The Wounds That Do Not Heal: The Life-time Scar of Youth Unemployment

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Introduction

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Unprecedented levels of youth unemployment in many developed economies over last decade.

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This depends on two questions:

- *Better Evidence:* Will these workers suffer long term consequences?
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- Labour/Macro models: Recent evidence suggests importance of early shocks for labour market shocks/experimentation. (c.f.)

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- Oreopoulos et al (2012) Canadian Graduates.

Model

Framework

- Simple Mincer Equation:

$$w_i^t = f\left(Z_i, \lambda^t, \boldsymbol{e}_i^t, \varepsilon_i^t\right)$$

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- ε_i^t is a random shock affecting earnings.

Importance of past experience depends on how far in the past it was.

- Thus rewrite $\boldsymbol{e}_i^t$ as the vector $\left(e_i^t, e_i^{t-1}, \ldots, e_i^2, e_i^1\right)$.

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- Then denote each element as a function of previous experience and current shock:
  $e_i^2 = e^2\left(e_i^1, \varepsilon_i^2\right)$,
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- Then:

$$w_i^t = f^t\left(Z_i, \lambda^t, e^t\left(e^{t-1}\left(\ldots\right), \ldots, e^2\left(e_i^1, \varepsilon_i^2\right), e_i^1, \varepsilon_i^t\right), \ldots, e^2\left(e_i^1, \varepsilon_i^2\right), e_i^1, \varepsilon_i^t\right)$$

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- And the total effect of a period of unemployment when, e.g. $t = 1$ in period $t = 2$ is given by:

$$\frac{\mathrm{d}w_i^2}{\mathrm{d}e_i^1} = \frac{\partial w_i^2}{\partial e^2}\frac{\partial e^2}{\partial e_i^1} + \frac{\partial w_i^2}{\partial e_i^1}$$

Framework

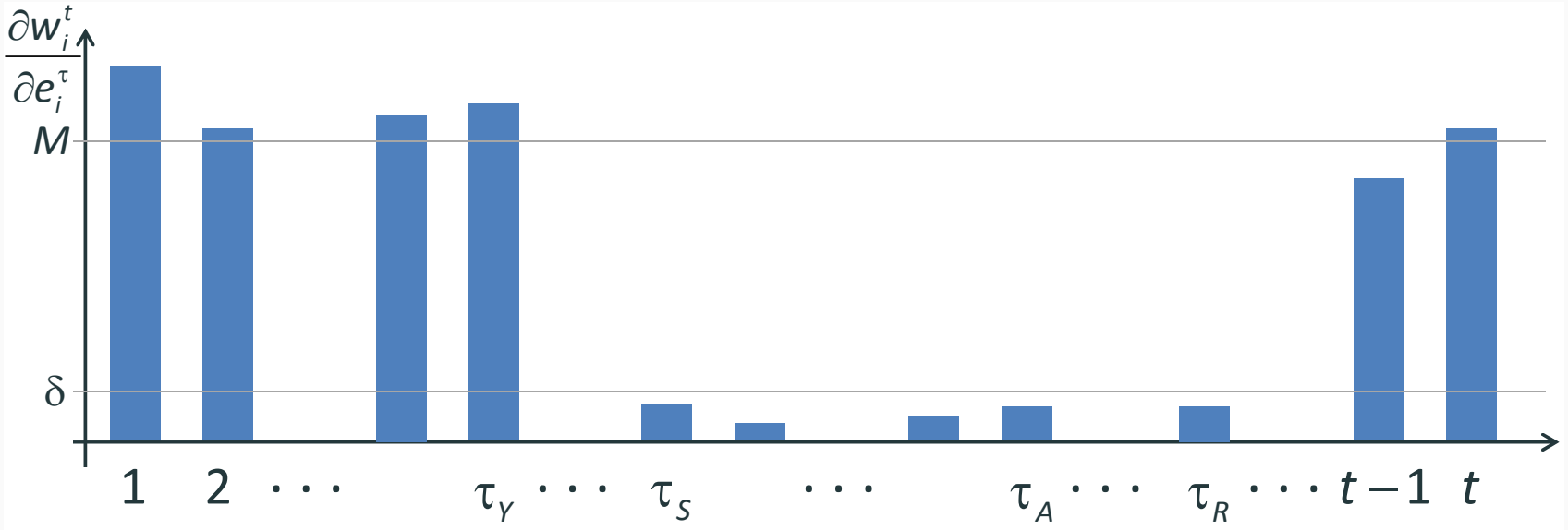
Assumption

There exist τ_Y, τ_A, τ_S, and τ_R, with $\tau_Y \leq \tau_S \leq \tau_A \leq \tau_R$, and positive constants M and δ, such that for $t \geqslant \tau_R$

$$\textit{Scarring effect:} \qquad \frac{\partial w_i^t}{\partial e_i^\tau} > M, \qquad \tau = 1, \ldots, \tau_Y,$$

$$\textit{Healing effect:} \qquad 0 \leqslant \left| \frac{\partial w_i^t}{\partial e_i^\tau} \right| < \delta, \qquad \tau = \tau_S, \ldots, \tau_A.$$

Framework



The partial derivatives of the earnings at time t implied by Assumption 1.

Empirical Strategy

Empirical Model

Empirical Analogue of Mincerian Equation:

Assume that $f(\cdot)$ is log-linear, and consider earnings until age 40:

$$\log w_i^t = Z_i^t \alpha^t + \underbrace{\gamma^t e_i^t}_{\text{Current Unemployment}} + \underbrace{\beta_{t-1}^t e_i^{t-1} + \beta_{t-2}^t e_i^{t-2} + \ldots + \beta_{s+1}^t e_i^{s+1} + \beta_s^t e_i^s}_{\text{Past Unemployment Scarring Effects}},$$

$$t = 19, \ldots, 40, \qquad s = 18, \ldots, t-1.$$

Empirical Model

$$\log w_i^{40} = X_i^{40}\alpha^{40} + \underbrace{\gamma^{40} e_i^{40}} + \underbrace{\beta_{39}^{40} e_i^{39} + \beta_{38}^{40} e_i^{38} + \ldots + \beta_{19}^{40} e_i^{19} + \beta_{18}^{40} e_i^{18}} + V_i^{4}$$

$$\log w_i^{39} = X_i^{39}\alpha^{39} + \underbrace{\gamma^{39} e_i^{39}} + \underbrace{\beta_{38}^{39} e_i^{38} + \ldots + \beta_{19}^{39} e_i^{19} + \beta_{18}^{39} e_i^{18}} + V_i^{39},$$

$$\vdots$$

$$\log w_i^{20} = X_i^{20}\alpha^{20} + \underbrace{\gamma^{20} e_i^{20}} + \underbrace{\beta_{19}^{20} e_i^{19} + \beta_{18}^{20} e_i^{18}} + V_i^{20},$$

$$\log w_i^{19} = X_i^{19}\alpha^{19} + \underbrace{\gamma^{19} e_i^{19}} + \underbrace{\beta_{18}^{19} e_i^{18}} + V_i^{19}$$

Empirical Model

Or:

$$\log \boldsymbol{w}_i = \boldsymbol{\alpha} \boldsymbol{X}_i + \boldsymbol{\gamma} \boldsymbol{E}_i + \boldsymbol{\beta} \boldsymbol{E}_i^L + \boldsymbol{V}_i,$$

where $\boldsymbol{w}_i = \left(w_i^{40}, \ldots, w_i^{19}\right)$, $\boldsymbol{X}_i = \left(X_i^{40}, \ldots, X_i^{19}\right)$, $\boldsymbol{E}_i = \left(e_i^{40}, \ldots, e_i^{19}\right)$, $\boldsymbol{E}_i^L = \left(e_i^{39}, \ldots, e_i^{18}\right)$ and $\boldsymbol{V}_i = \left(V_i^{40}, \ldots, V_i^{19}\right)$ are $\boldsymbol{\beta}$ is the following upper triangular matrix:

$$\begin{bmatrix} \beta_{39}^{40} & \beta_{38}^{40} & \beta_{37}^{40} & \cdots & \beta_{19}^{40} & \beta_{18}^{40} \\ & \beta_{38}^{39} & \beta_{37}^{39} & \cdots & \beta_{19}^{39} & \beta_{18}^{39} \\ & & \beta_{37}^{38} & \cdots & \beta_{19}^{38} & \beta_{18}^{38} \\ & & & \ddots & \vdots & \vdots \\ & & & & \beta_{19}^{20} & \beta_{18}^{20} \\ & & & & & \beta_{18}^{19} \end{bmatrix}$$

Restricting β

Building on Oreopoulous et al (2012):

"Entrant Unemployment"

$$\beta_s^t = \beta_E^t, \quad \text{if} \quad s = 18, 19, 20 \quad \text{and} \quad t > 22;$$
$$\beta_s^t = 0, \quad \text{otherwise.}$$

"Youth Unemployment"

$$\beta_s^t = \beta_Y^t, \quad \text{if} \quad s = 21, 22, 23 \quad \text{and} \quad t > 24;$$
$$\beta_s^t = 0, \quad \text{otherwise.}$$

"Adult Unemployment"

$$\beta_s^t = \beta_A^t, \quad \text{if} \quad s = 24, 25, 26 \quad \text{and} \quad t > 28;$$
$$\beta_s^t = 0, \quad \text{otherwise.}$$

And:

$$\beta_s^t = \beta_s^{t+1}, \qquad t = 23, 25, 27, \ldots, 39.$$

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- $\mu_a \in \{1, \ldots, 409\}$ defined by local area districts.

Benchmark Specification

$$\ln w_{iac}^t = X_i^t \alpha + \gamma e_i^t + \underbrace{\beta_E^t \sum_{s=18}^{20} e_i^s}_{\substack{\text{Scar effects of} \\ \text{unemployment} \\ \text{for Entrants}}} + \underbrace{\beta_Y^t \sum_{s=21}^{23} e_i^s}_{\substack{\text{Scar effects of} \\ \text{unemployment} \\ \text{for Youths}}} + \underbrace{\beta_A^t \sum_{s=24}^{26} e_i^s}_{\substack{\text{Scar effects of} \\ \text{unemployment} \\ \text{for early Adults}}} \tag{1}$$

$$+ \mu_a \theta_i + \eta_{ac}^t + \varepsilon_i^t,$$

$$t = 23\text{-}24, 25\text{-}26, \ldots, 39\text{-}40. \tag{2}$$

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- National Insurance number provides unique ID to track individuals.

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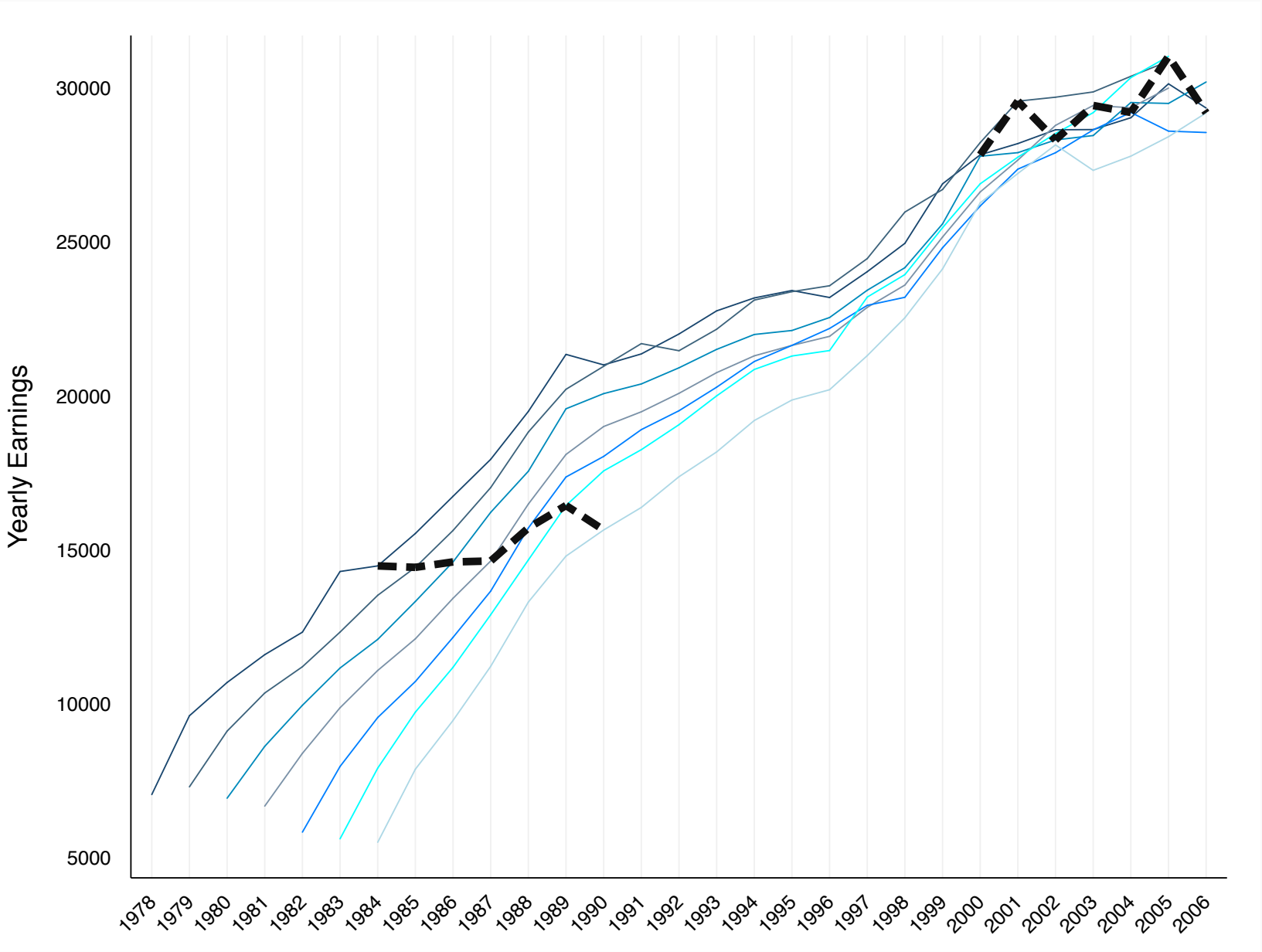
- Focus on Men. But, results similar for Women.

Income Data


Yearly Earnings
30000
25000
20000
15000
10000
5000
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
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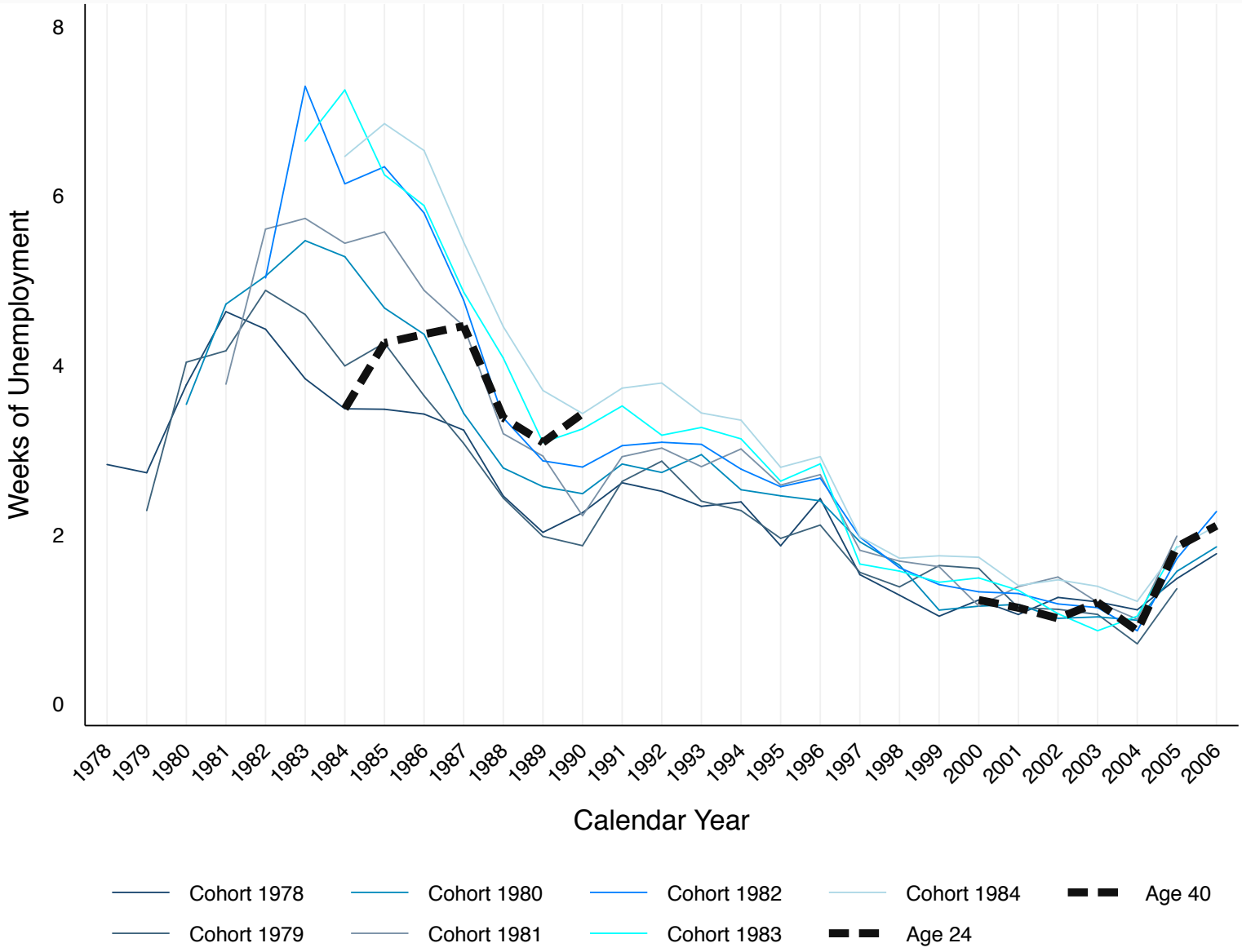
2004
2005
2006

Unemployment Data



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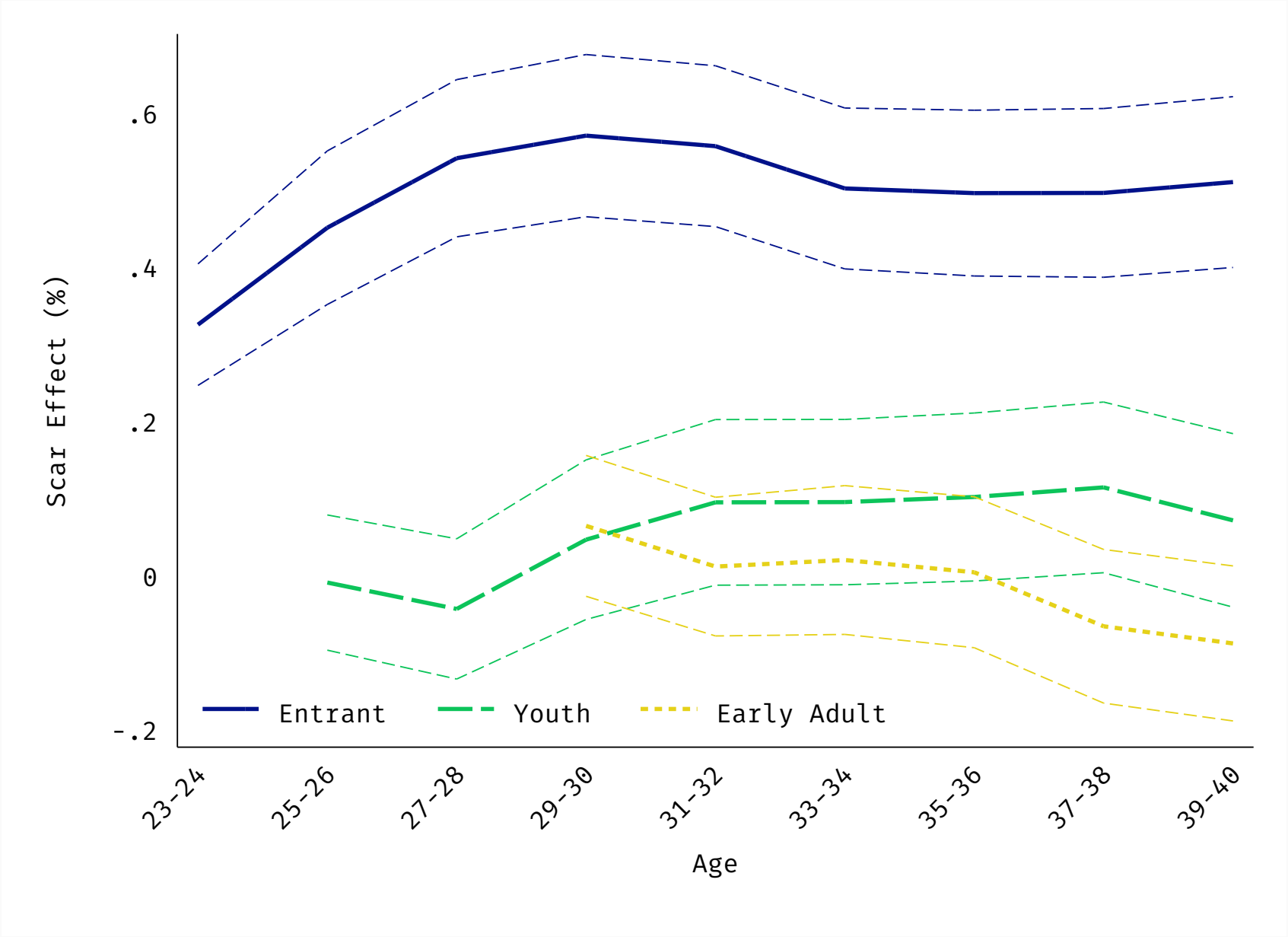
- Address measured extremely precisely: $\mu_a \in \{1, \ldots, 409\}$ local area districts.
- Address data is missing, not at random, pre-1996. Use 'meta' fixed-effects strategy defined on first observed addressed for these observations. Results robust to other assumptions. Define $\mu_a^0 \in \{1, \ldots, 409\}$

Results

Early Unemployment Scars, Later Unemployment Heals



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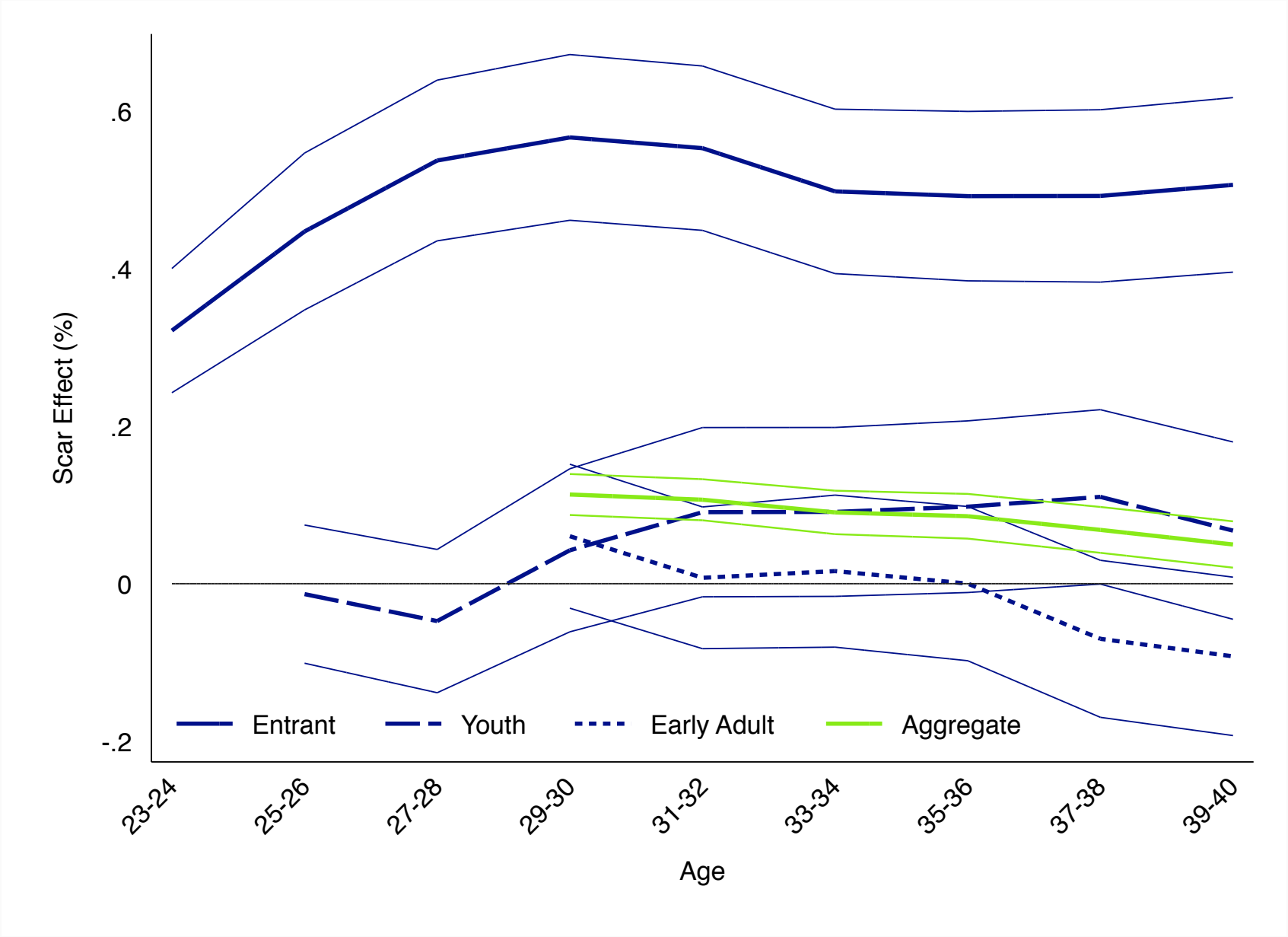

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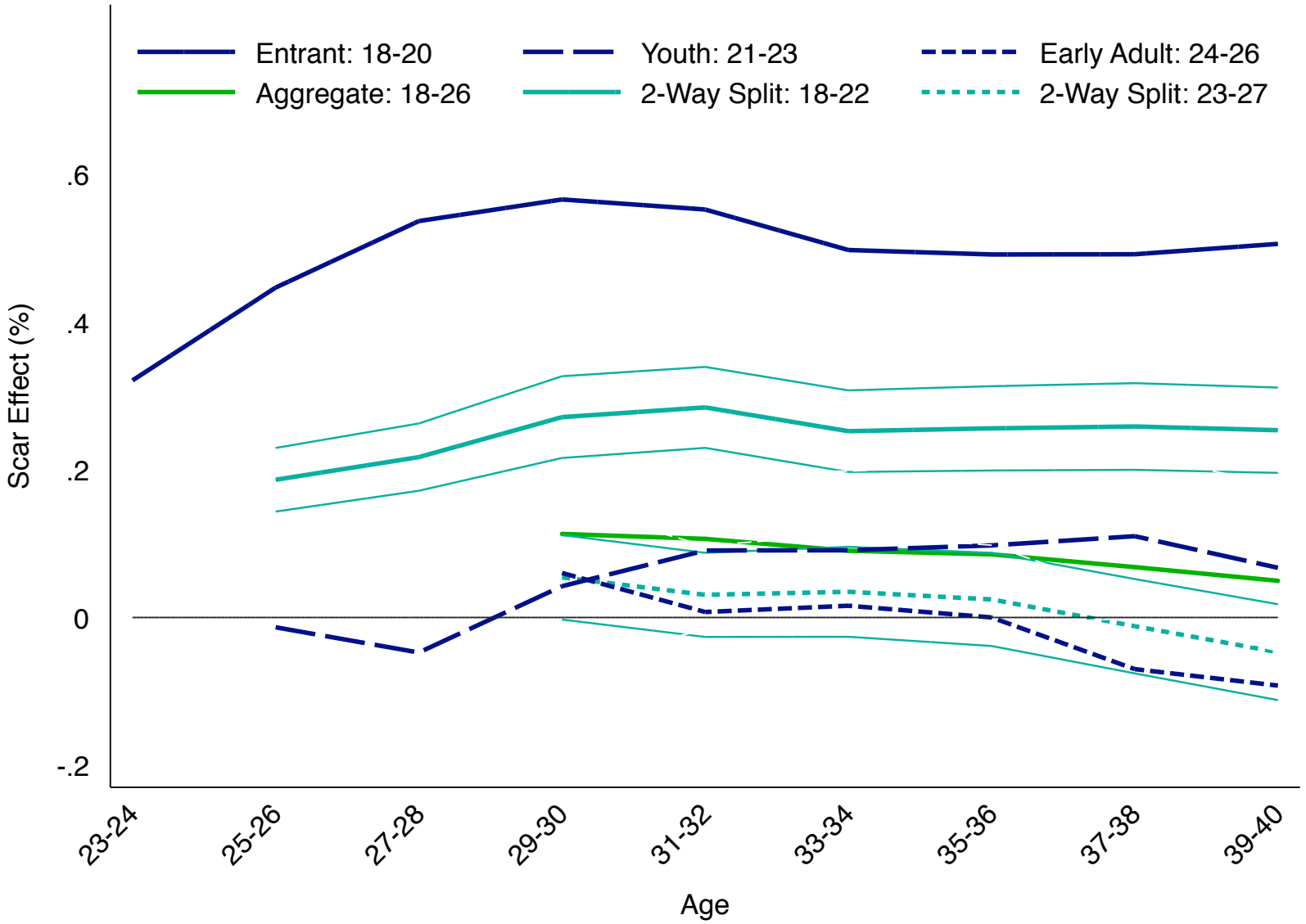
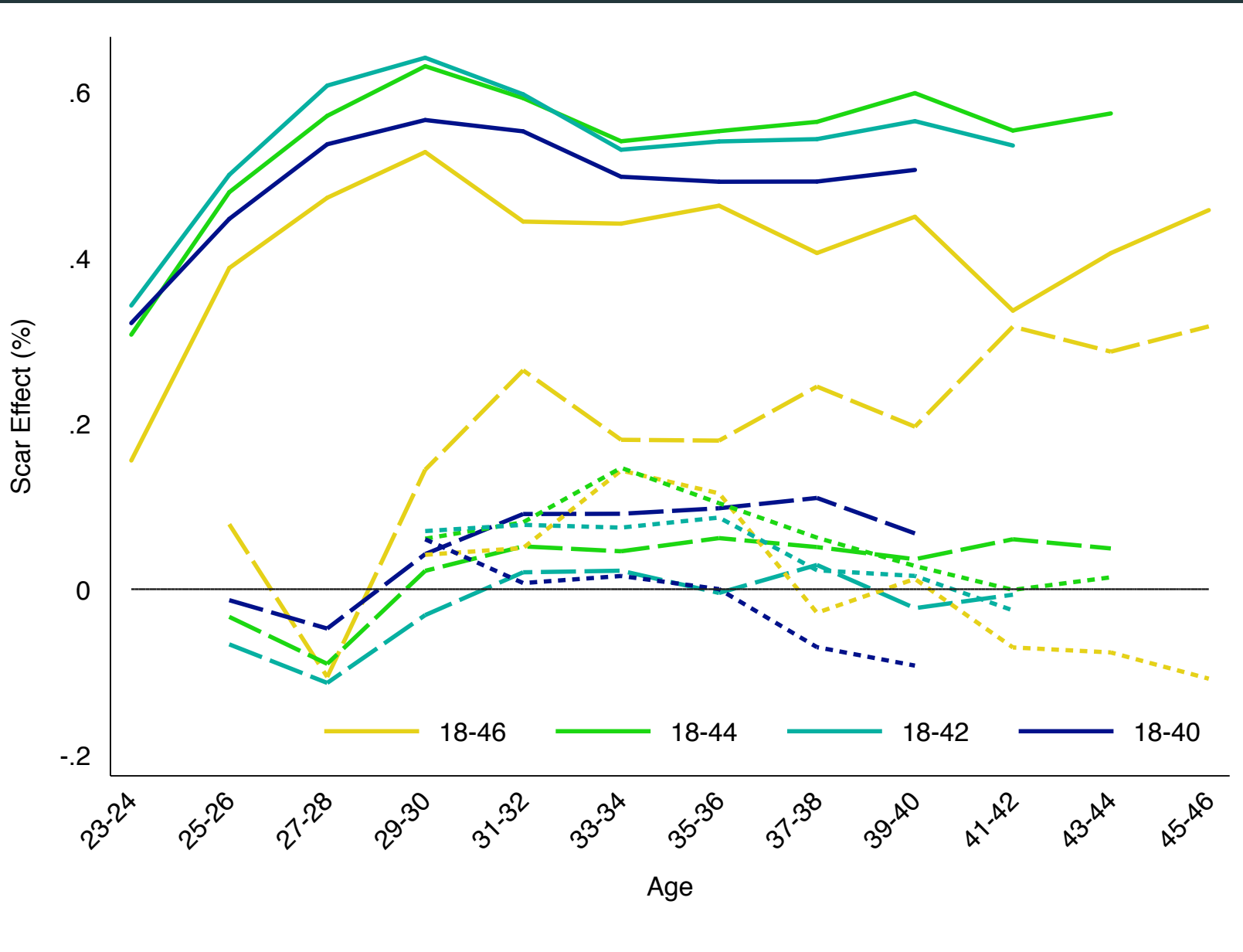
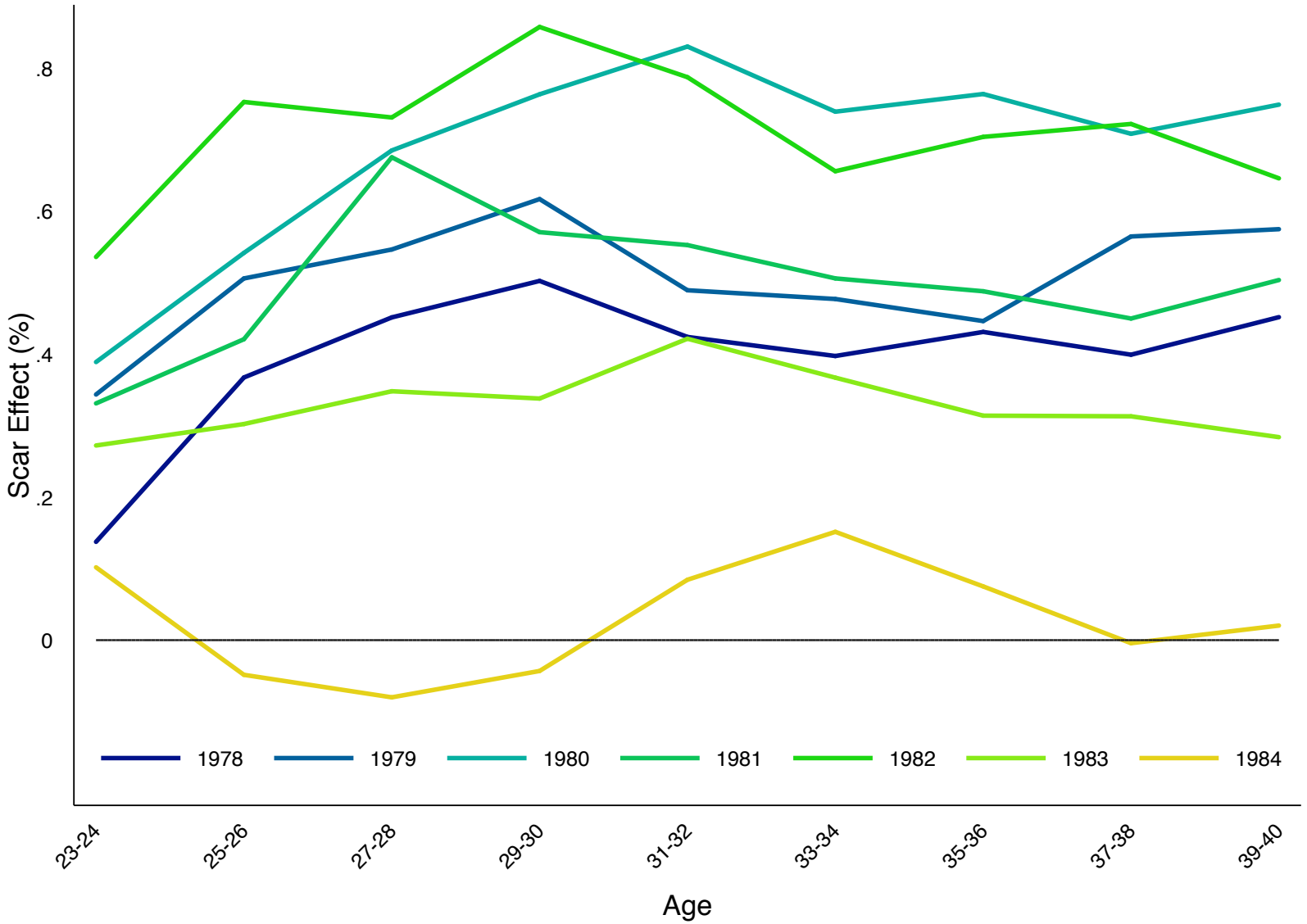


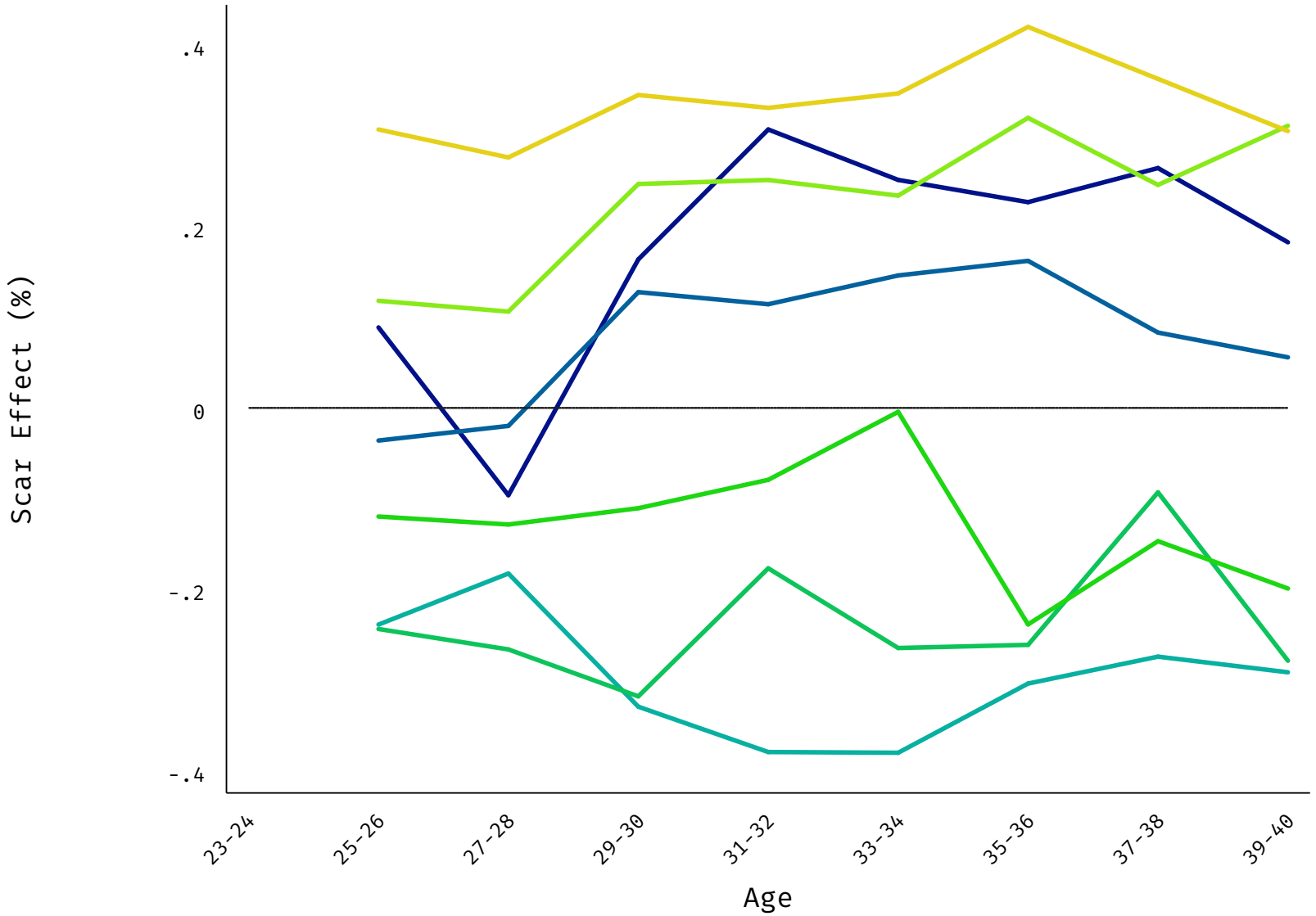
Different Cut-Off Ages



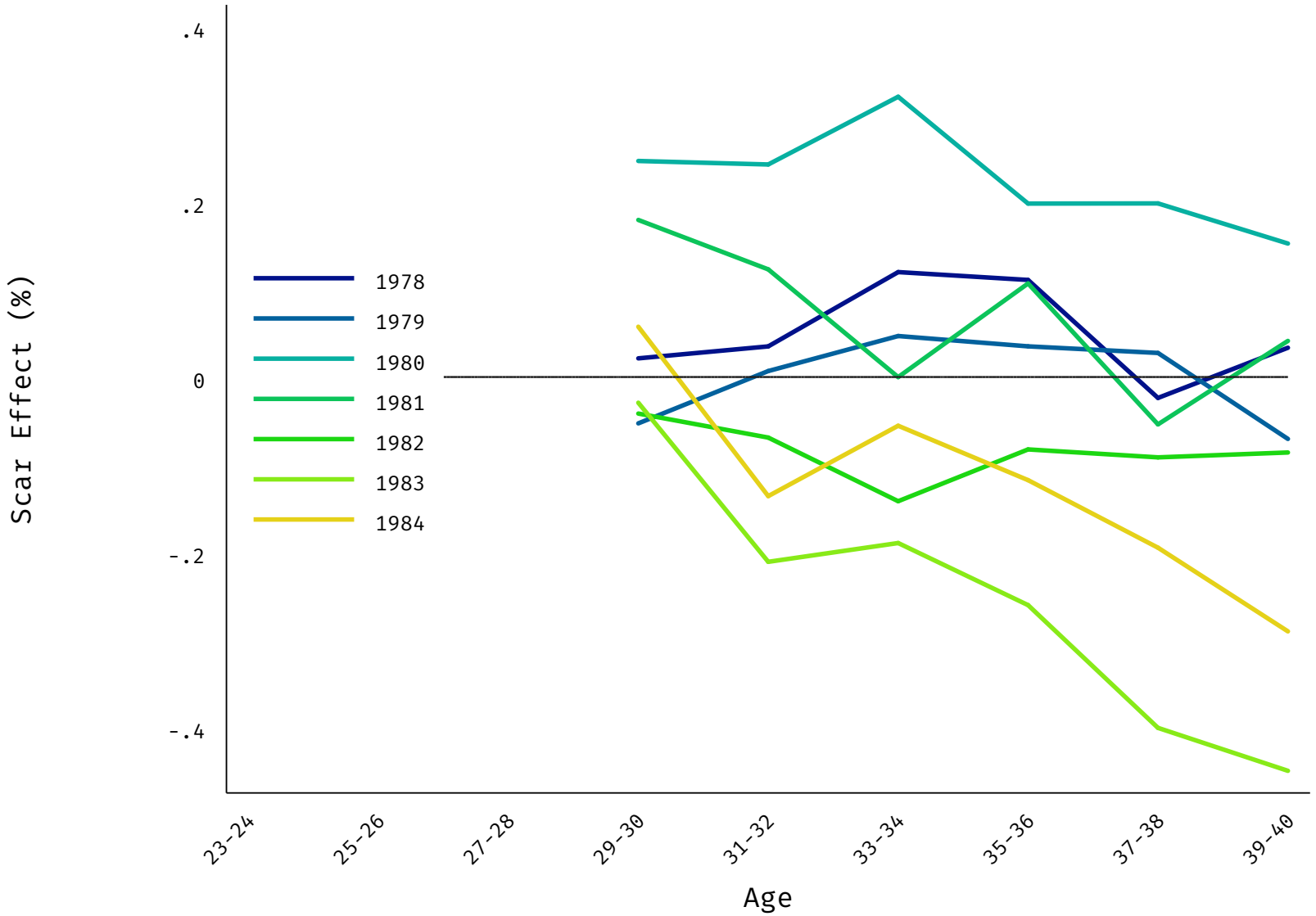
Largely homogenous across cohorts.



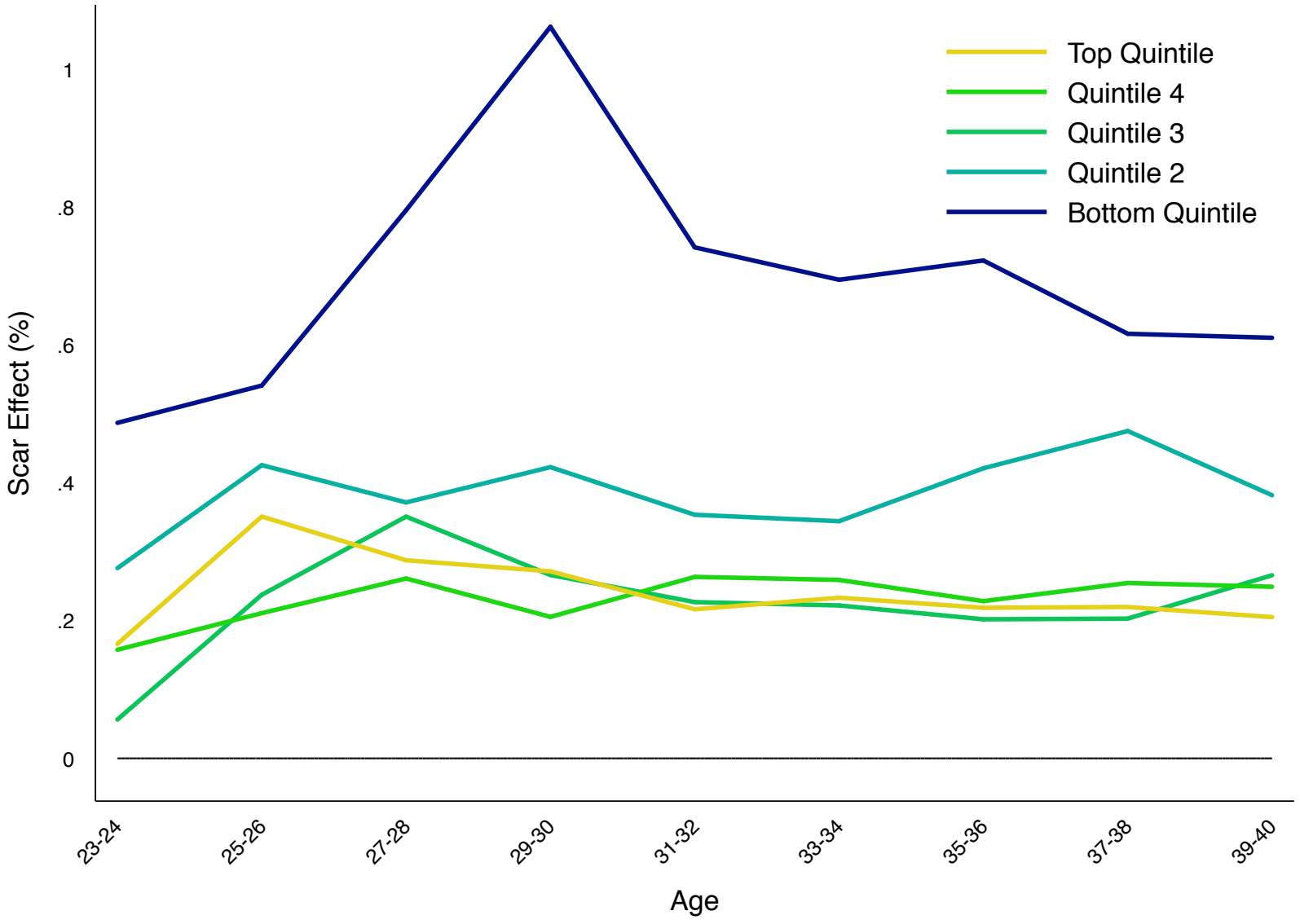
Cohorts (Youths)



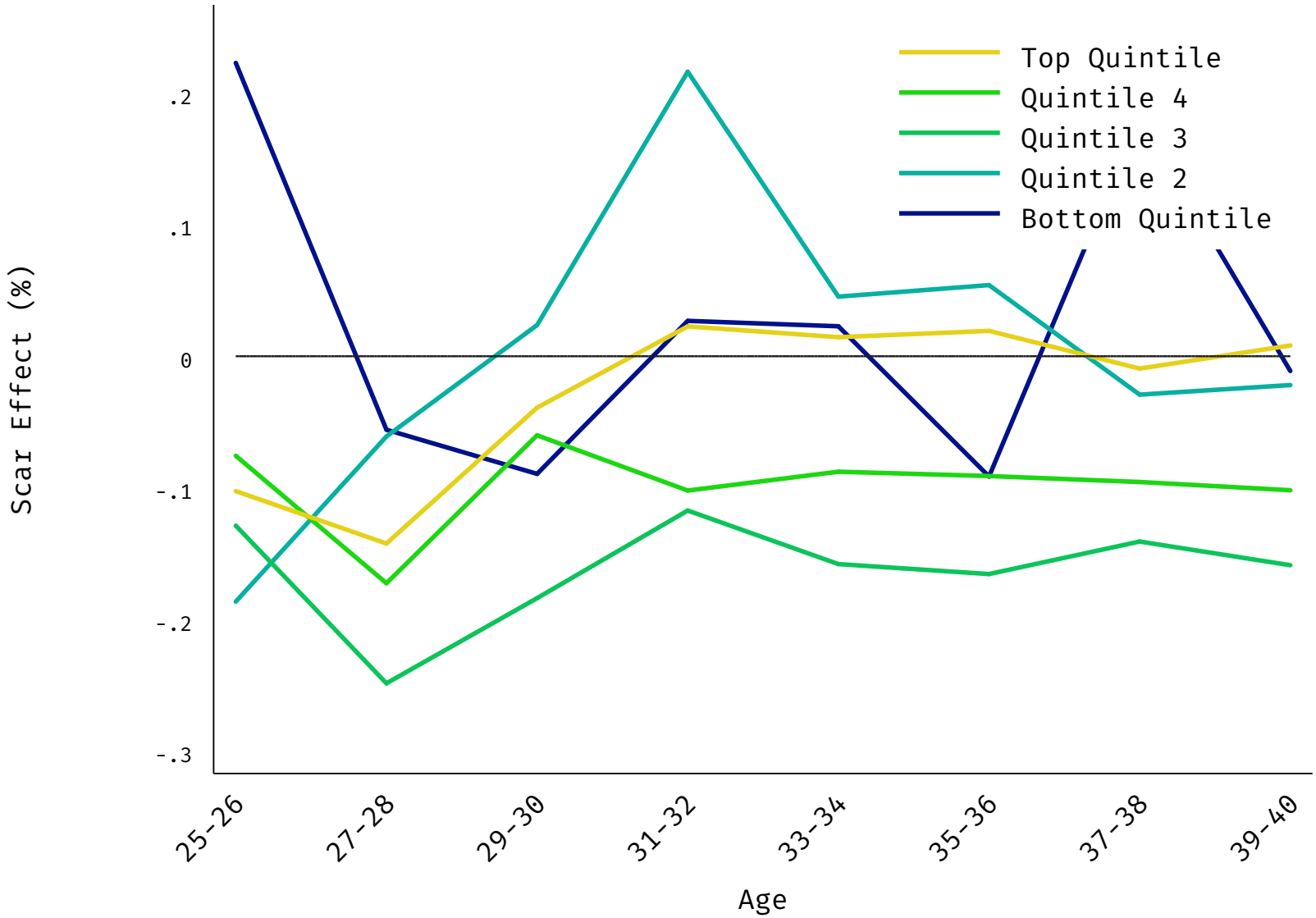
Cohorts (Adults)



Effects are concentrated on low-ability workers



Quintiles (Youths)



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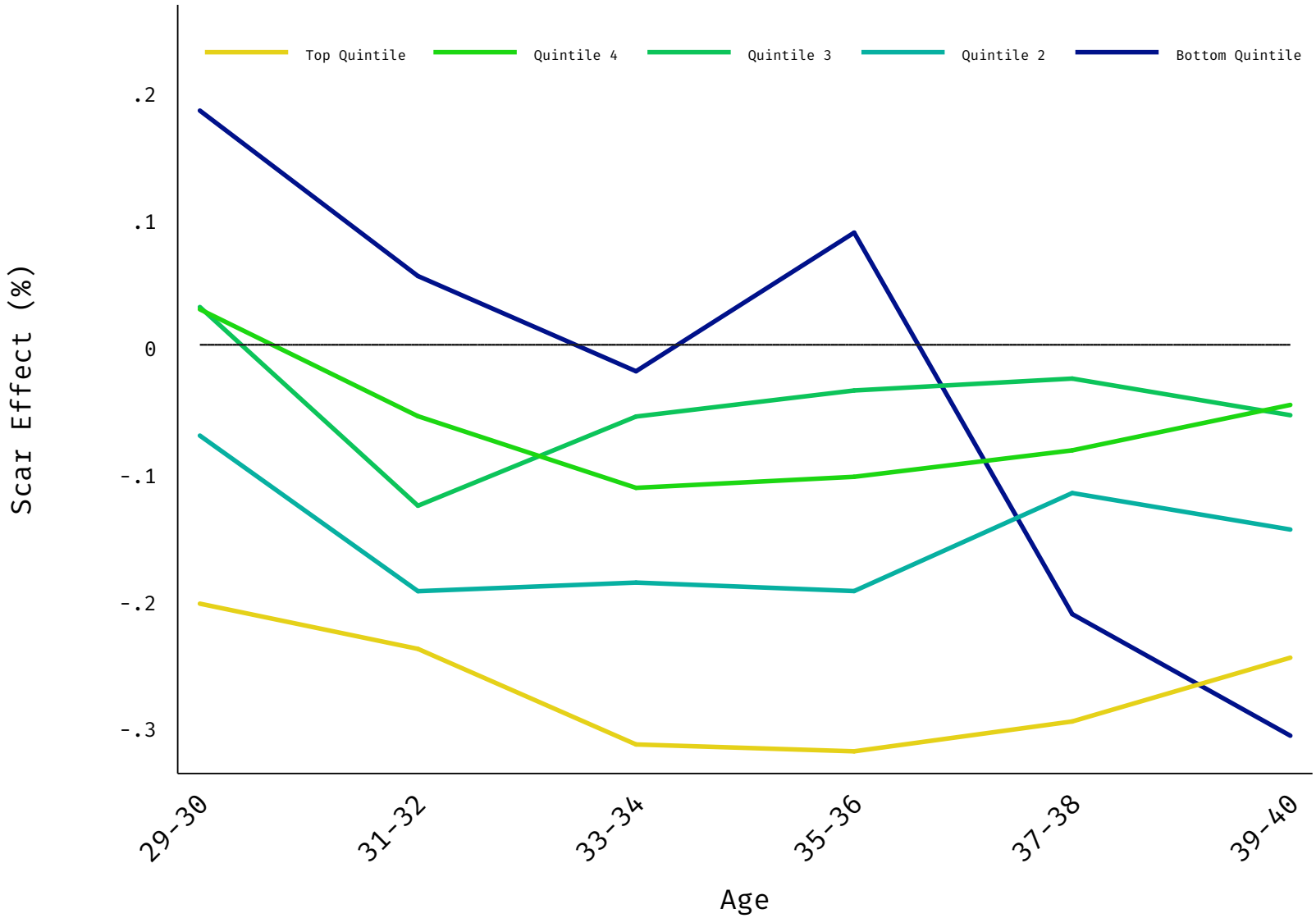
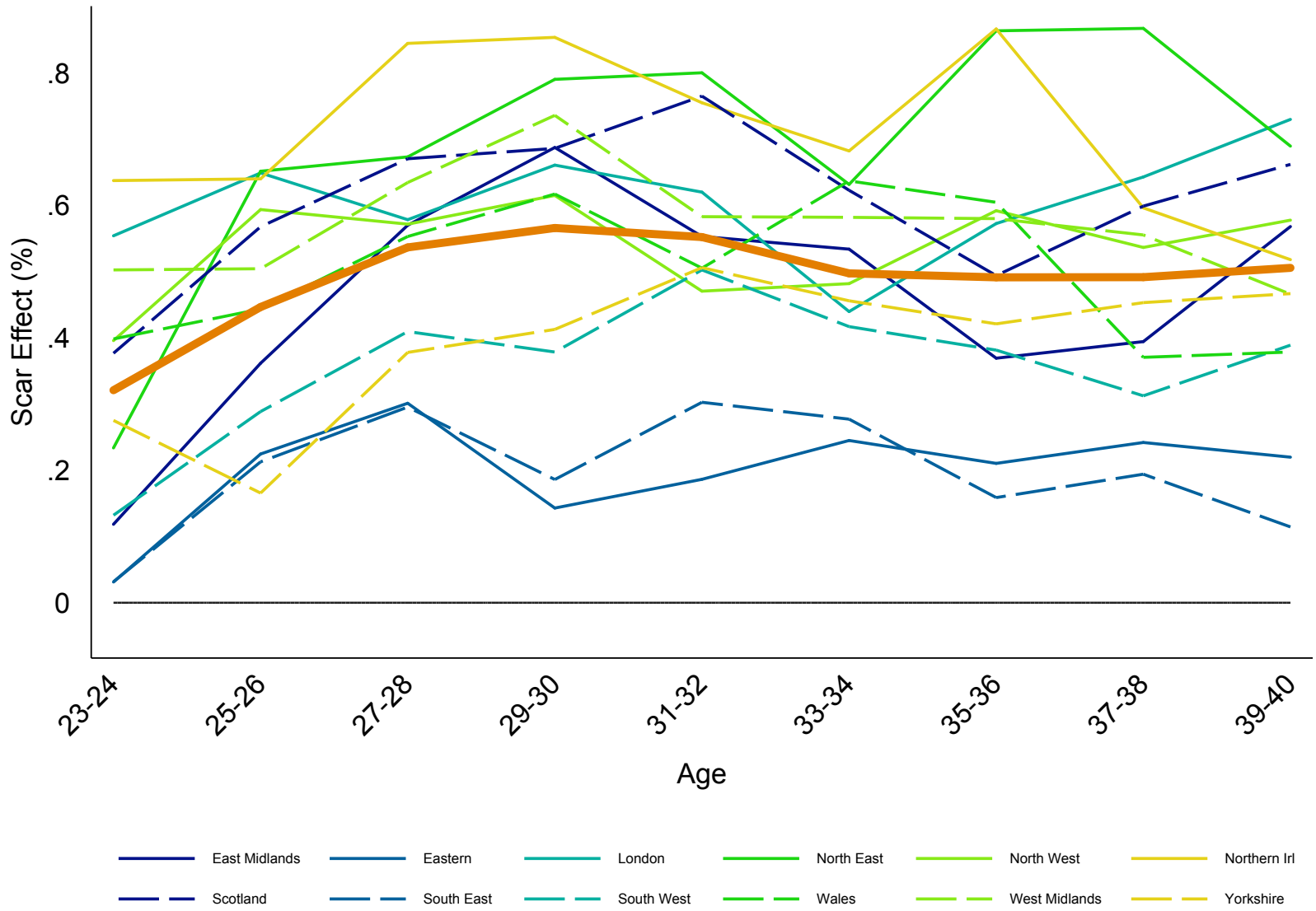


Effects by Region



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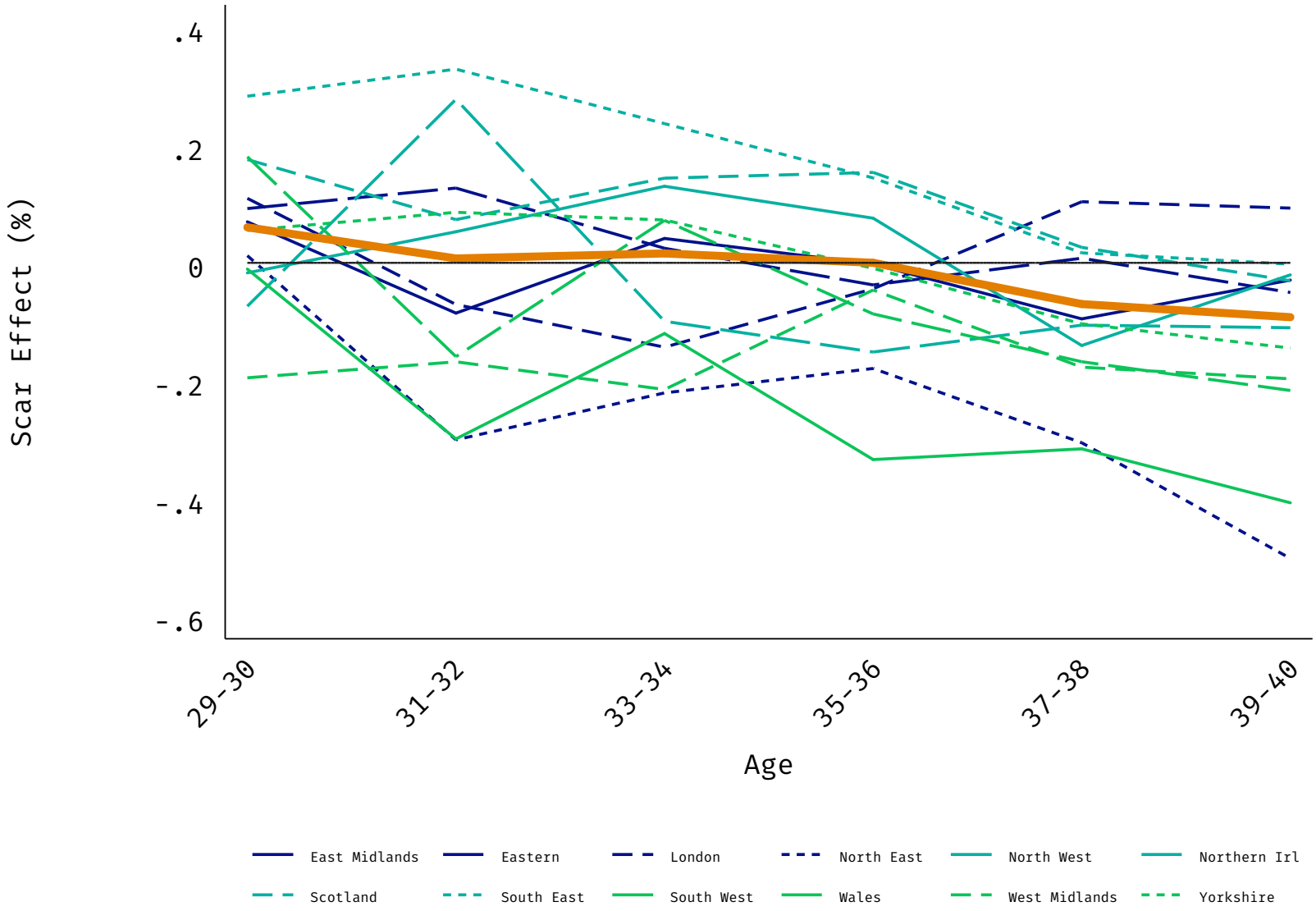

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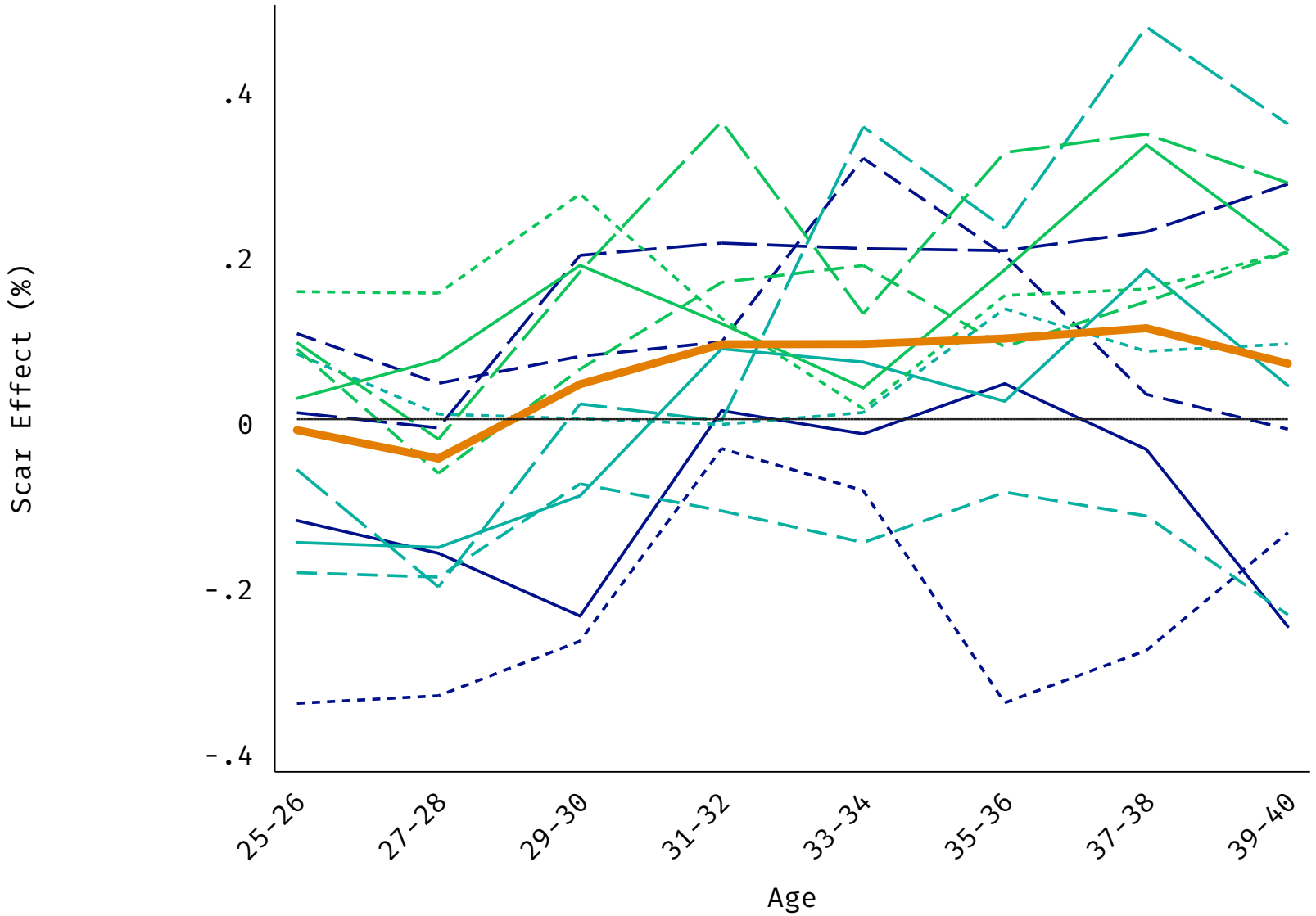

Decomposing the Scar Effect

$$\frac{dw_i^t}{duw_{1820}} = \overbrace{\beta_E^t}^{(1)} + \overbrace{\underbrace{\beta_Y^t}_{(3)} \underbrace{\frac{\partial uw_{2123}}{\partial uw_{1820}}}_{(4)}}^{(2)} + \overbrace{\underbrace{\beta_A^t}_{(6)} \left(\underbrace{\frac{\partial uw_{2426}}{\partial uw_{2123}}}_{(7)} \underbrace{\frac{\partial uw_{2123}}{\partial uw_{1820}}}_{(4)} + \underbrace{\frac{\partial uw_{2426}}{\partial uw_{1820}}}_{(8)} \right)}^{(5)}.$$

Decomposition of the Scar Effect

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
On Earnings Aged 29-30	0.566	−0.021	−0.042	0.507	0.062	0.060	1.917	0.067
On Earnings Aged 31-32	0.552	0.046	0.091	0.510	0.004	0.007	0.714	0.143
On Earnings Aged 33-34	0.498	0.047	0.091	0.520	0.005	0.016	0.563	0
On Earnings Aged 35-36	0.492	0.050	0.098	0.510	0.000	0.001	2	−1
On Earnings Aged 37-38	0.492	0.056	0.110	0.506	−0.022	−0.070	0.471	0.071
On Earnings Aged 39-40	0.506	0.028	0.067	0.417	−0.024	−0.092	0.467	0.065

Initial Inequality associated with lower wages