

# Learning Together?

## Peer income exposure across the income distribution

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# Public schools are uniquely positioned to foster interaction among income-diverse children

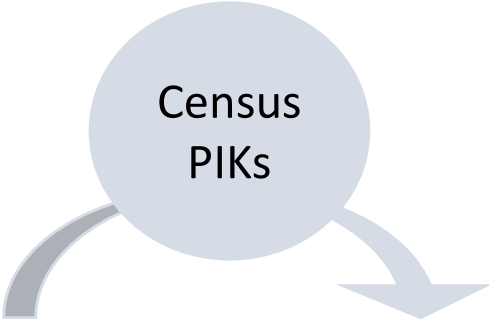
- American children overwhelmingly attend public school
  - In Oregon: 83% overall, and 58% in the top income percentile
- Public schools advance social equality, potentially through exposure to diverse peers (Downey & Condrón, 2016; Raudenbush & Eschmann, 2015; Hansen & Gustafsson 2019; Van de Werfhorst & Mijs 2010; Reardon et al. 2019)
  - The presence of high-income peers predicts upward mobility for low-income children (Chetty et al. 2022)
- Are public school students exposed to income-diverse peers?
  - Existing studies limited to free/reduced-price lunch eligibility – a dichotomous income proxy (Dalane & Marcotte, 2022; Owens, Reardon, & Jencks, 2016)

# Our study: Characterizing students' exposure to peers *across the income distribution*

- Unique data linkage brings **continuous measure of student family income** into K-12 administrative data from Oregon
- Calculate the **average proportion of peers in each percentile** of the student family income distribution **for students in each percentile**
  - 100-by-100 grid
- Develop a novel measure to summarize the unevenness of peer income exposure in each student income percentile
- Investigate whether peer income exposure is driven by **sorting across or within schools**
  - Variation by grade level

# Data & key variables

Census  
PIKs



## Oregon Department of Education K-12 Administrative Data

- Students in Oregon public schools enrolled as of April 1, 2017
- *School identifier*
  - ***School peer group***
- *Classroom identifiers*
  - ***Classroom peer group***, with peers weighted by number of classes shared

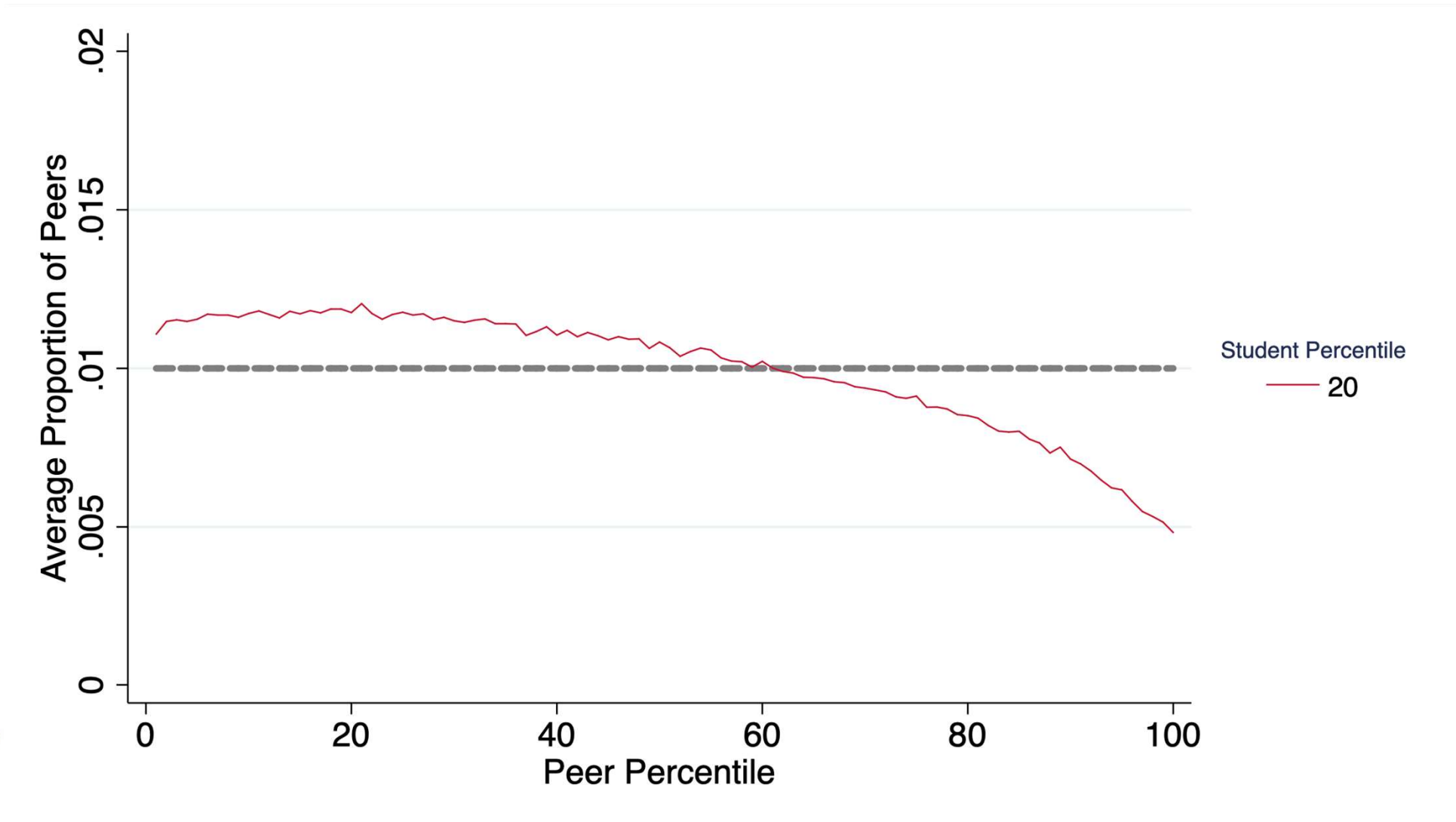
## IRS Form 1040 data

- Students are claimed as dependents on tax returns
  - 2016 tax year, or most recent prior year
- *Adjusted Gross Income* = estimate of student family income
  - ***Family income percentile***, defined within birth cohort

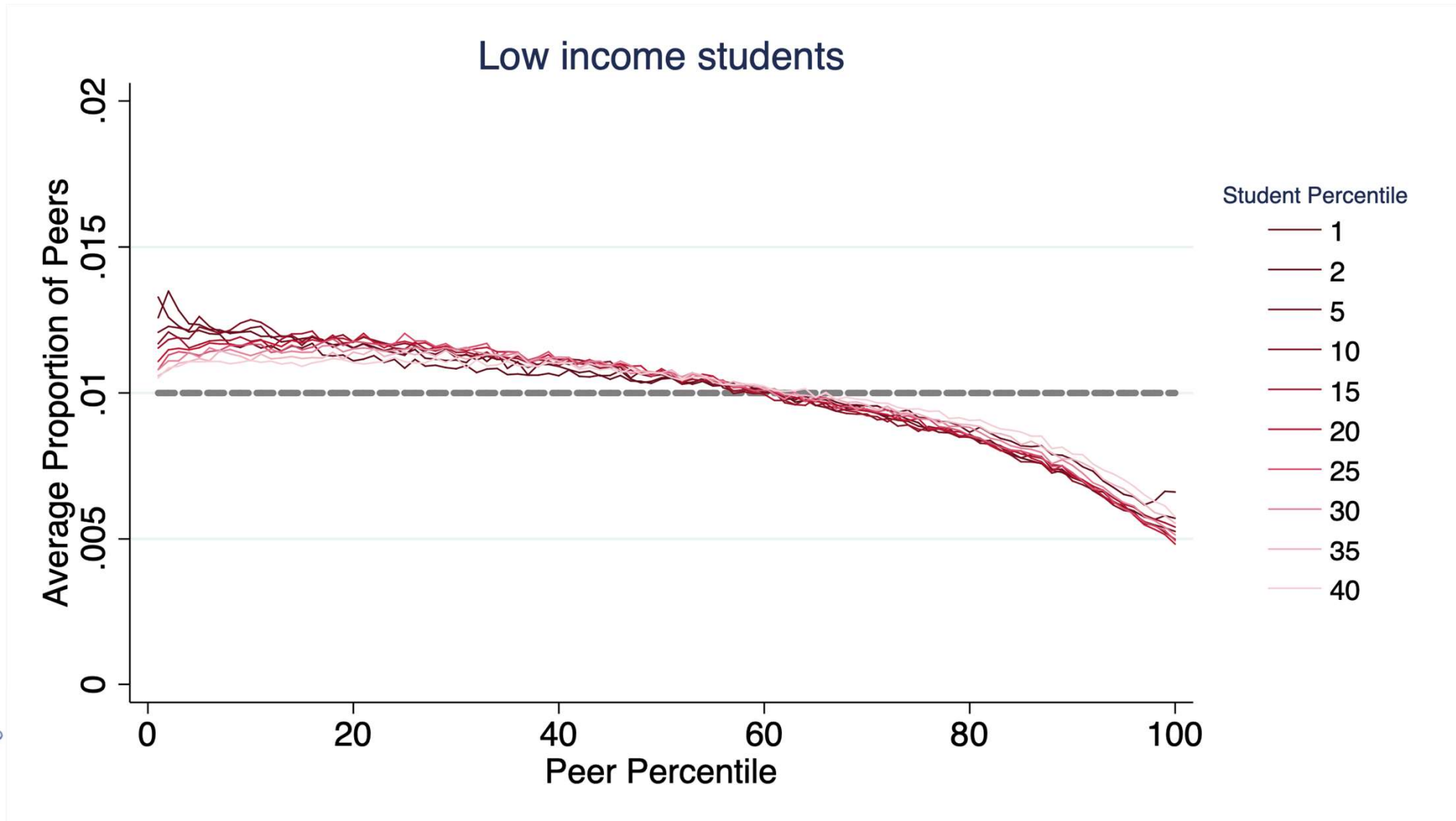
# Sample overview

- Students in ODE sample: 573,000
- We restrict sample the sample by requiring
  - Schools enroll at least 50 students
  - Valid course/classroom information
  - Courses are not online
- Students in analysis sample: 536,000
  - 92% have observed student family income

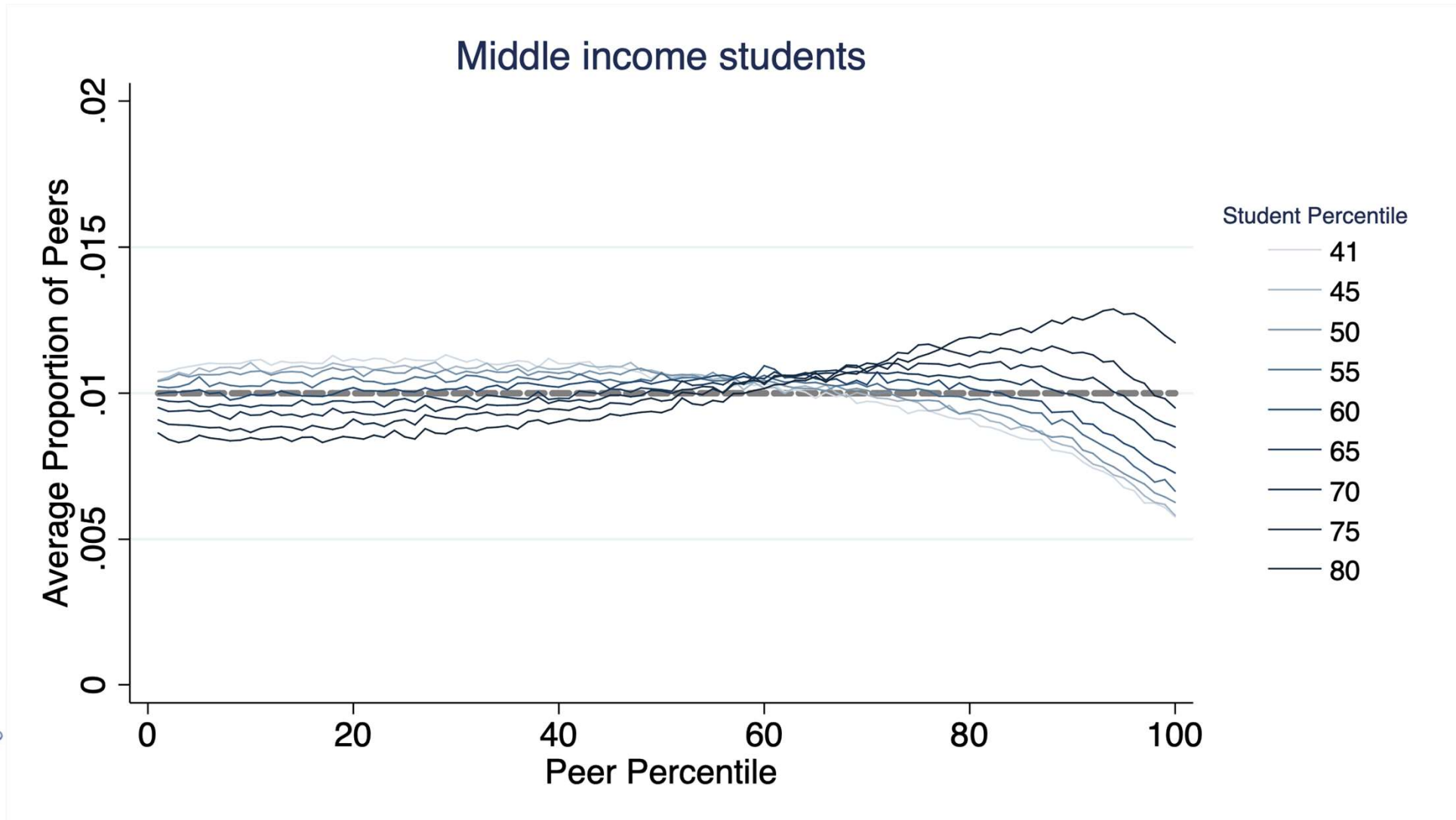
# Average proportion of school peers in each income percentile



# Low-income students have a disproportionate share of low-income peers

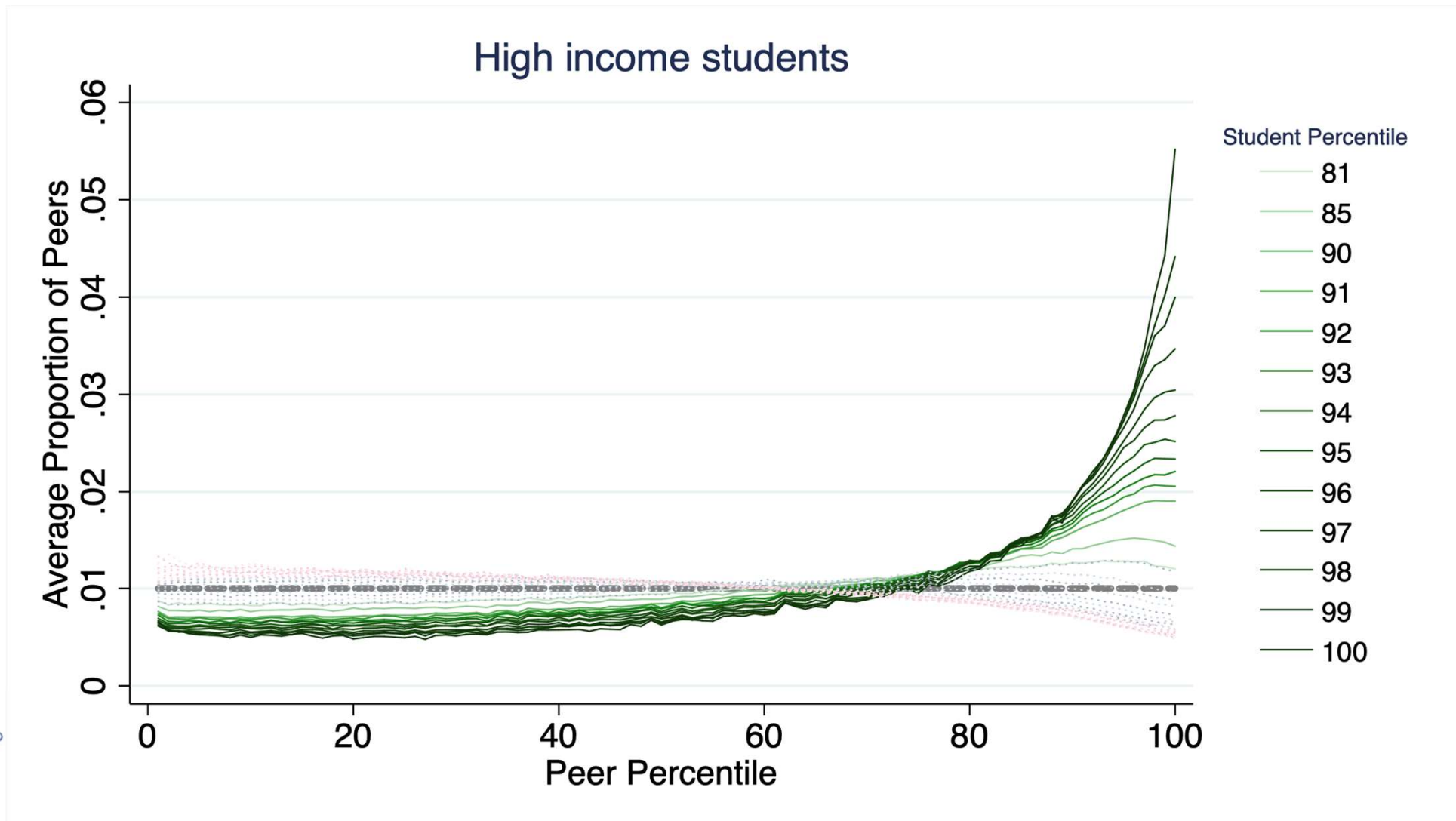


# Middle income students have relatively even peer income exposure

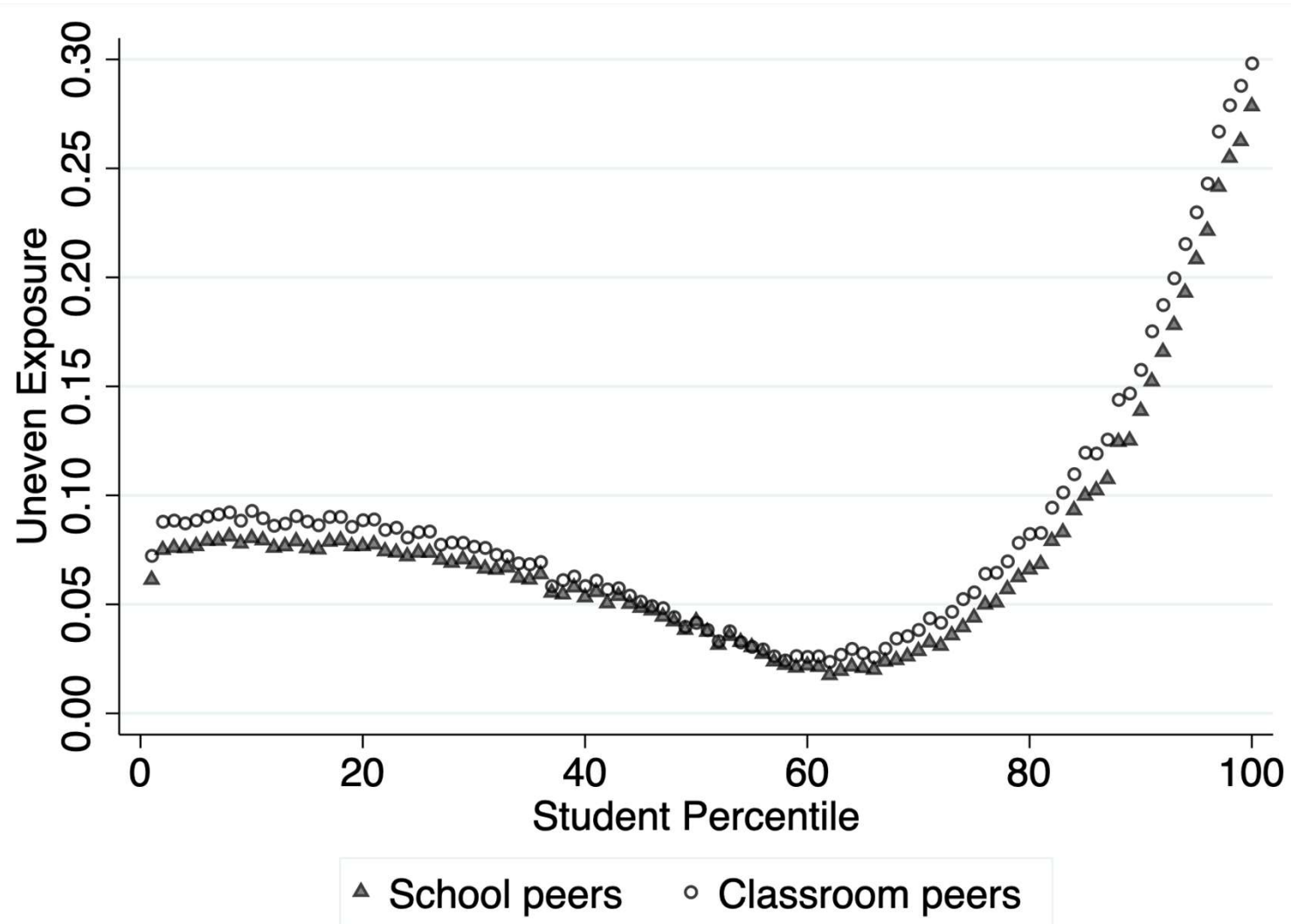




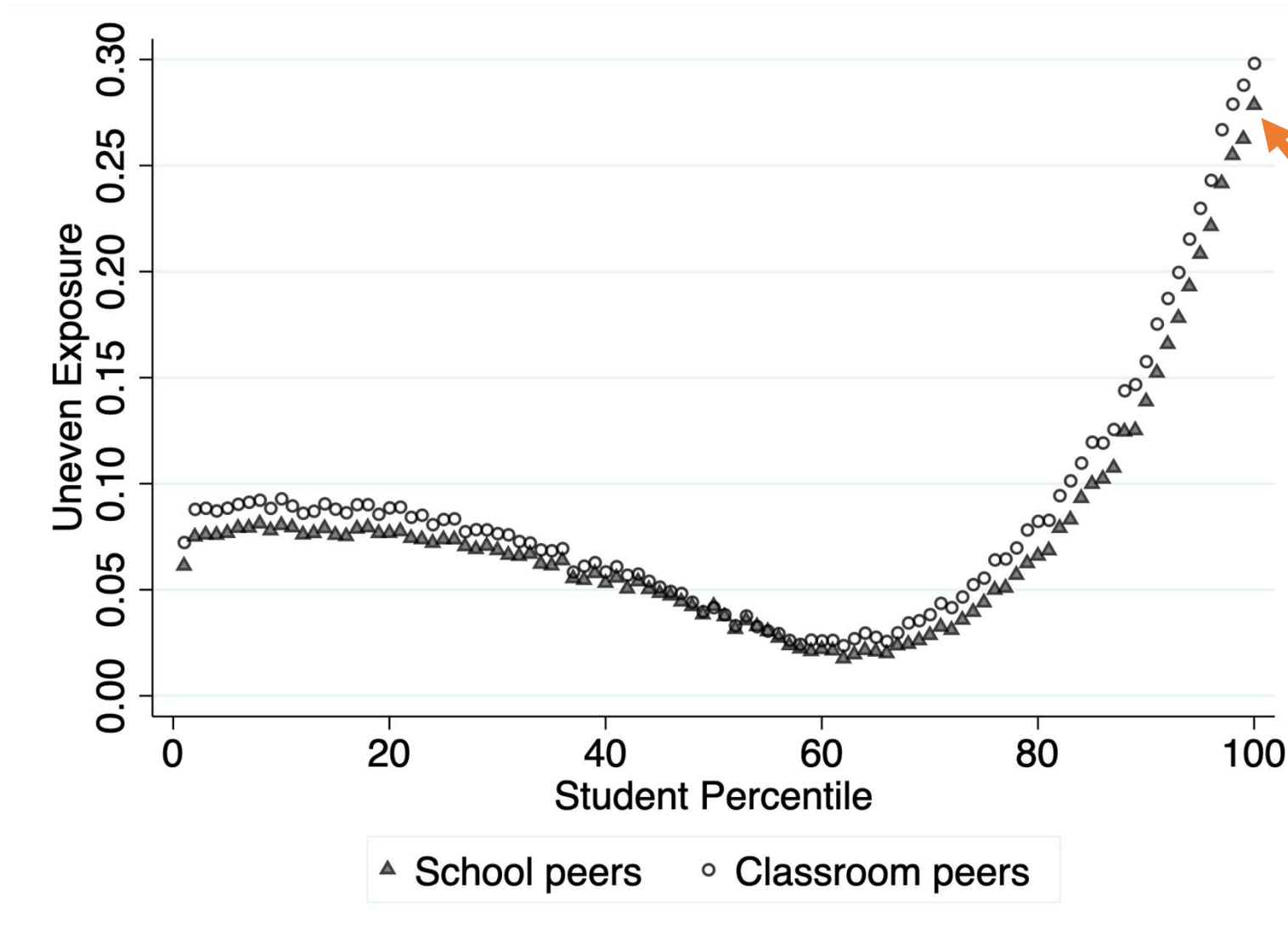
# High-income students have exceptionally skewed average peer income distributions



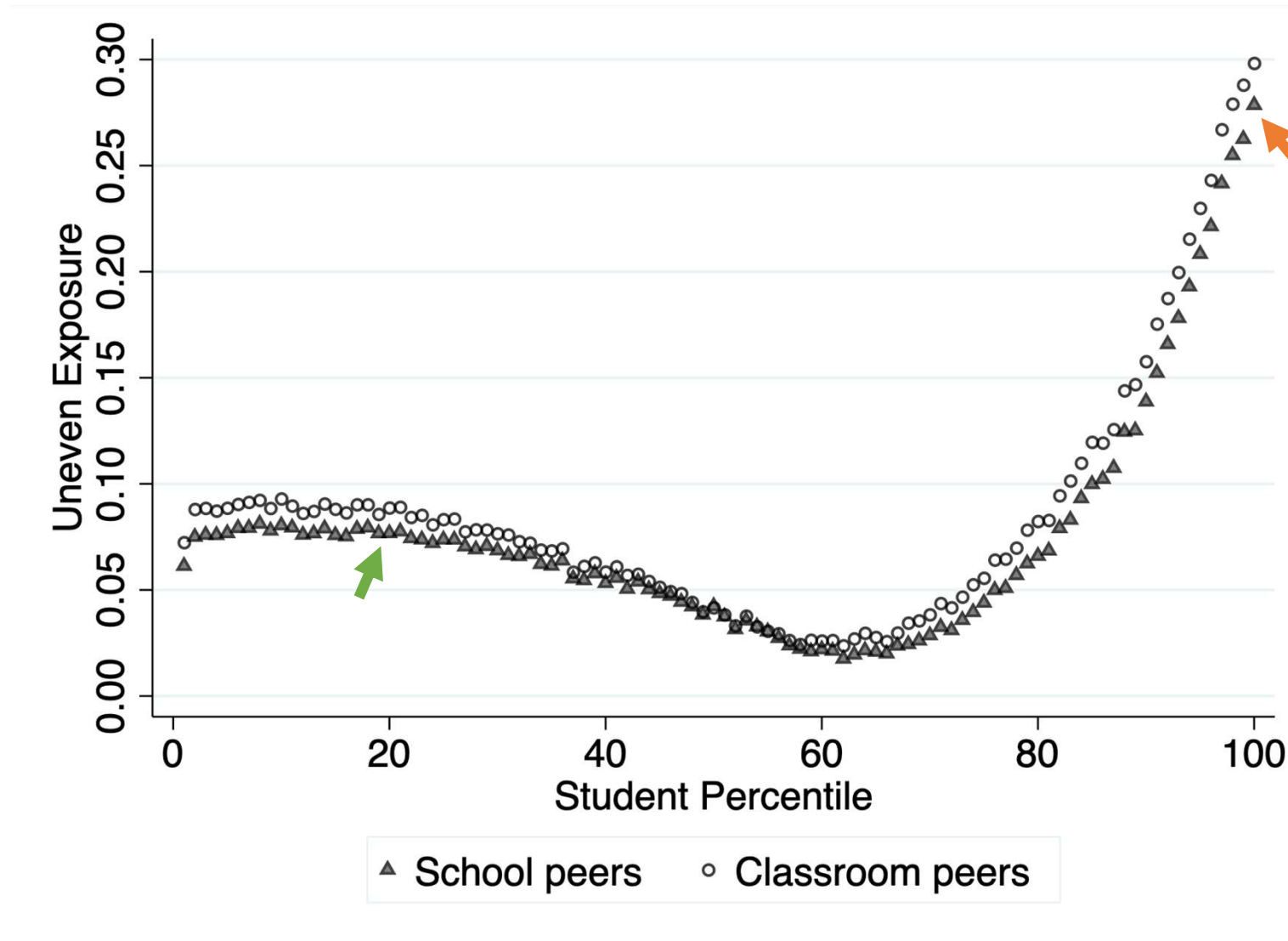
*Uneven exposure*: the minimum proportion of peers that would need to be swapped with students elsewhere in the income distribution to achieve an even distribution



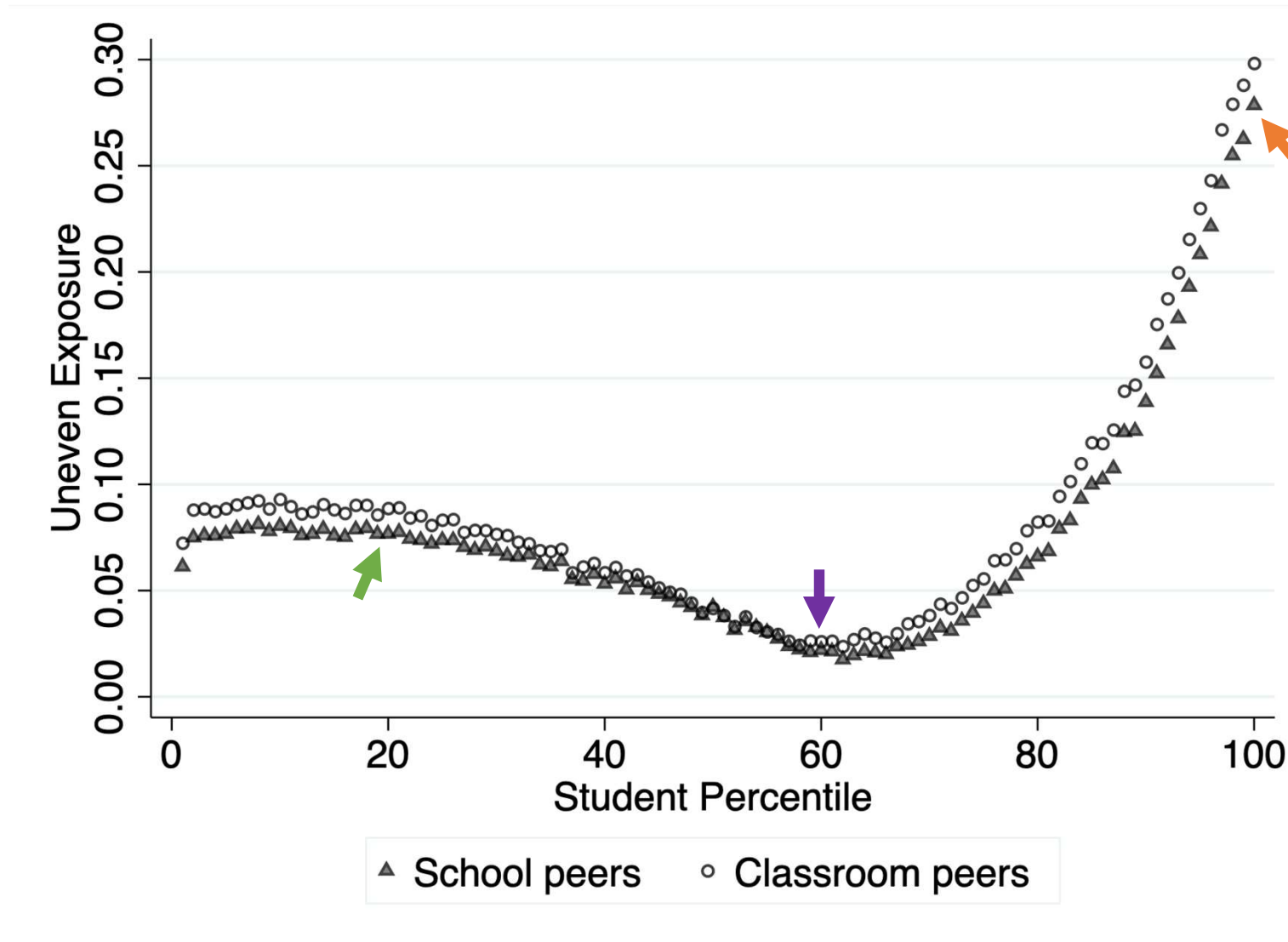
At the 100<sup>th</sup> income percentile, 28% of school peers need to be swapped to achieve an even distribution



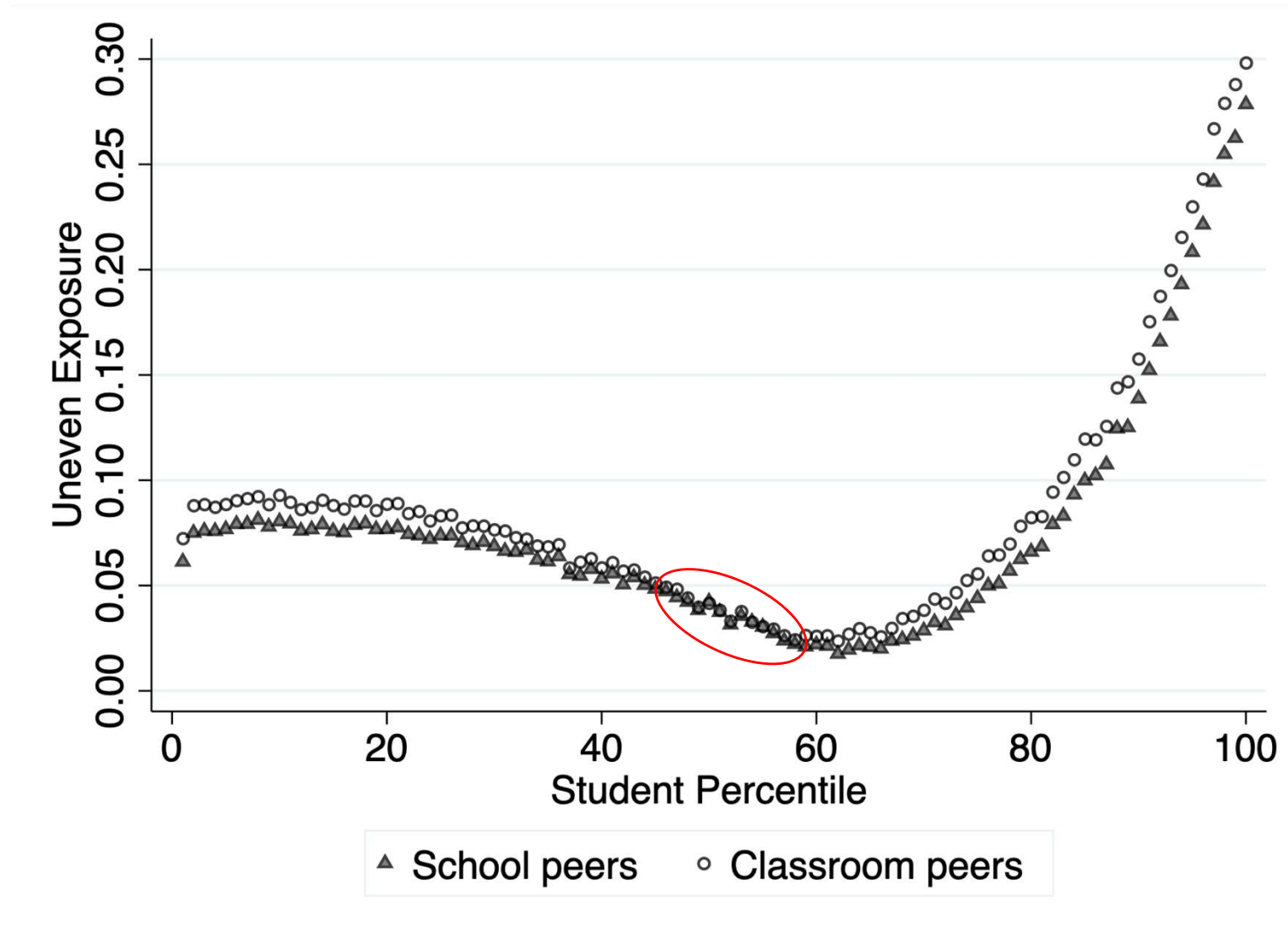
At the 20<sup>th</sup> income percentile, 8% of school peers need to be swapped to achieve an even distribution



At the 60<sup>th</sup> income percentile, just over 1% of school peers need to be swapped to achieve an even distribution



Sorting *within* schools increases uneven exposure, but sorting *across* schools is the primary driver



# Patterns are broadly consistent across grades

- **Elementary schools have more uneven peer income distributions** than middle and high schools
  - Typically draw from smaller geographic areas and reflect residential sorting
- **Within-school sorting is generally a bigger factor for middle and high schools** for students in the lower and upper thirds of the income distribution

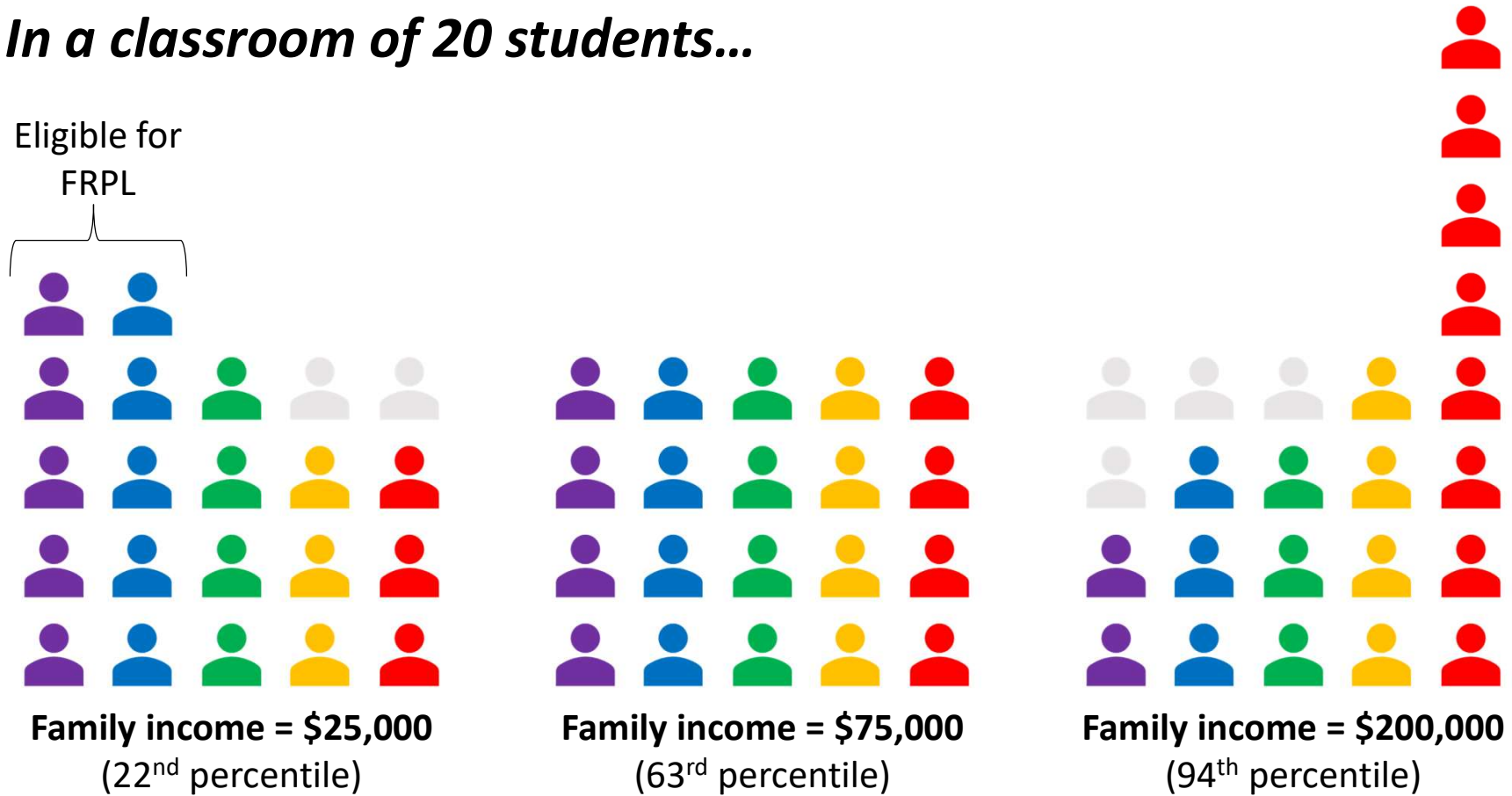
# Limitations

- 8% of students are missing income
  - Findings robust to varying assumptions about this population
- No private school enrollments
- Income captures a single dimension of social class – factors like wealth and parental education might paint a more complete picture
- Average peer income distributions mask considerable heterogeneity across schools



# High-income students are isolated from low- and middle-income students in public schools

*In a classroom of 20 students...*



# Thanks!

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# Appendix

# Key notation & statistics

- Student's own income percentile, indexed by  $m$ 
  - $m = 1$  for the lowest family incomes
  - $m = 100$  for the highest family incomes
- Percentiles of peer income, indexed by  $j$
- For each student, we calculate the proportion of their peers in each percentile  $j$ ...
- ... then we average these proportions across all students in percentile  $m$ 
  - $\overline{p_j^m}$  = The average proportion of peers in percentile  $j$  for all students in percentile  $m$
  - Average peer income distributions
- If students in percentile  $m$  had a perfectly even distribution of peer incomes

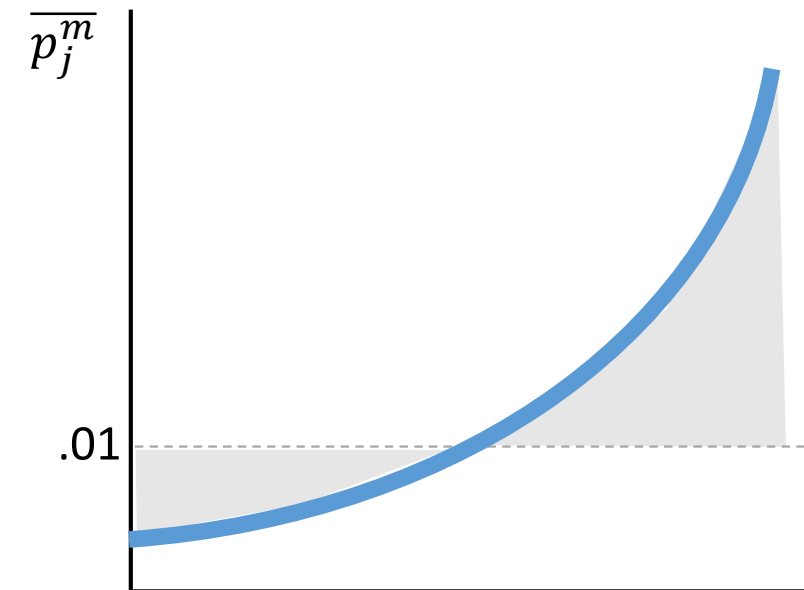
$$\overline{p_j^m} = .01 \forall j$$

# Summary unevenness measure

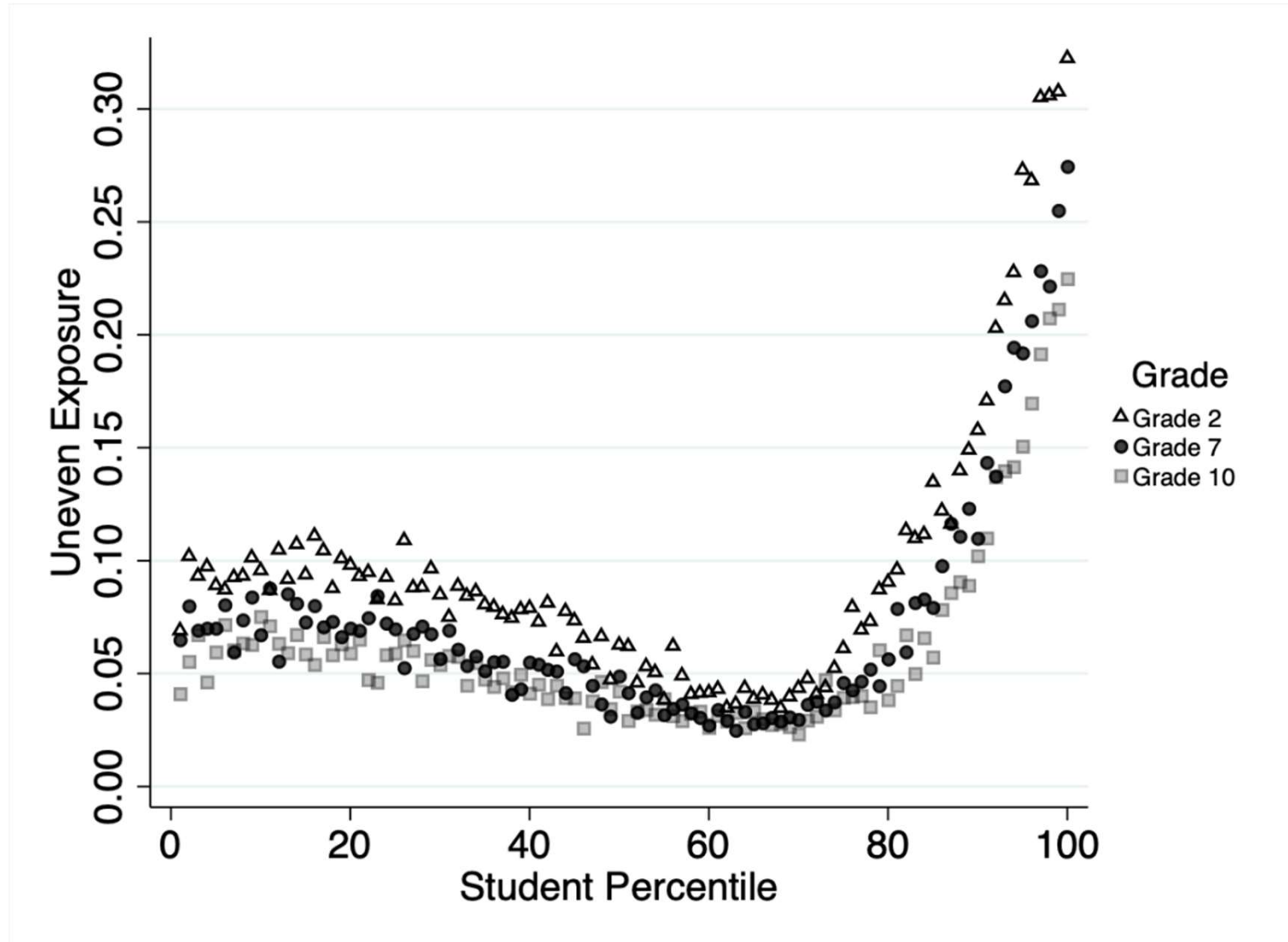
- For each student percentile  $m$

$$P^m = \frac{1}{2} \sum_{j=1}^{100} |0.01 - \overline{p}_j^m|$$

- Interpretation: for students in percentile  $m$ , the proportion of peers that would have to be **swapped with students in other percentiles** to yield a perfectly even distribution of peer income



# Uneven exposure by grade



# Proportion of classroom uneven exposure explained by school, by grade

