be explained by longer exposure to the shock.
→ Suggest that family income is more productive at very early age.
  - Either infancy is a critical period for human capital development.
  - Or structural feature of younger families makes it harder to compensate income loss: e.g., lower assets, or more exposure to the home environment.
- Interventions tackling job loss impacts should target workers with younger children.
- Results are worrying given the Danish safety net: may expect larger impacts elsewhere.

Main References

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