The Fading American Dream
Trends in Absolute Income Mobility Since 1940

Raj Chetty, Stanford Economics
David Grusky, Stanford Sociology
Maximilian Hell, Stanford Sociology
Nathan Hendren, Harvard Economics
Robert Manduca, Harvard Sociology
Jimmy Narang, UC-Berkeley Economics

February 2017

Absolute Mobility and the American Dream

- Central feature of American Dream: aspiration that children have a higher standard of living than their parents [Samuel 2012]
  - When asked to assess economic progress, children often compare their earnings to their parents [Goldthorpe 1987, Hoschschild 2016]
  - Obama (2014): “People’s frustrations are partly rooted “in the fear that their kids won’t be better off than they were”

→ Longstanding interest in measuring *absolute mobility*: fraction of children who have a higher standard of living than their parents

SOCIAL MOBILITY MEMOS

How many people are better off than their parents? Depends on how you cut the data.

Dimitrios Halikias and **Richard V. Reeves** · Wednesday, August 10, 2016

SOCIAL MOBILITY MEMOS

How many people are better off than their parents? Depends on how you cut the data.

Dimitrios Halikias and **Richard V. Reeves** · Wednesday, August 10, 2016

Key problem for estimating absolute mobility:
lack of large panel datasets linking parents and children

This Paper

- We develop a method of estimating absolute mobility for the 1940-84 birth cohorts that can be implemented using existing data

- We estimate mobility by decomposing joint distribution of income into two components:

  1. Marginal income distributions for parents and children, estimated using CPS and Census cross-sections

  2. Joint distribution of parent and child ranks (copula)

     – For recent cohorts, obtain copula from tax records, building on prior work showing stable *relative* mobility [Chetty et al. 2014]

     – For early cohorts, derive bounds to show that estimates of absolute mobility are *insensitive* to copula

Outline

1. Data and methods
2. Baseline estimates under copula stability
3. Bounds under alternative copulas
4. Sensitivity to specification choices
5. Policy counterfactuals

Data and Methods

Methodology

- Baseline income measure: pre-tax family income at age 30, deflated using CPI-U-RS

- Estimate absolute mobility by combining three sets of inputs for each birth cohort *c*:

  1. Children's marginal income distributions $Q_c^k\left(r^k\right)$
  2. Parents' marginal income distributions $Q_c^p\left(r^p\right)$
  3. Copula: joint distribution of parent and child ranks $C_c\left(r^k, r^p\right)$

- Calculate absolute mobility for birth cohort *c* as:

$$A_c = \int 1\left\{Q_c^k\left(r^k\right) \geq Q_c^p\left(r^p\right)\right\} C_c\left(r^k, r^p\right) dr^k dr^p$$

Children's Income Distributions

- Estimate income distributions at age 30 for children in each birth cohort from 1940-84 using CPS data from 1970-2014
  - Sample: all non-institutionalized individuals born in the U.S.
  - Income defined as sum of spouses' personal pre-tax incomes

Parents' Income Distributions

- Constructing parents' income distributions by child's birth cohort is more complicated because of lack of panel data
  - Overcome this problem by pooling data from multiple Census cross-sections

Parents' Income Distributions

- Example: income distribution of parents of children in 1970 birth cohort
- Combine data from three Censuses (1% IPUMS):
  1. In 1970 Census, select parents aged 25-35 with children born in that year
  2. In 1980 Census, select parents aged 25-35 with 10 year old children (parents who had children before age 25 in 1970)
  3. In 1960 Census, select all individuals aged 25-35
     - Give this group weight equal to the fraction of individuals who have 1 year old children *after* age 35 in 1970 Census
     - Assumption: income distribution of those who have kids after age 35 is representative of income distribution of general population

Copula: Joint Distribution of Ranks

- For children born in 1980s, estimate copula using population tax data
  [Chetty, Hendren, Kline, Saez, Turner 2015]

- Income definition in tax records: pre-tax family income (AGI+SSDI)
  - For non-filers, use W-2 wage earnings + SSDI + UI income
  - If no 1040 and no W-2, code income as 0

- Incomes of children born in 1980s measured at age ~30 in 2012

- Incomes of parents measured in 1996-2000 between ages 30-60
  - Copula (distribution of ranks) is stable after age 30
    [Chetty et al. 2014]

Copula: Joint Distribution of Ranks

- Estimate copula non-parametrically as a 100 x 100 percentile transition matrix for 1980-82 birth cohorts
  - Rank children based on their incomes relative to other children in same birth cohort
  - Rank parents of these children based on their incomes relative to other parents
  - Compute joint probabilities of each rank pair

Copula Stability

- Chetty et al. (2014) show that copula is very stable back to 1971 birth cohort using Statistics of Income 0.1% sample
  - Constant *relative* mobility (in percentile ranks, not absolute dollars)
- Baseline: assume copula stability for *all* cohorts going back to 1940
  - Then derive bounds for absolute mobility with alternative copulas

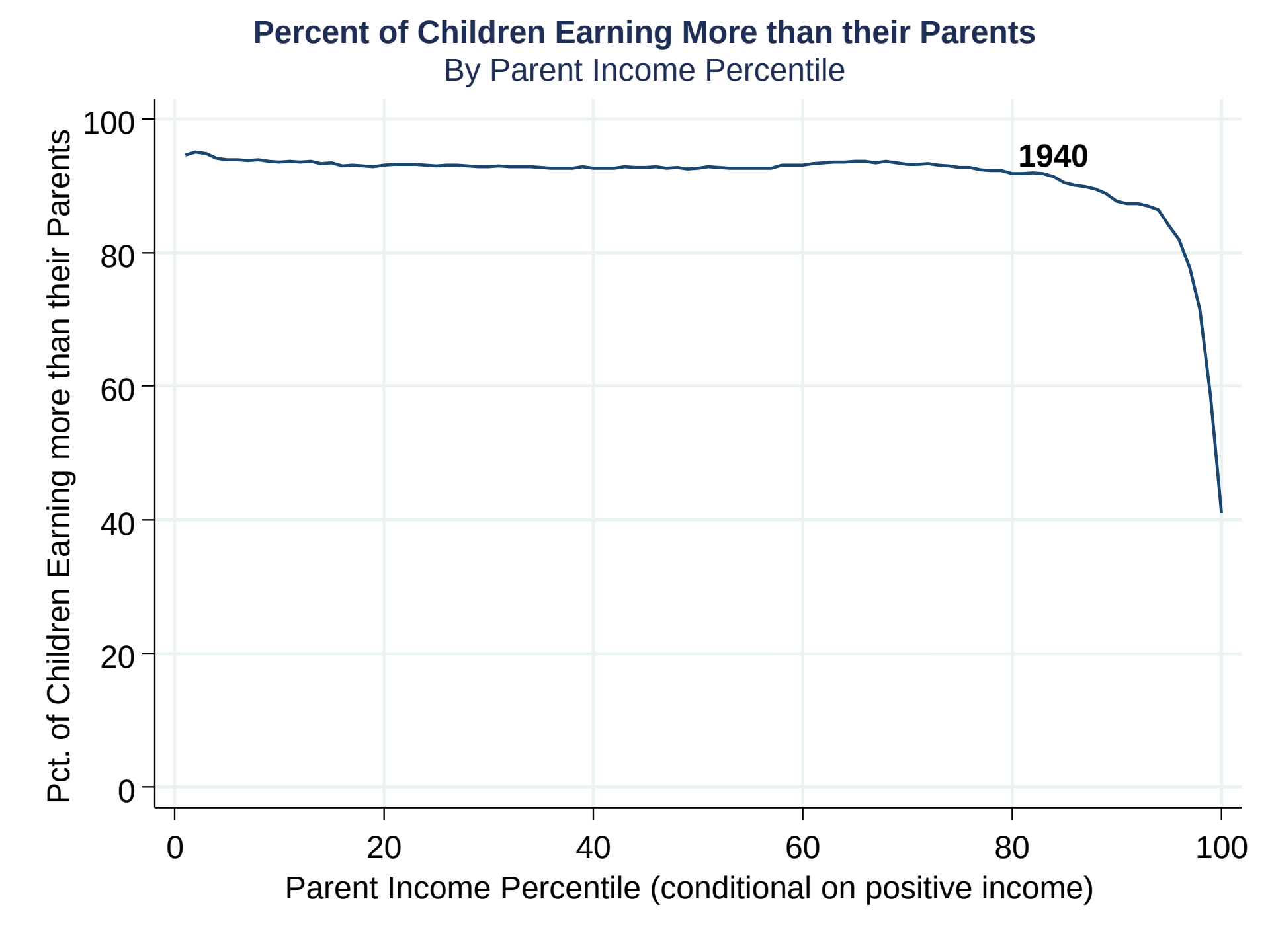
Baseline Estimates

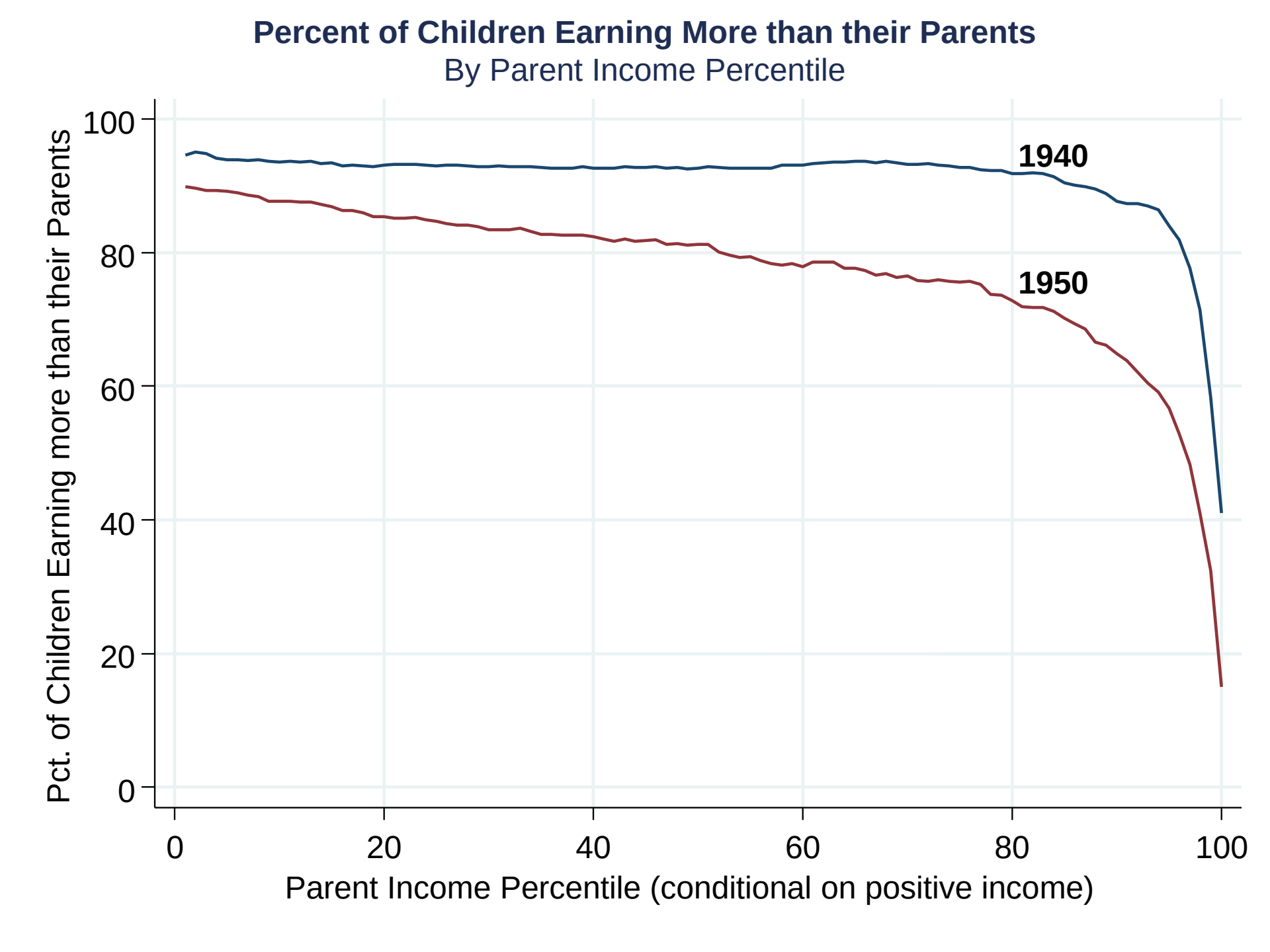
Baseline Estimates of Absolute Mobility

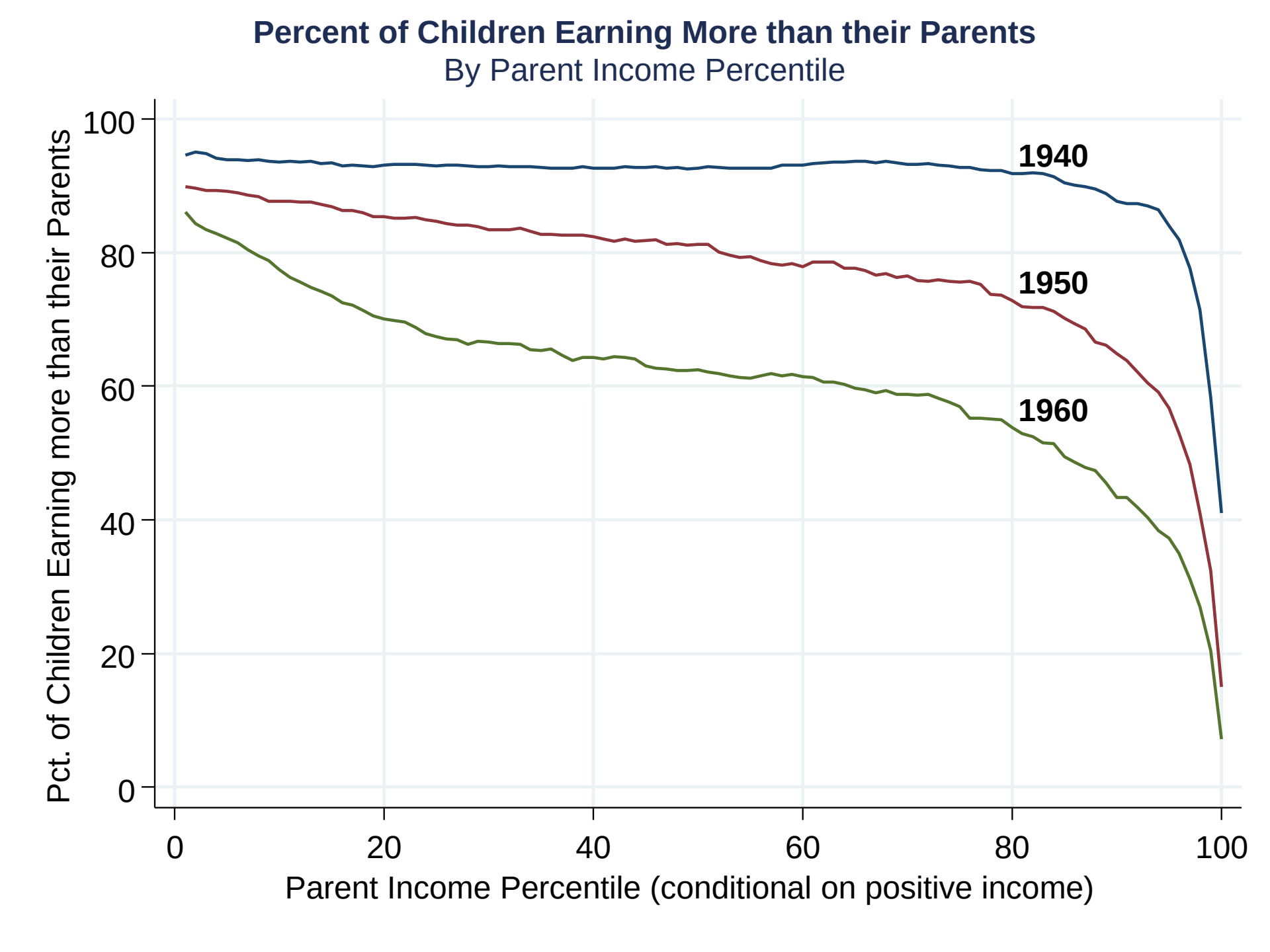
- Consider children in 1940 birth cohort

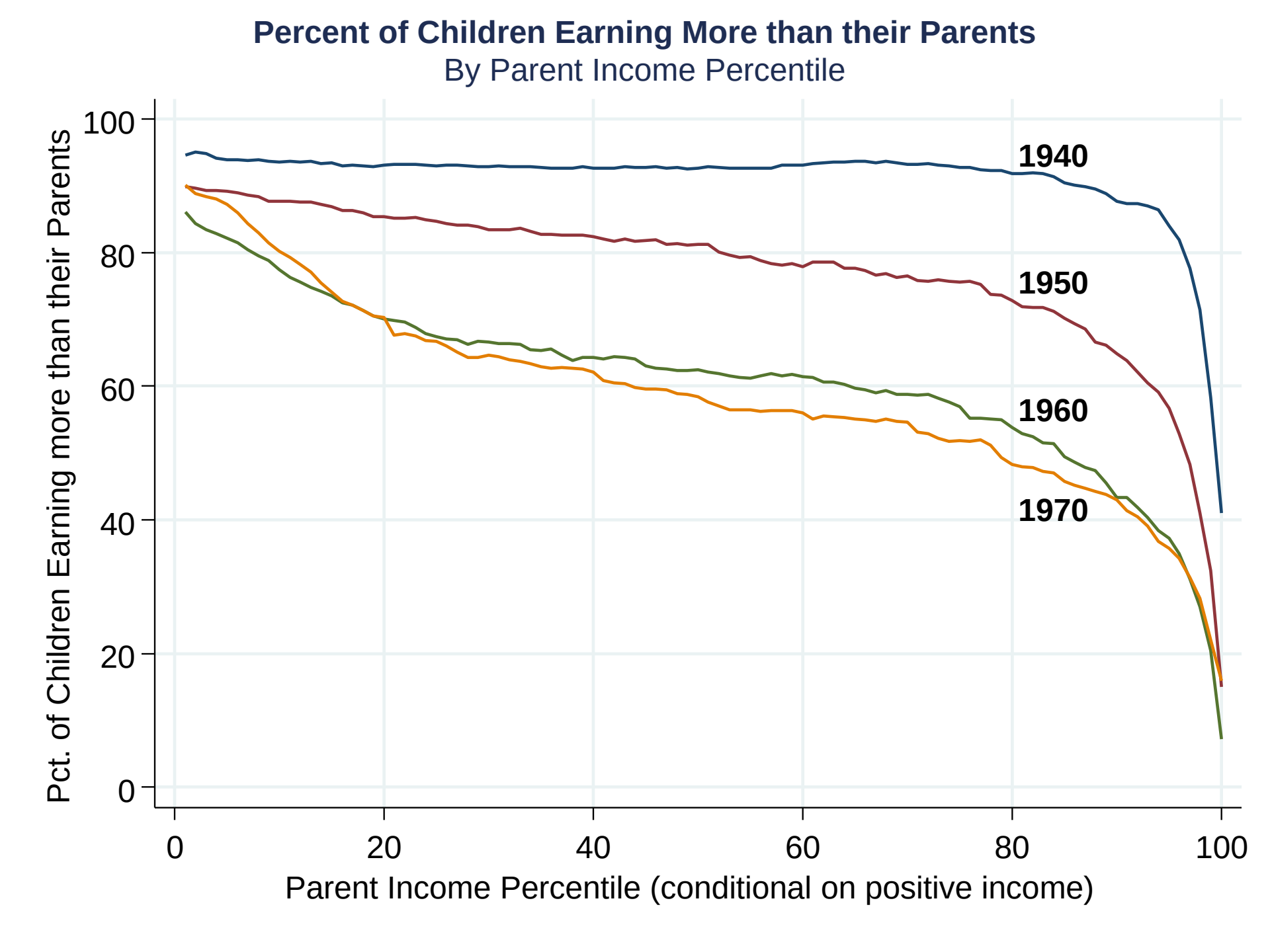
- Estimate absolute mobility in four steps:

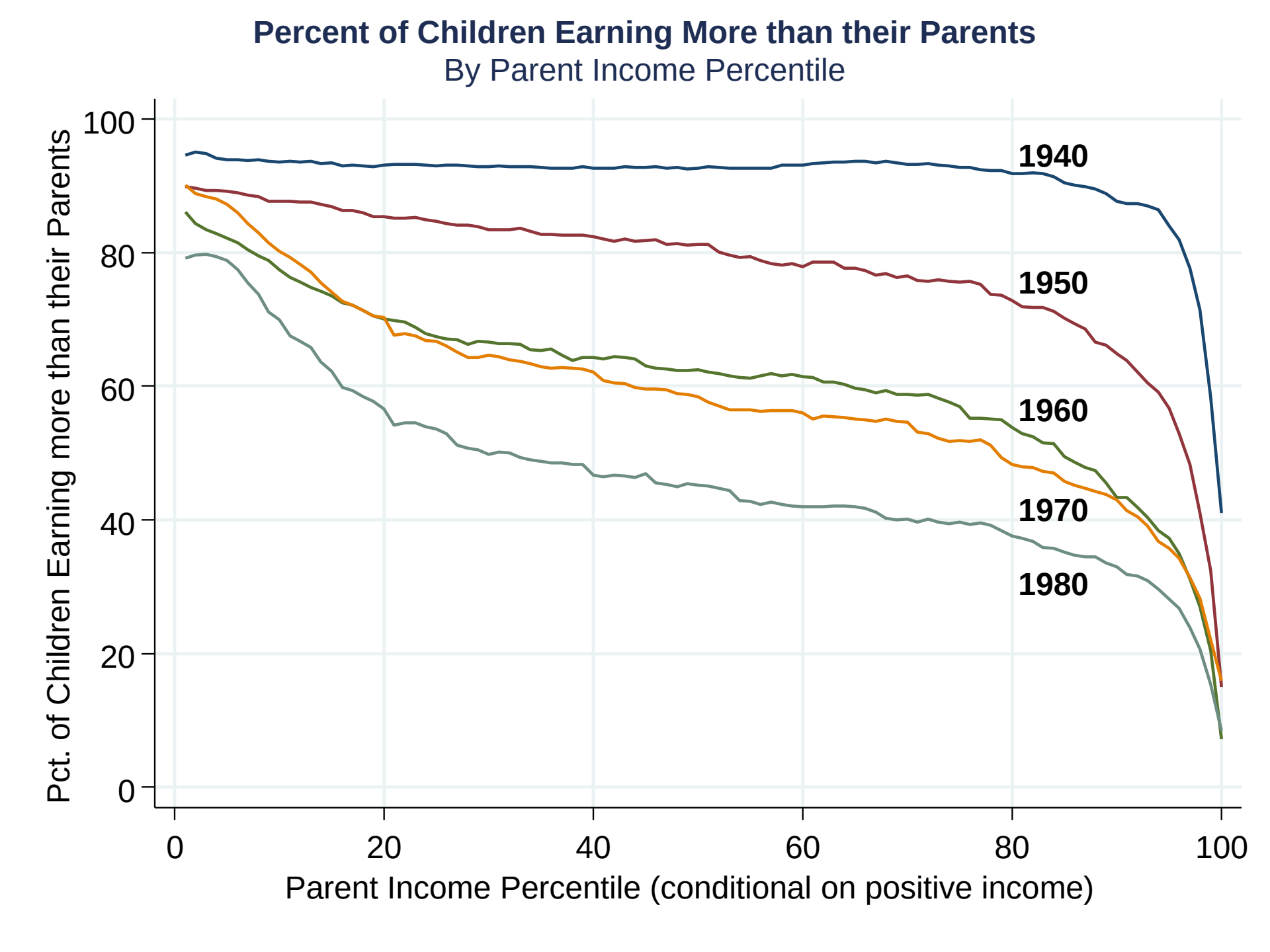
  1. Estimate parent income distribution using Census data
  2. Obtain distribution of child ranks for each parent rank using copula from tax data for 1980 cohort
  3. Map children's ranks to incomes at age 30 using 1970 CPS
  4. Calculate fraction of children with incomes exceeding parents by parent income percentile

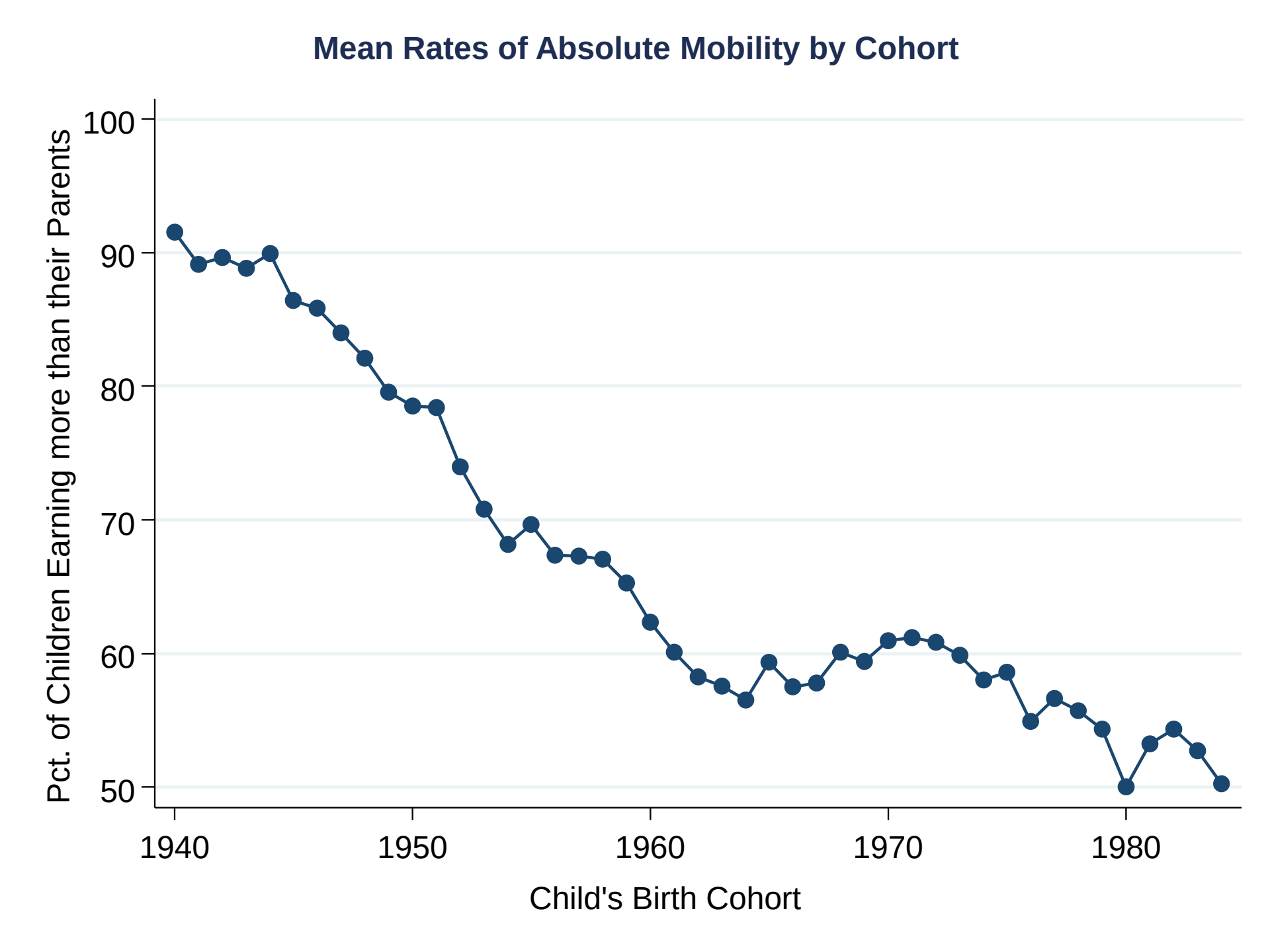

Percent of Children Earning More than their Parents
By Parent Income Percentile
Pct. of Children Earning more than their Parents
100
80
60
40
20
0
1940
0
20
40
60
80
100
Parent Income Percentile (conditional on positive income)


Percent of Children Earning More than their Parents
By Parent Income Percentile
Pct. of Children Earning more than their Parents
100
80
60
40
20
0
1940
1950
0
20
40
60
80
100
Parent Income Percentile (conditional on positive income)


Percent of Children Earning More than their Parents
By Parent Income Percentile
Pct. of Children Earning more than their Parents
100
80
60
40
20
0
1940
1950
1960
0
20
40
60
80
100
Parent Income Percentile (conditional on positive income)


Percent of Children Earning More than their Parents
By Parent Income Percentile
Pct. of Children Earning more than their Parents
100
80
60
40
20
0
0
20
40
60
80
100
Parent Income Percentile (conditional on positive income)
1940
1950
1960
1970


Percent of Children Earning More than their Parents
By Parent Income Percentile
Pct. of Children Earning more than their Parents
100
80
60
40
20
0
0
20
40
60
80
100
Parent Income Percentile (conditional on positive income)
1940
1950
1960
1970
1980


Mean Rates of Absolute Mobility by Cohort
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
1940
1950
1960
1970
1980
Child's Birth Cohort

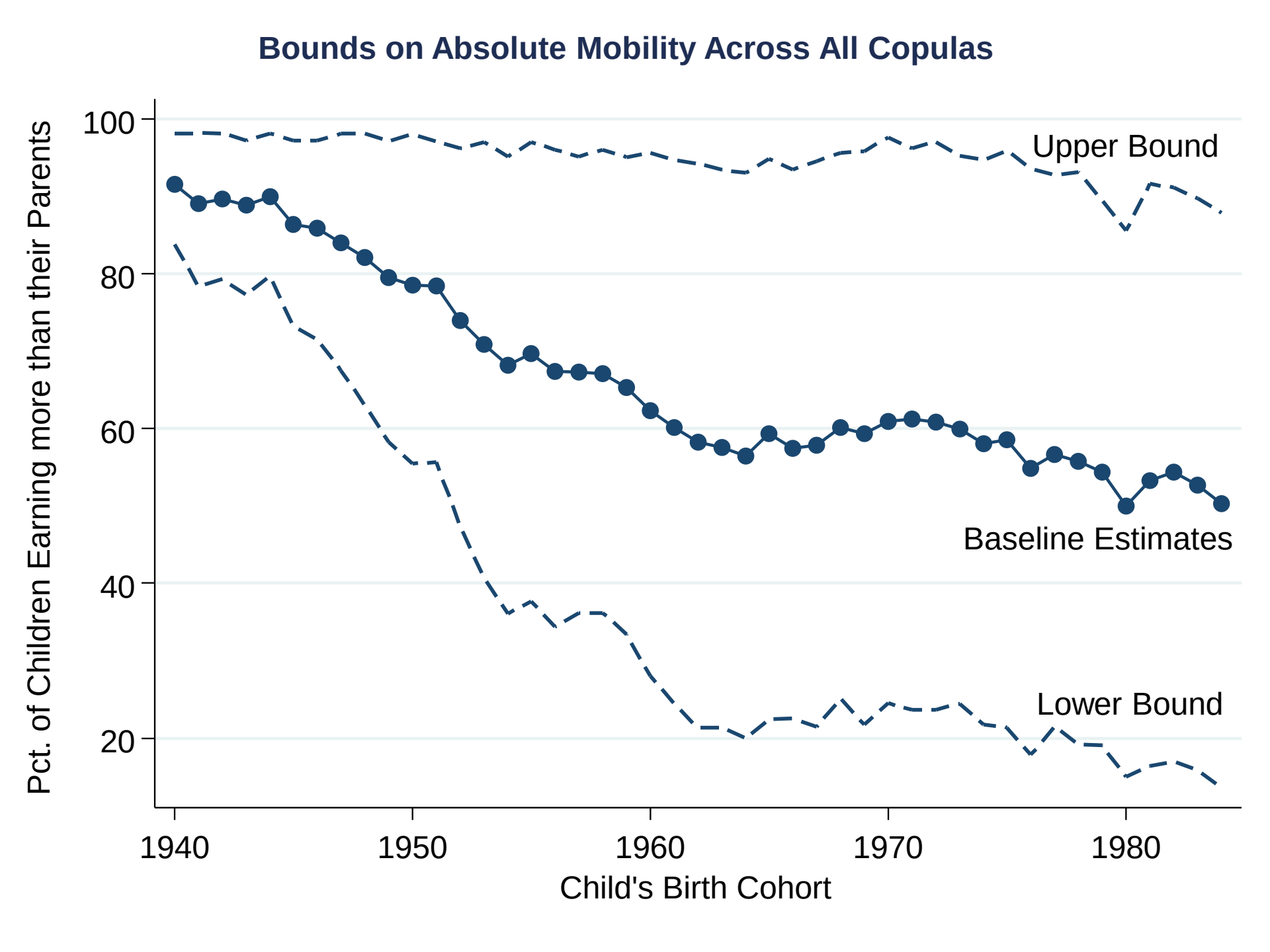
Bounds with Alternative Copulas

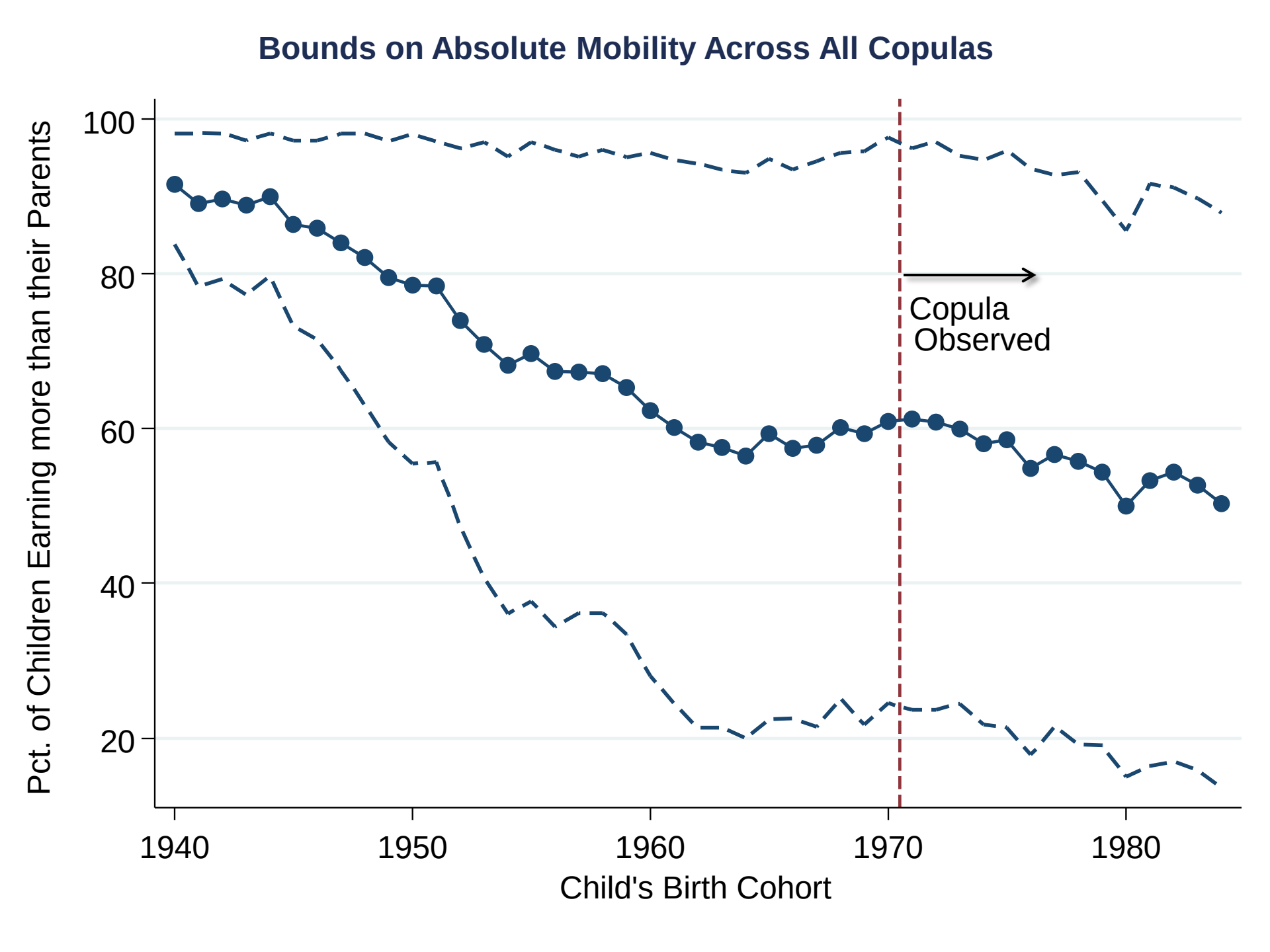
Sensitivity to Copula: Bounds on Absolute Mobility

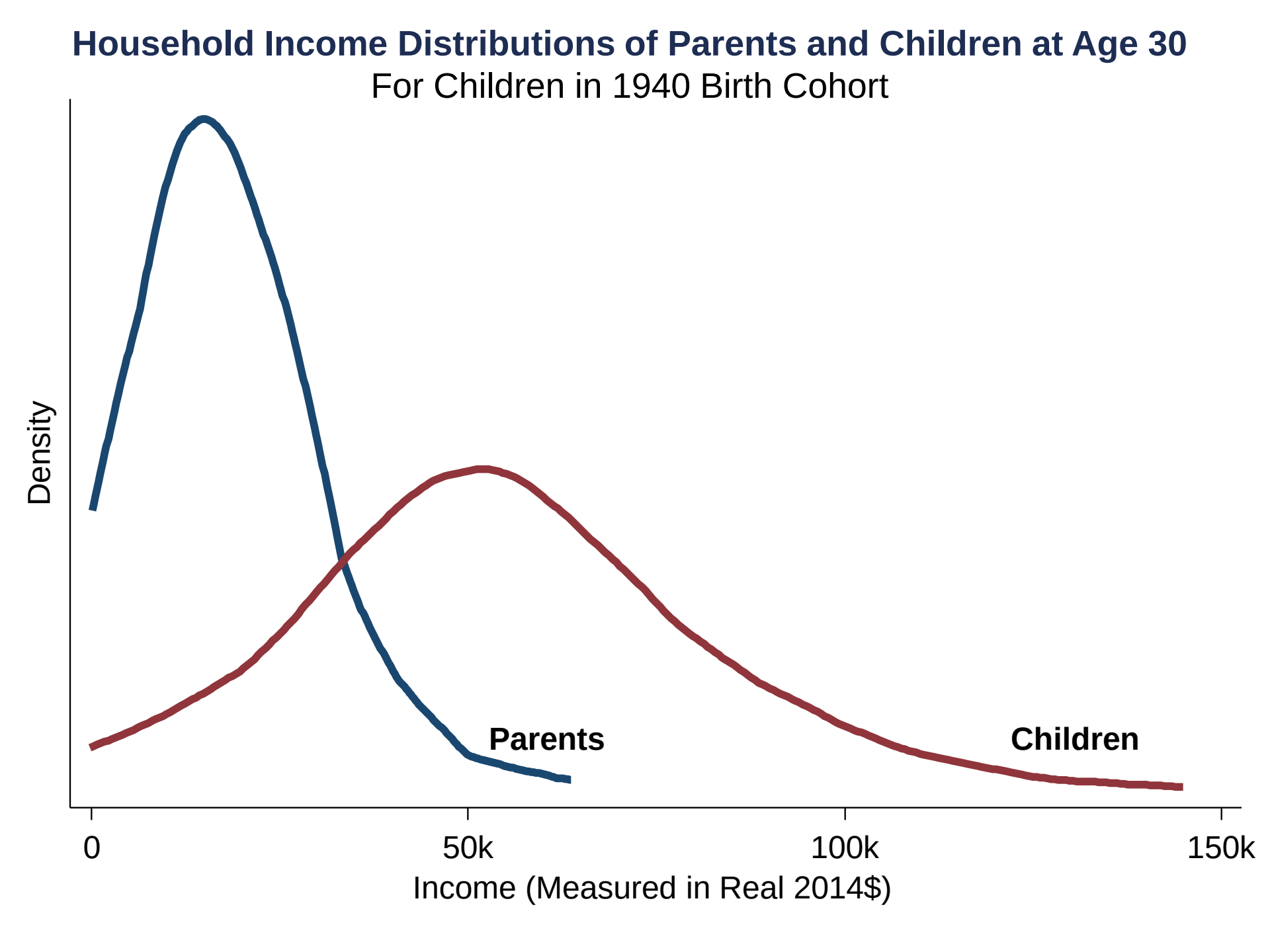
- Baseline estimates rely on assumption that copula remains stable back to 1940 cohort

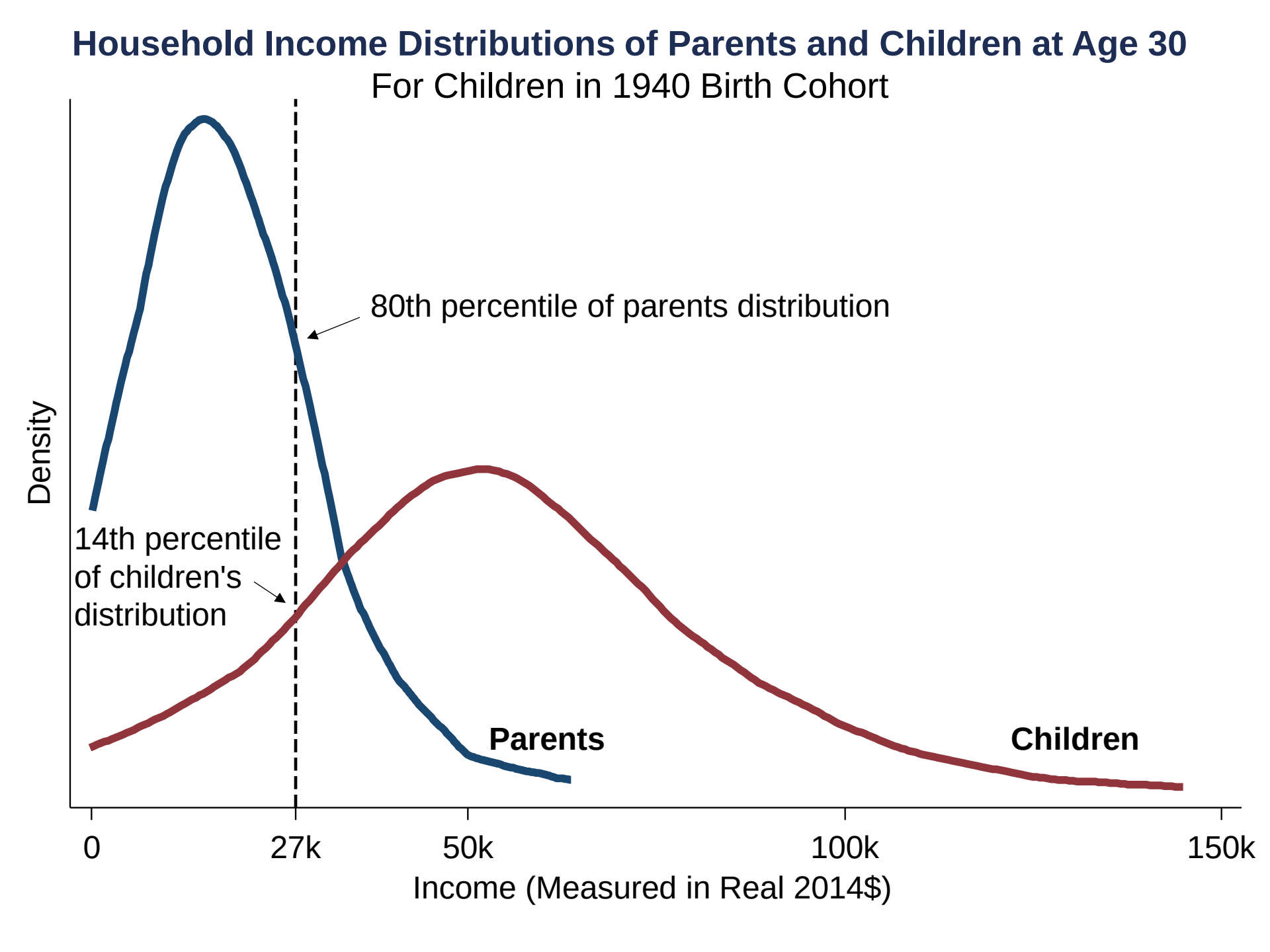
- Now relax this assumption and derive bounds on absolute mobility under alternative copulas by birth cohort
  - Consider all copulas under which children's ranks increase with parent ranks (first-order stochastic dominance)
  - Rules out negative intergenerational persistence

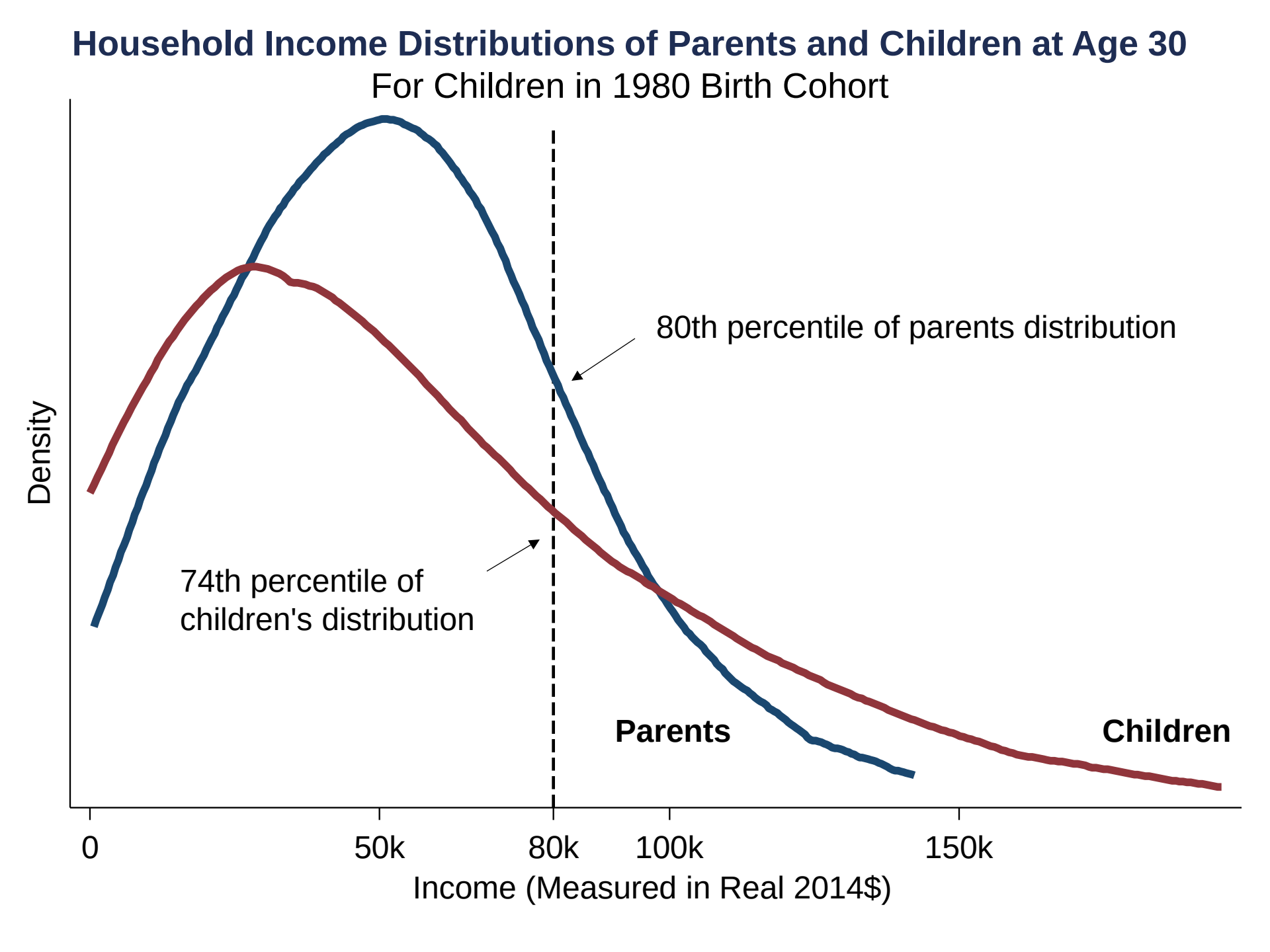
- High-dimensional (10,000-variable) maximization problem, but objective function and constraints are all linear
  - Can be solved efficiently using linear programming

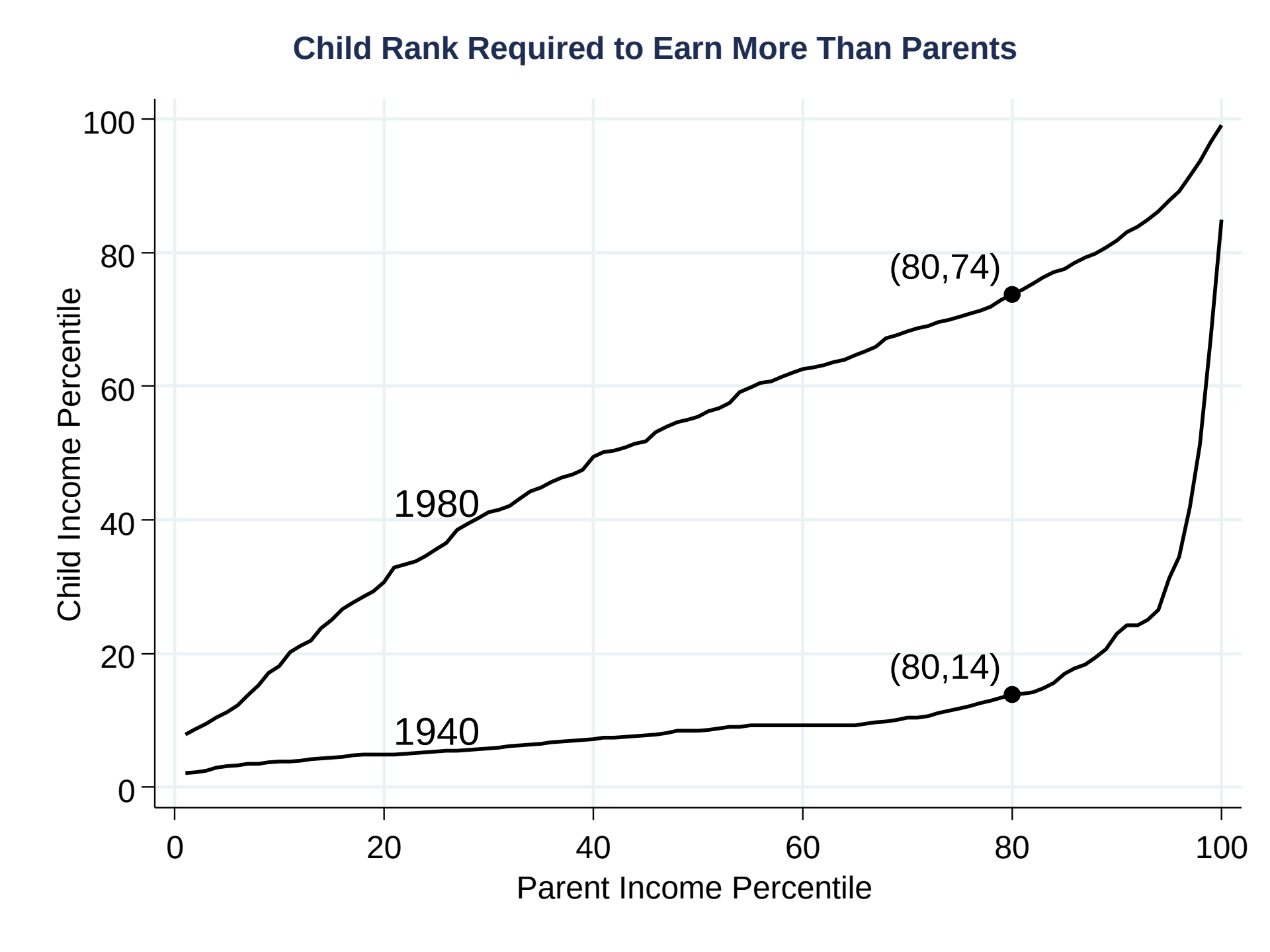

Bounds on Absolute Mobility Across All Copulas
Pct. of Children Earning more than their Parents
100
80
60
40
20
1940
1950
1960
1970
1980
Child's Birth Cohort
Upper Bound
Baseline Estimates
Lower Bound


Bounds on Absolute Mobility Across All Copulas
Pct. of Children Earning more than their Parents
100
80
60
40
20
1940
1950
1960
1970
1980
Child's Birth Cohort
Copula
Observed

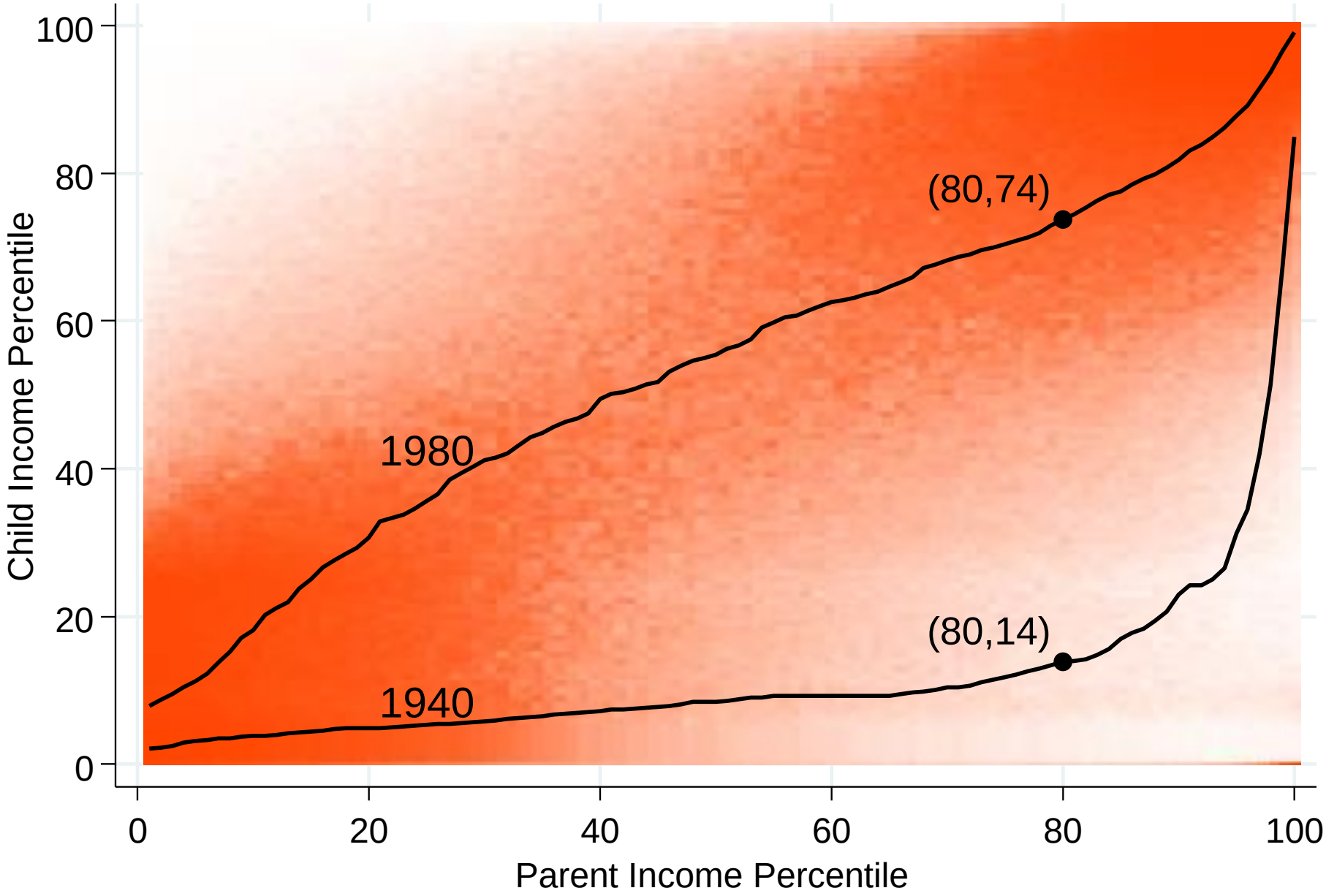

Household Income Distributions of Parents and Children at Age 30
For Children in 1940 Birth Cohort
Density
Parents
Children
0
50k
100k
150k
Income (Measured in Real 2014$)


Household Income Distributions of Parents and Children at Age 30
For Children in 1940 Birth Cohort
80th percentile of parents distribution
14th percentile of children's distribution
Parents
Children
Density
0
27k
50k
100k
150k
Income (Measured in Real 2014$)


Household Income Distributions of Parents and Children at Age 30
For Children in 1980 Birth Cohort
Density
80th percentile of parents distribution
74th percentile of
children's distribution
Parents
Children
0
50k
80k
100k
150k
Income (Measured in Real 2014$)


Child Rank Required to Earn More Than Parents
100
80
60
40
20
0
Child Income Percentile
(80,74)
1980
(80,14)
1940
0
20
40
60
80
100
Parent Income Percentile

Child Rank Required to Earn More Than Parents with Copula for 1980 Cohort



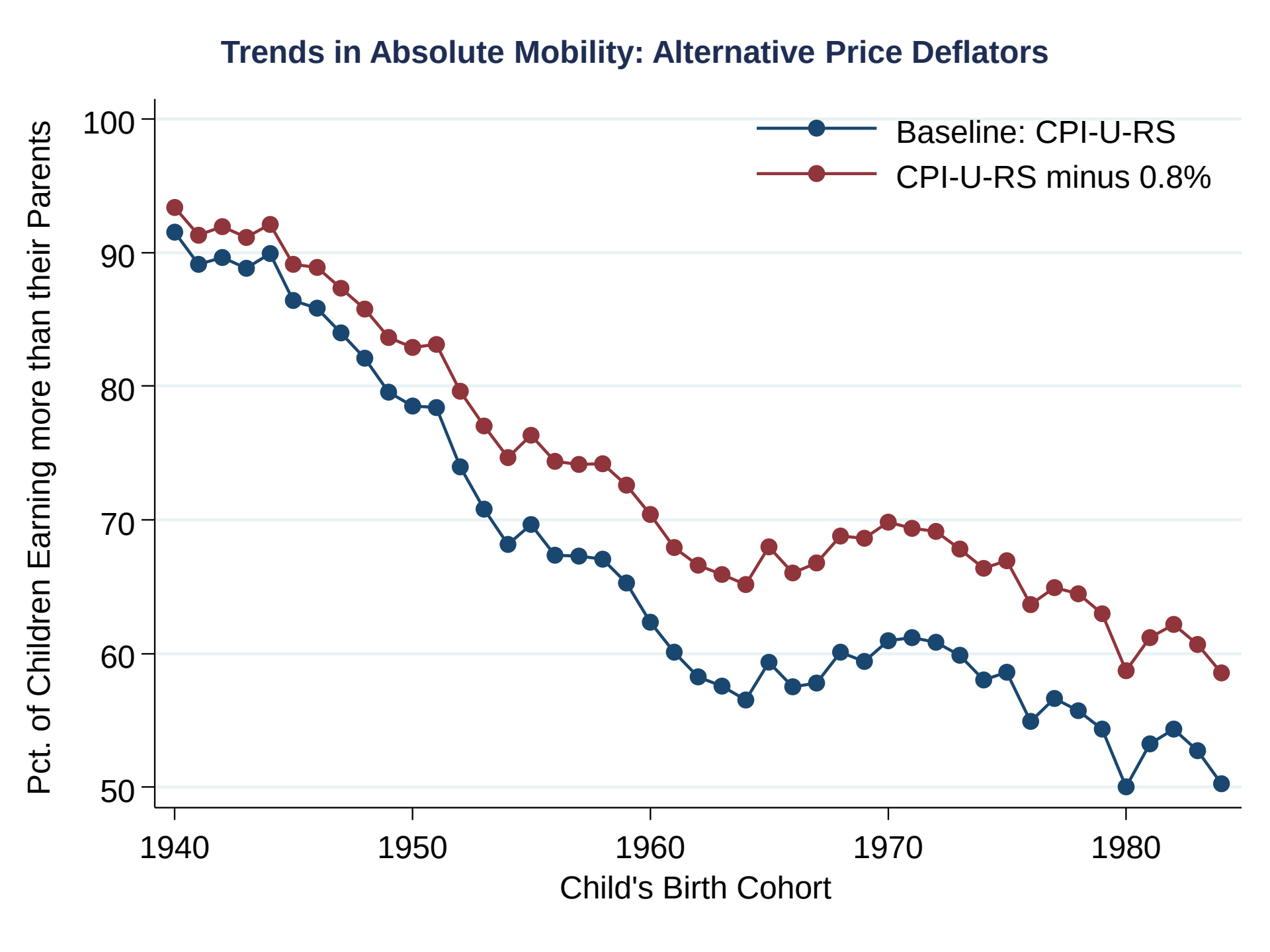
Note: Darker colors represent higher density in copula

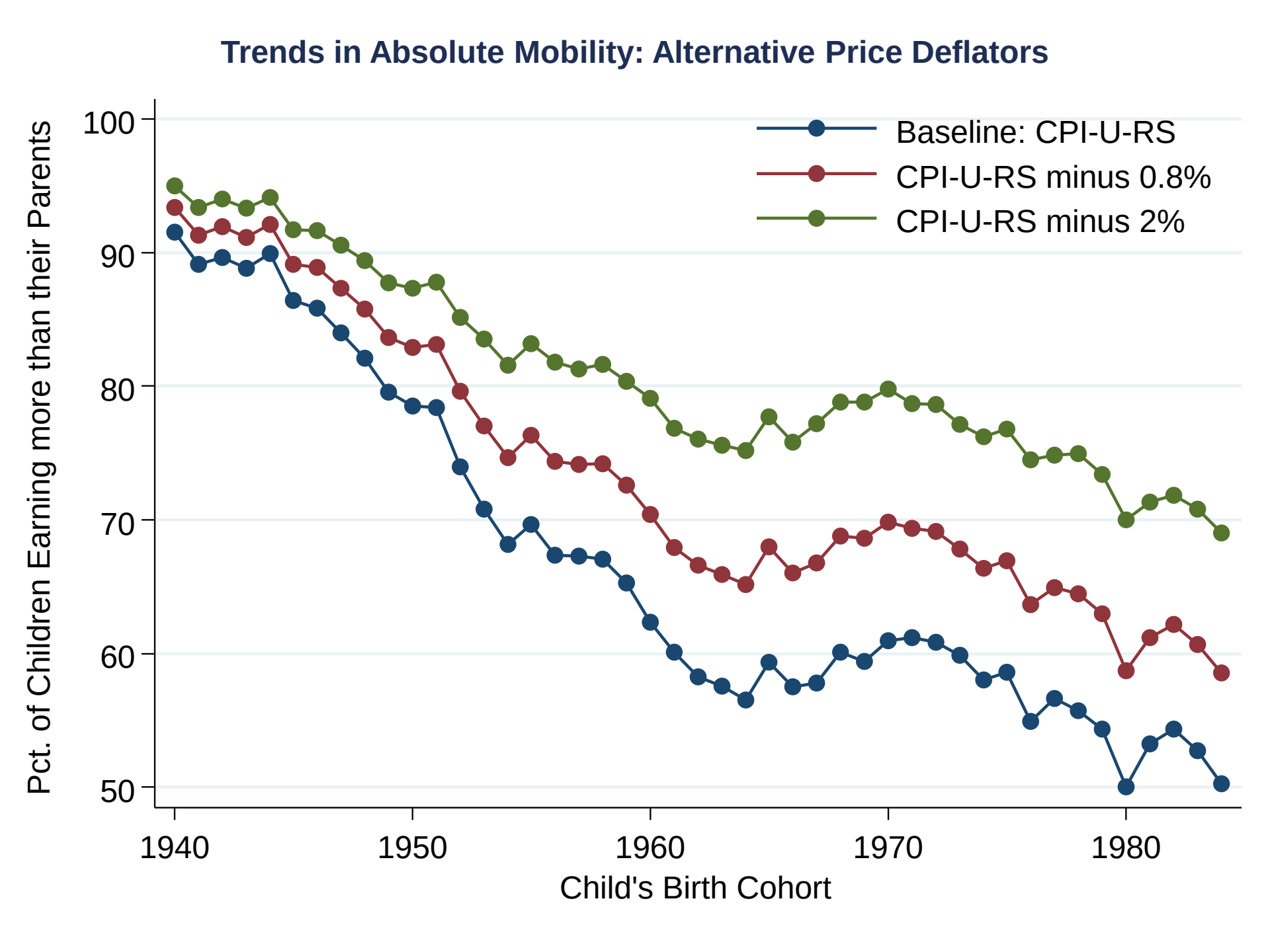
Sensitivity Analysis

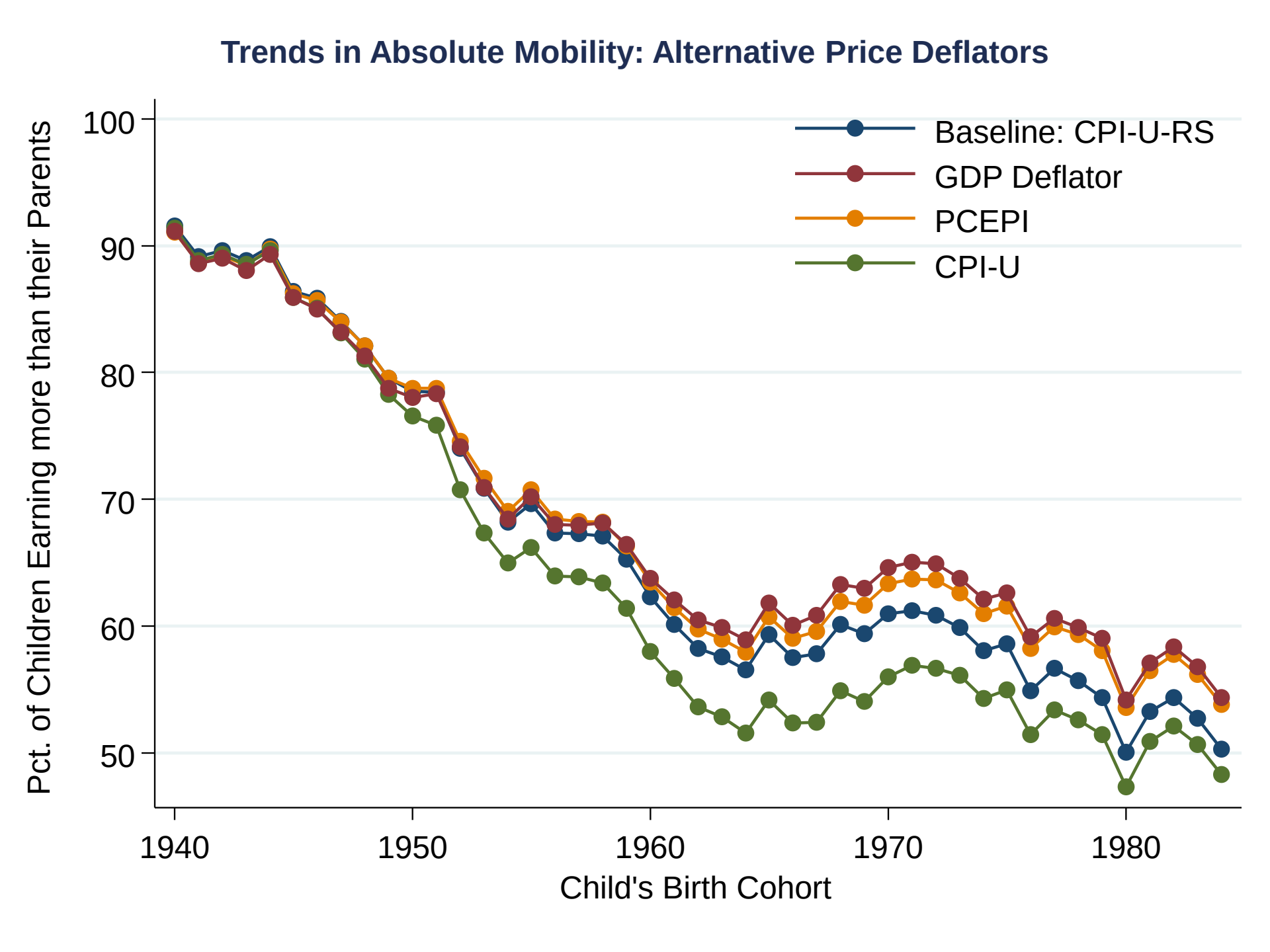
Sensitivity Analysis

- Assess sensitivity of results to key specification choices

1. Using alternative price deflators
    - CPI-U-RS fails to account adequately for quality improvements and new products [Boskin et al. 1996, Broda and Weinstein 2009]
    - Follow prior work by subtracting 0.8% from inflation rate implied by CPI-U-RS [Meyer and Sullivan 2009, Broda and Weinstein 2010]


Trends in Absolute Mobility: Alternative Price Deflators
Baseline: CPI-U-RS
CPI-U-RS minus 0.8%
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
1940
1950
1960
1970
1980
Child's Birth Cohort

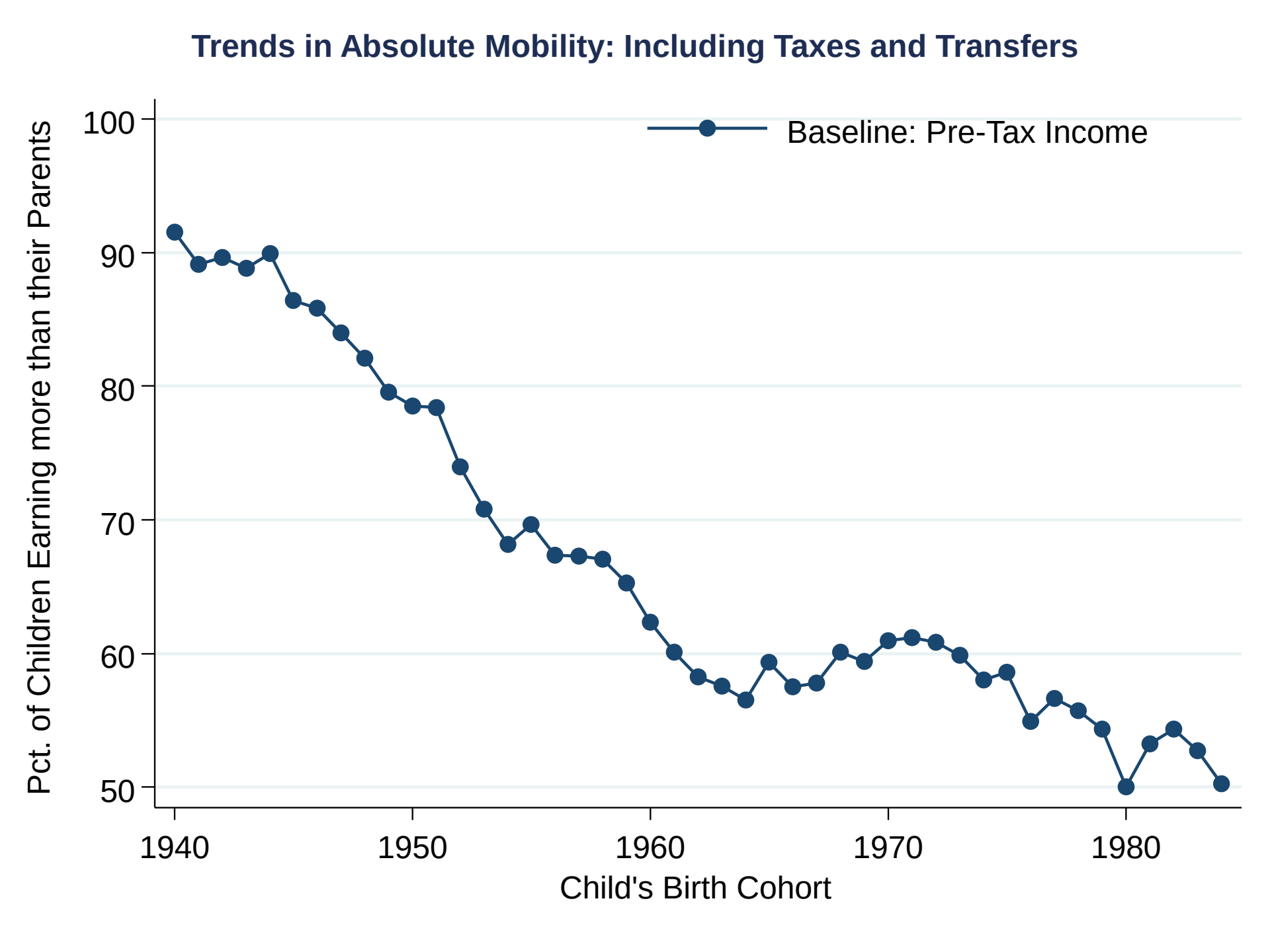

Trends in Absolute Mobility: Alternative Price Deflators
Baseline: CPI-U-RS
CPI-U-RS minus 0.8%
CPI-U-RS minus 2%
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
1940
1950
1960
1970
1980
Child's Birth Cohort

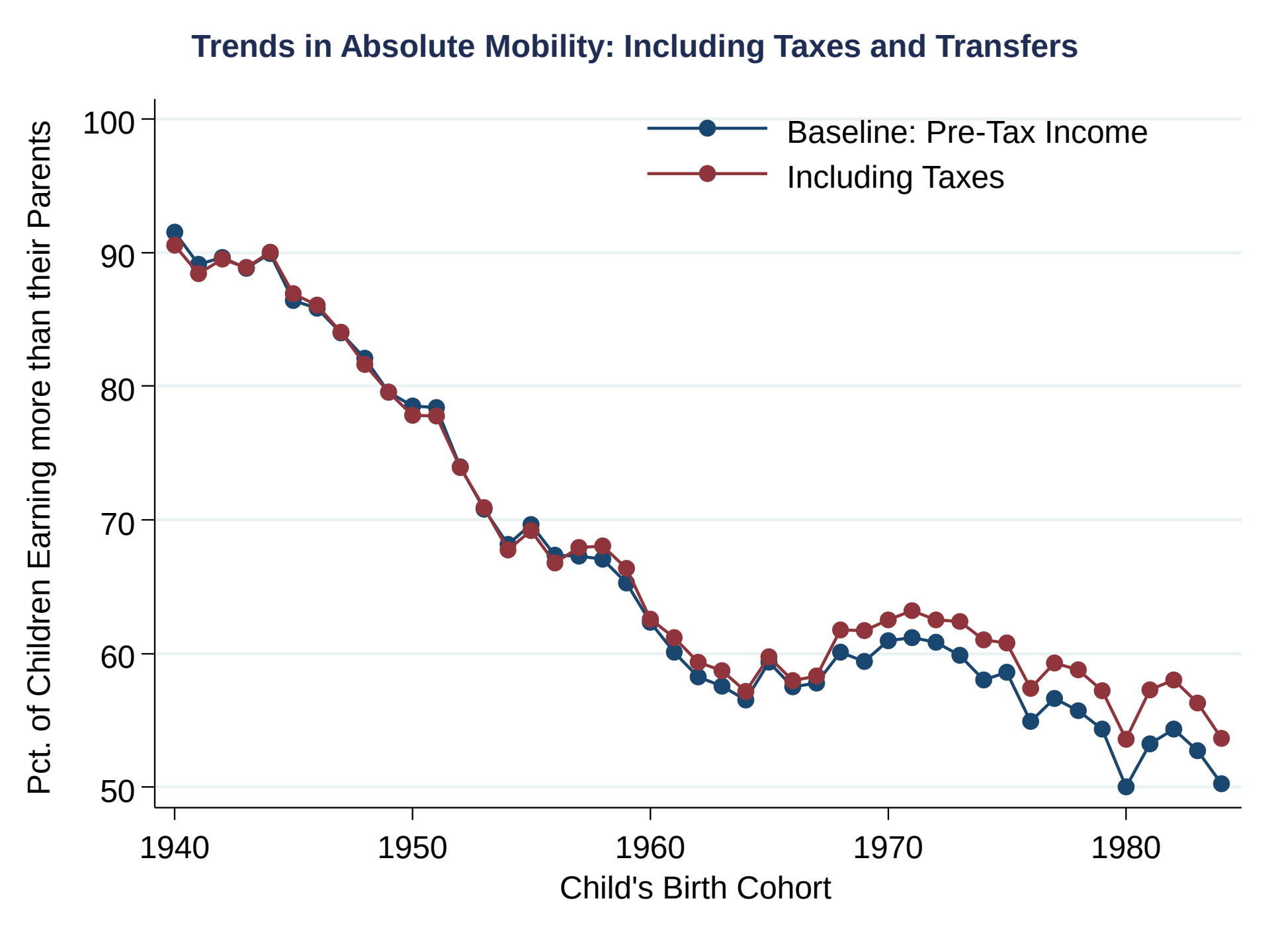

Trends in Absolute Mobility: Alternative Price Deflators
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
1940
1950
1960
1970
1980
Child's Birth Cohort
Baseline: CPI-U-RS
GDP Deflator
PCEPI
CPI-U

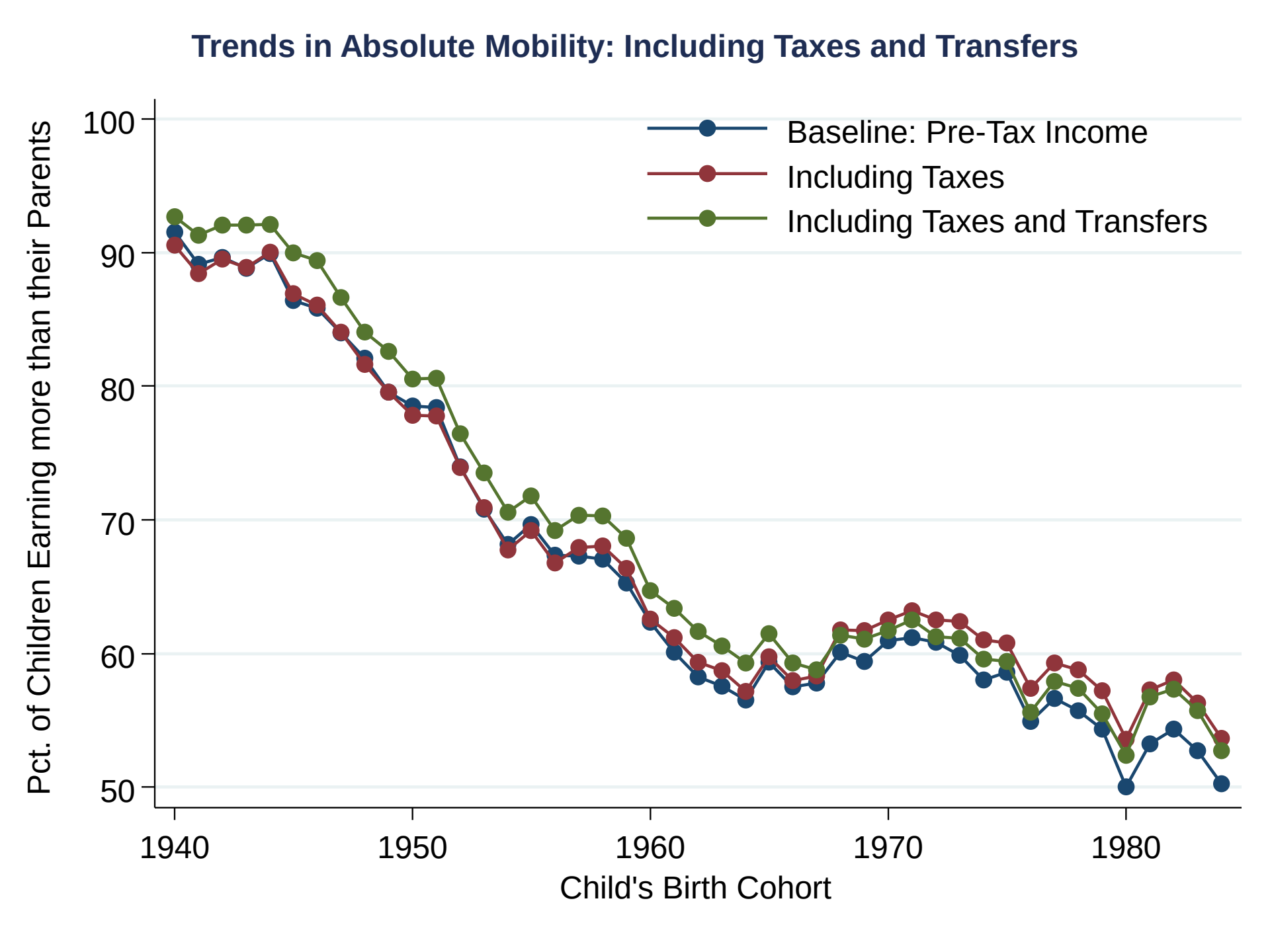
Sensitivity Analysis

- Assess sensitivity of results to key specification choices

1. Using alternative price deflators
2. Using post-tax and transfer incomes
    - Conceptually, not clear whether earnings or consumption is the relevant metric for absolute mobility
    - Assess whether distinction matters empirically
    - Calculate tax rates using NBER TAXSIM since 1960 and using raw federal MTR's prior to 1960
    - Estimate cash and in-kind transfers (SNAP, WIC, housing assistance) since 1967 using CPS data from Fox et al. (2014)


Trends in Absolute Mobility: Including Taxes and Transfers
Baseline: Pre-Tax Income
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
1940
1950
1960
1970
1980
Child's Birth Cohort

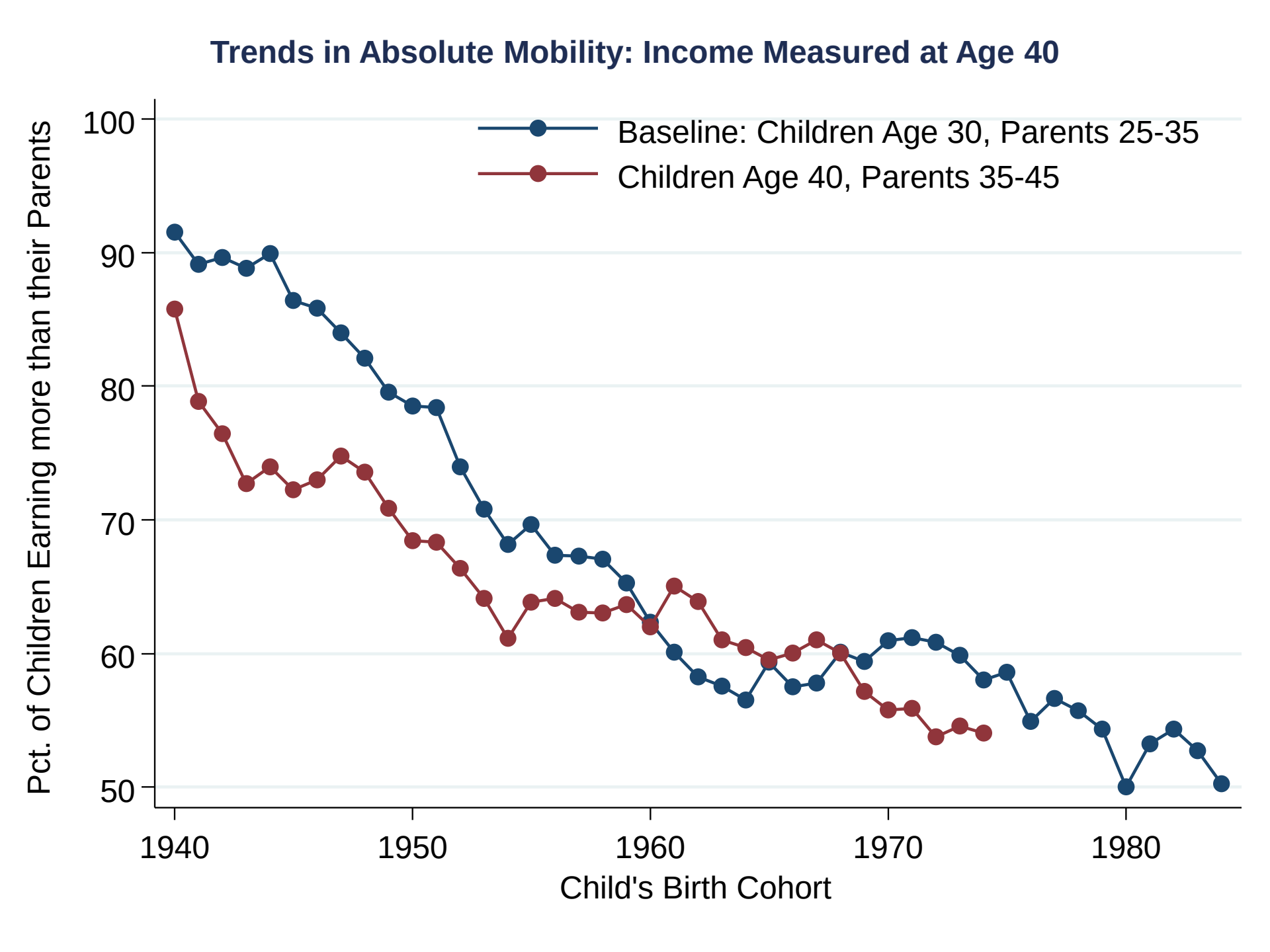

Trends in Absolute Mobility: Including Taxes and Transfers
Baseline: Pre-Tax Income
Including Taxes
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
1940
1950
1960
1970
1980
Child's Birth Cohort


Trends in Absolute Mobility: Including Taxes and Transfers
Baseline: Pre-Tax Income
Including Taxes
Including Taxes and Transfers
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
1940
1950
1960
1970
1980
Child's Birth Cohort

Sensitivity Analysis

- Assess sensitivity of results to key specification choices

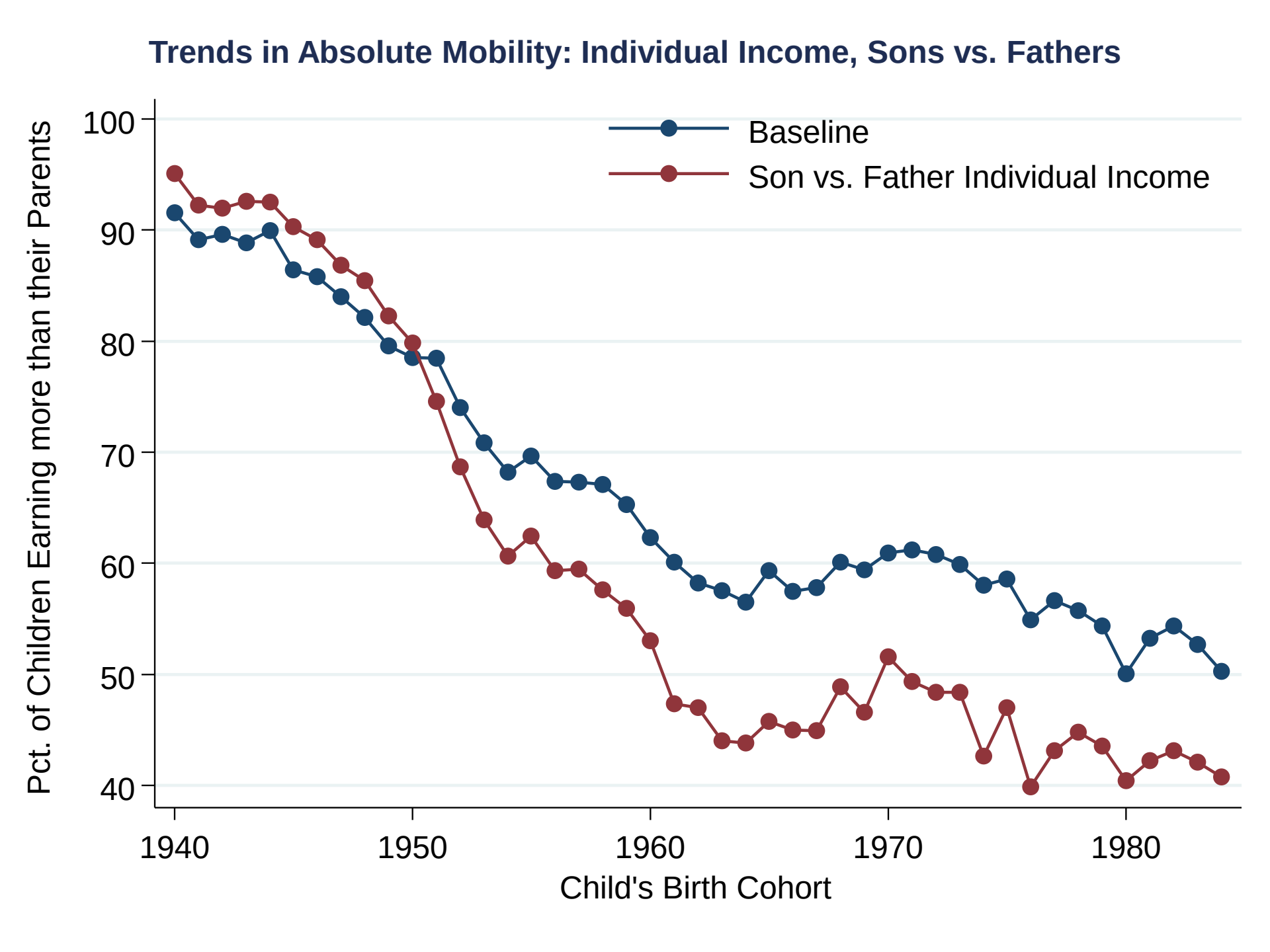
1. Using alternative price deflators
2. Using post-tax and transfer incomes
3. Measuring incomes at age 40 instead of 30
    - Children today may take longer to reach peak earnings than those in earlier cohorts


Trends in Absolute Mobility: Income Measured at Age 40
Baseline: Children Age 30, Parents 25-35
Children Age 40, Parents 35-45
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
1940
1950
1960
1970
1980
Child's Birth Cohort

Sensitivity Analysis

- Assess sensitivity of results to key specification choices

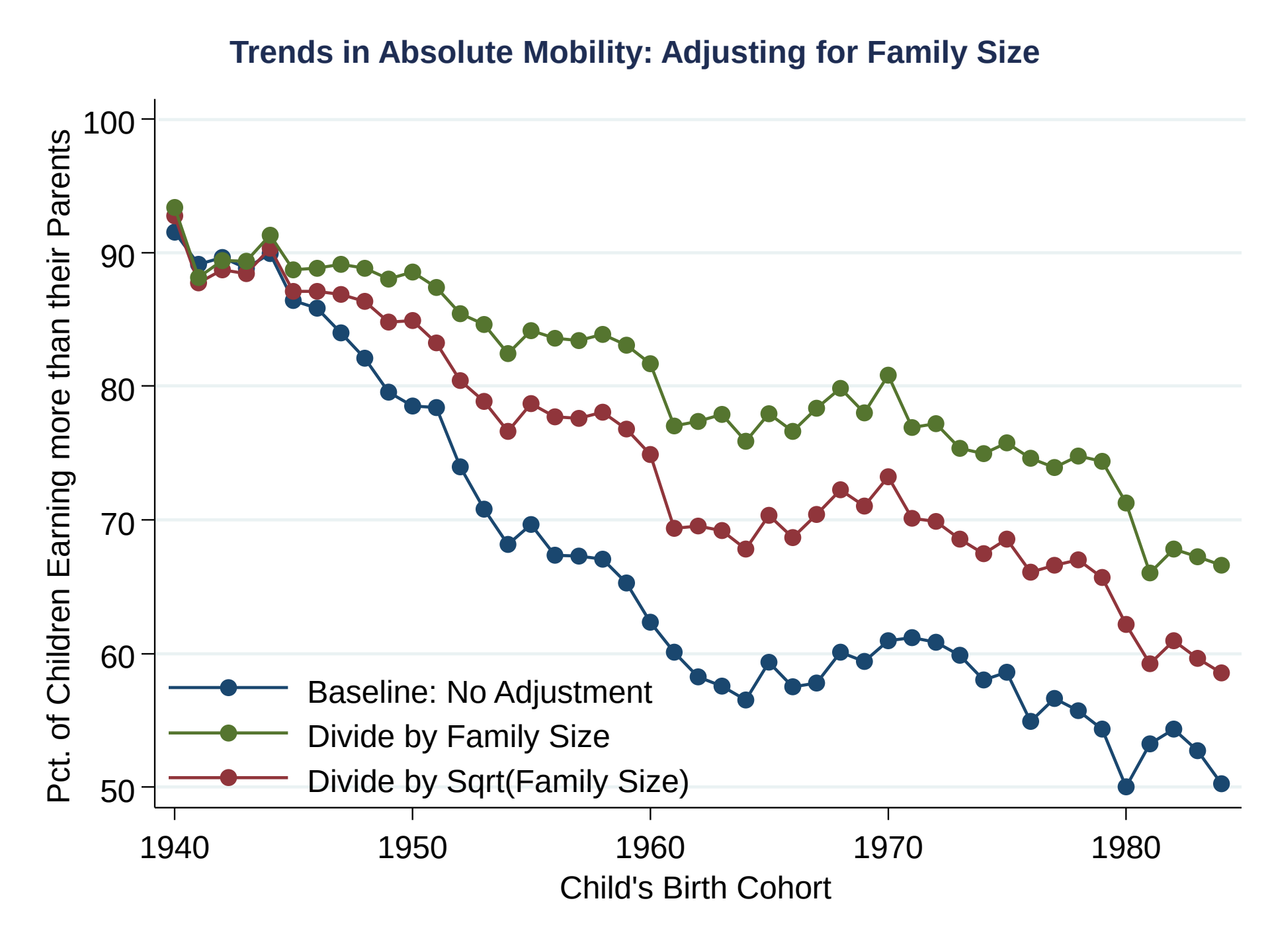
1. Using alternative price deflators
2. Using post-tax and transfer incomes
3. Measuring incomes at age 40 instead of 30
4. Using individual income instead of family income
    - Fraction of individuals married at age 30 has fallen over time → family income may be lower for recent cohorts


Trends in Absolute Mobility: Individual Income, Sons vs. Fathers
Baseline
Son vs. Father Individual Income
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
40
1940
1950
1960
1970
1980
Child's Birth Cohort

Sensitivity Analysis

- Assess sensitivity of results to key specification choices

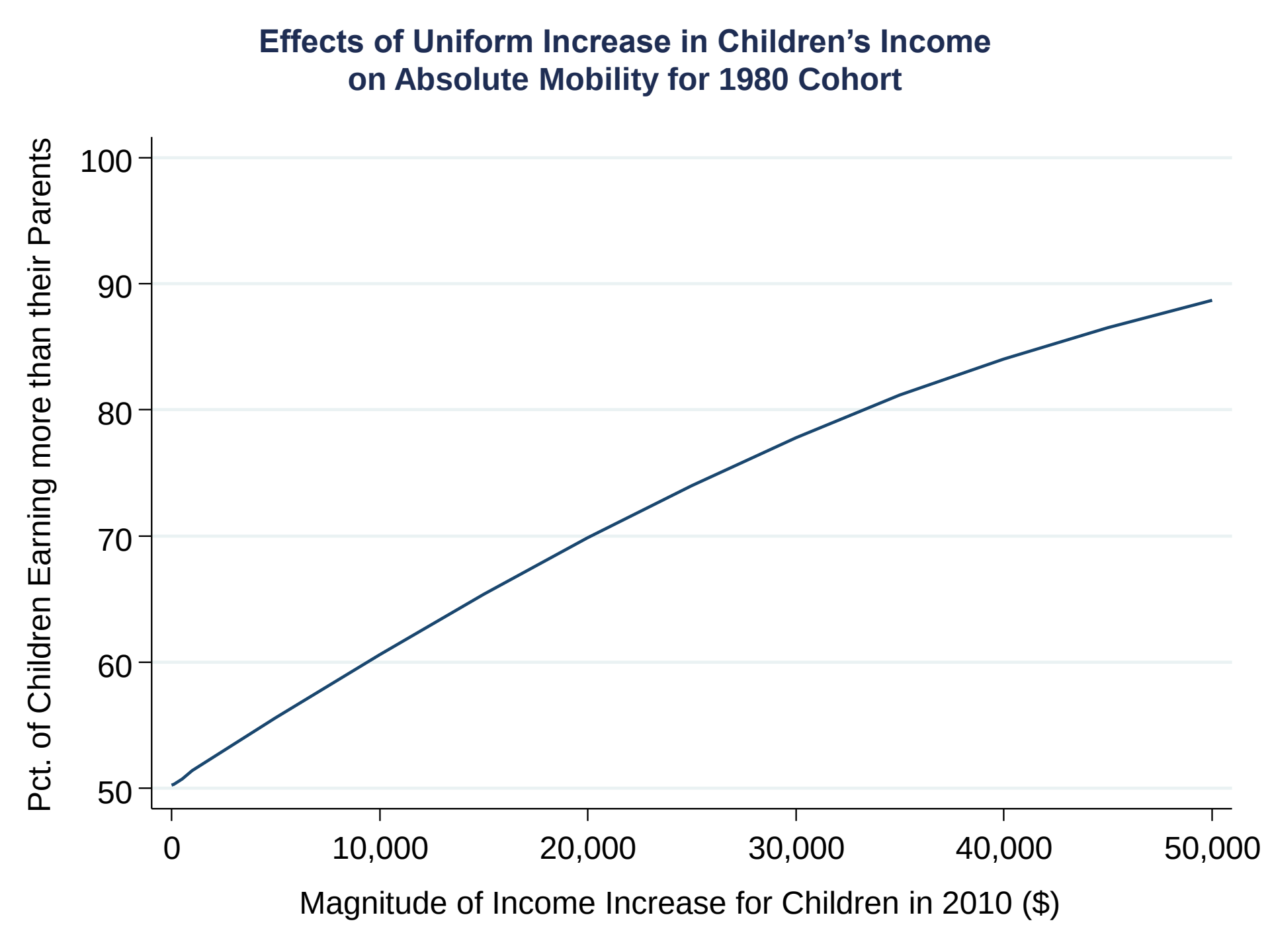
1. Using alternative price deflators
2. Using post-tax and transfer incomes
3. Measuring incomes at age 40 instead of 30
4. Using individual income instead of family income
5. Adjusting for changes in household size
    - Households have grown smaller over time → consumption per person may not have fallen as much


Trends in Absolute Mobility: Adjusting for Family Size
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
1940
1950
1960
1970
1980
Child's Birth Cohort
Baseline: No Adjustment
Divide by Family Size
Divide by Sqrt(Family Size)

Sensitivity Analysis

- Assess sensitivity of results to key specification choices

1. Using alternative price deflators
2. Using post-tax and transfer incomes
3. Measuring incomes at age 40 instead of 30
4. Using individual income instead of family income
5. Adjusting for changes in household size
6. Accounting for fringe benefits and income under-reporting
    - Divergence between income reported in CPS and total compensation has grown in recent years


Effects of Uniform Increase in Children's Income
on Absolute Mobility for 1980 Cohort
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
0
10,000
20,000
30,000
40,000
50,000
Magnitude of Income Increase for Children in 2010 ($)

Sensitivity Analysis

→ Result that absolute mobility has declined sharply since 1940 is robust to key specification choices

1. Using alternative price deflators
2. Using post-tax and transfer incomes
3. Measuring incomes at age 40 instead of 30
4. Using individual income instead of family income
5. Adjusting for changes in household size
6. Accounting for fringe benefits and income under-reporting

Counterfactuals

Counterfactual Scenarios

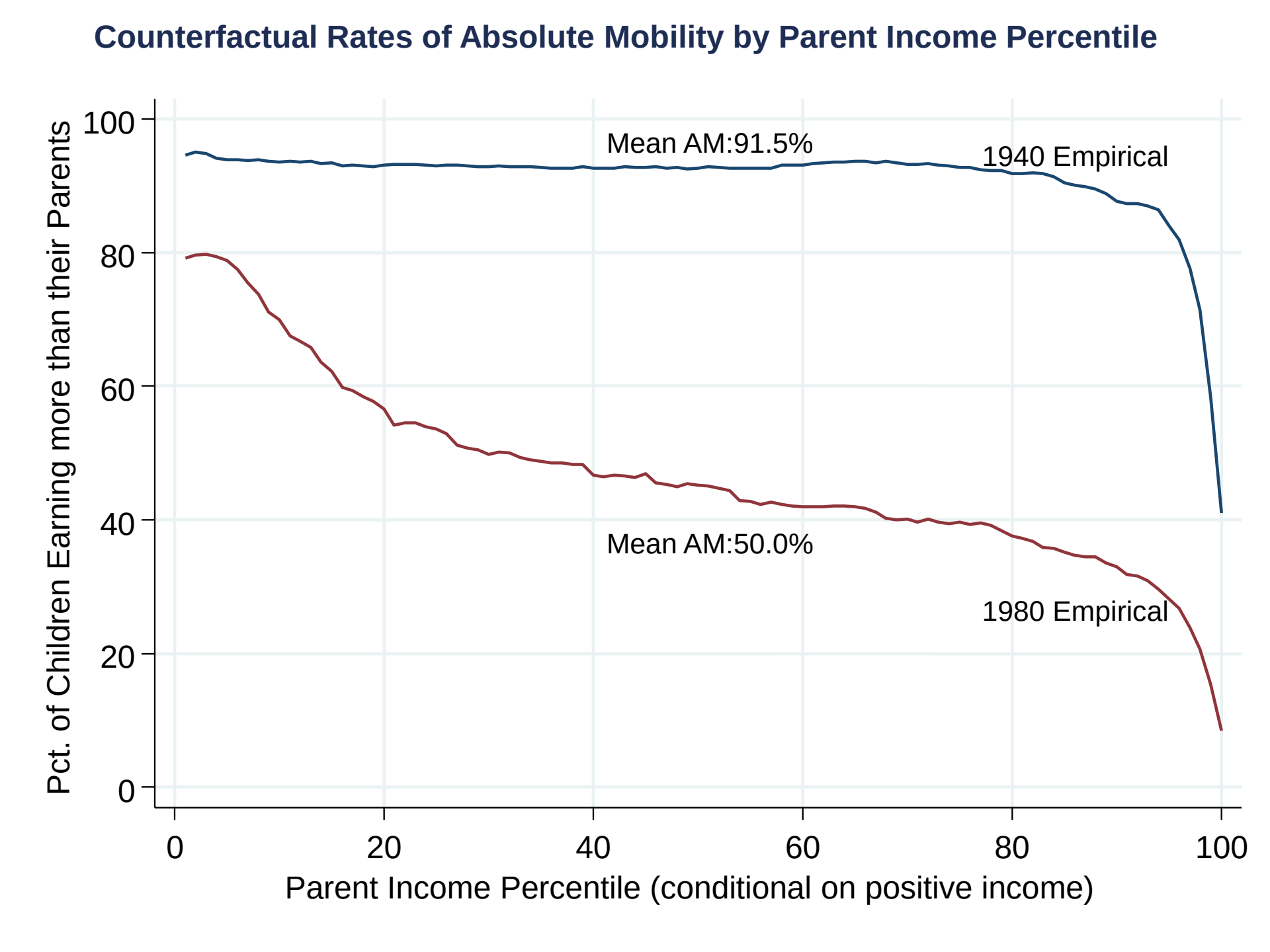
- What policies can restore absolute mobility to historical levels?

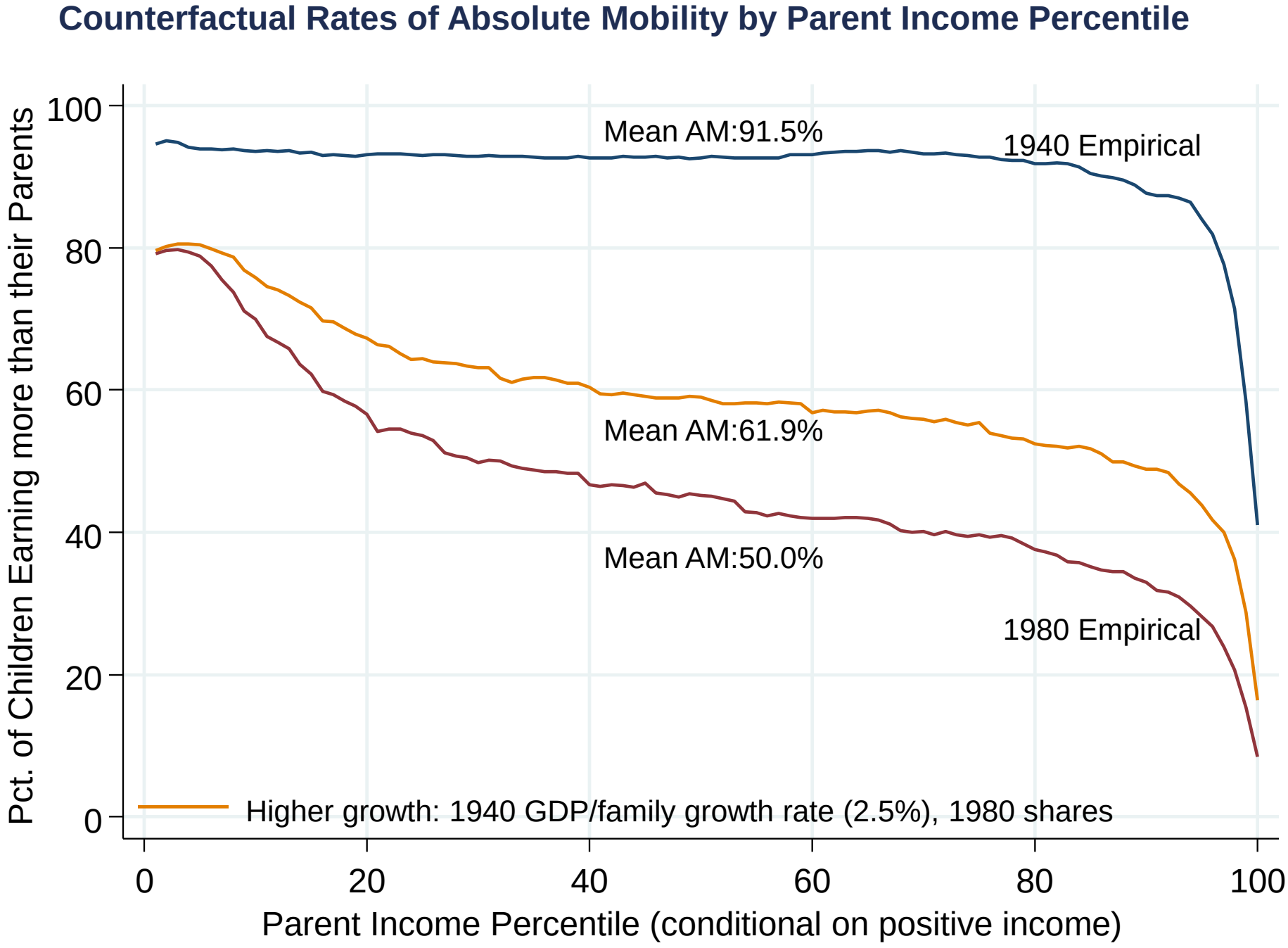
- Two key macroeconomic changes since 1940: lower GDP growth rates and less equal distribution of growth [e.g., Goldin and Katz 2009]

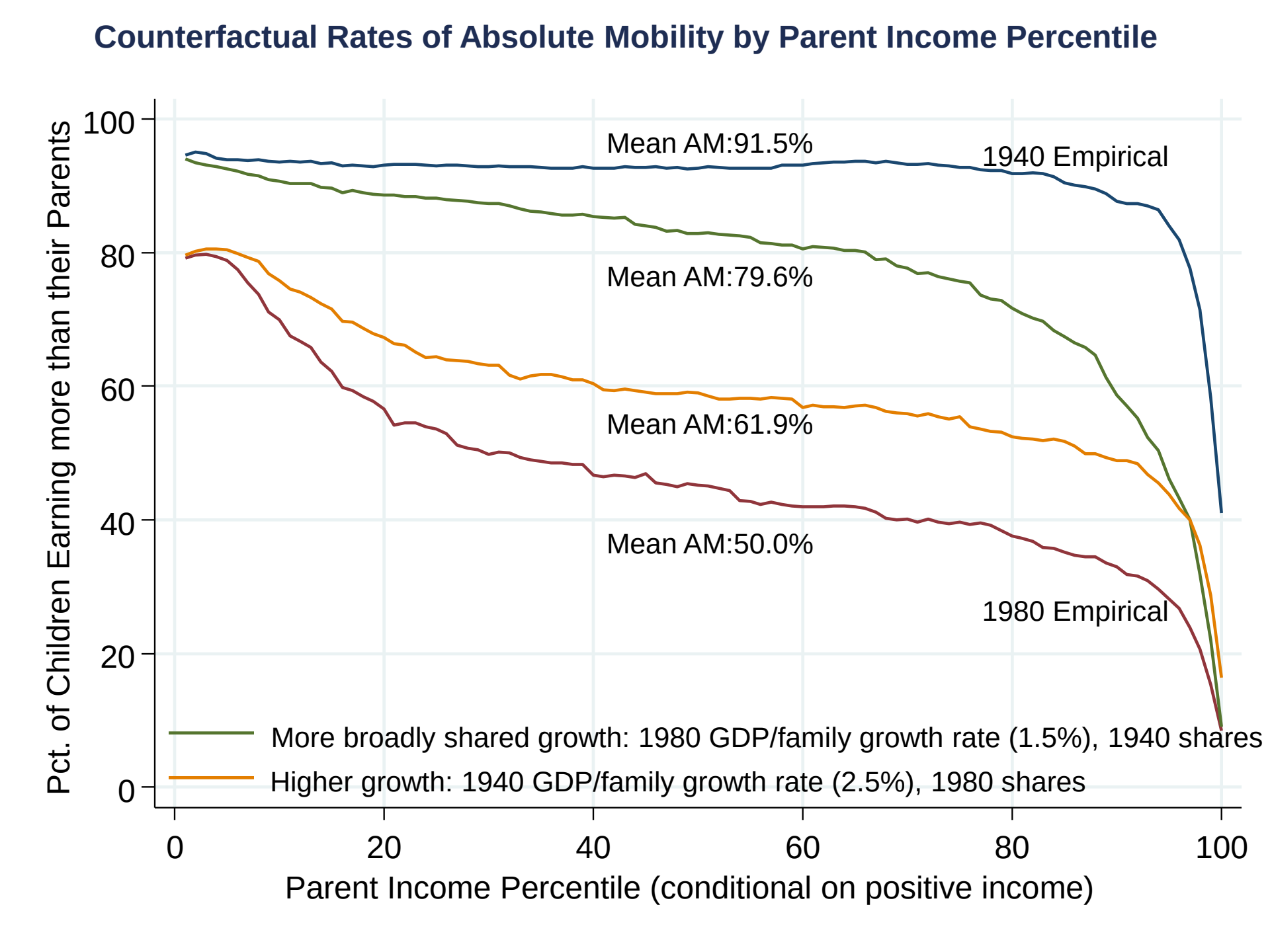
- Consider two counterfactual scenarios for children born in 1980:

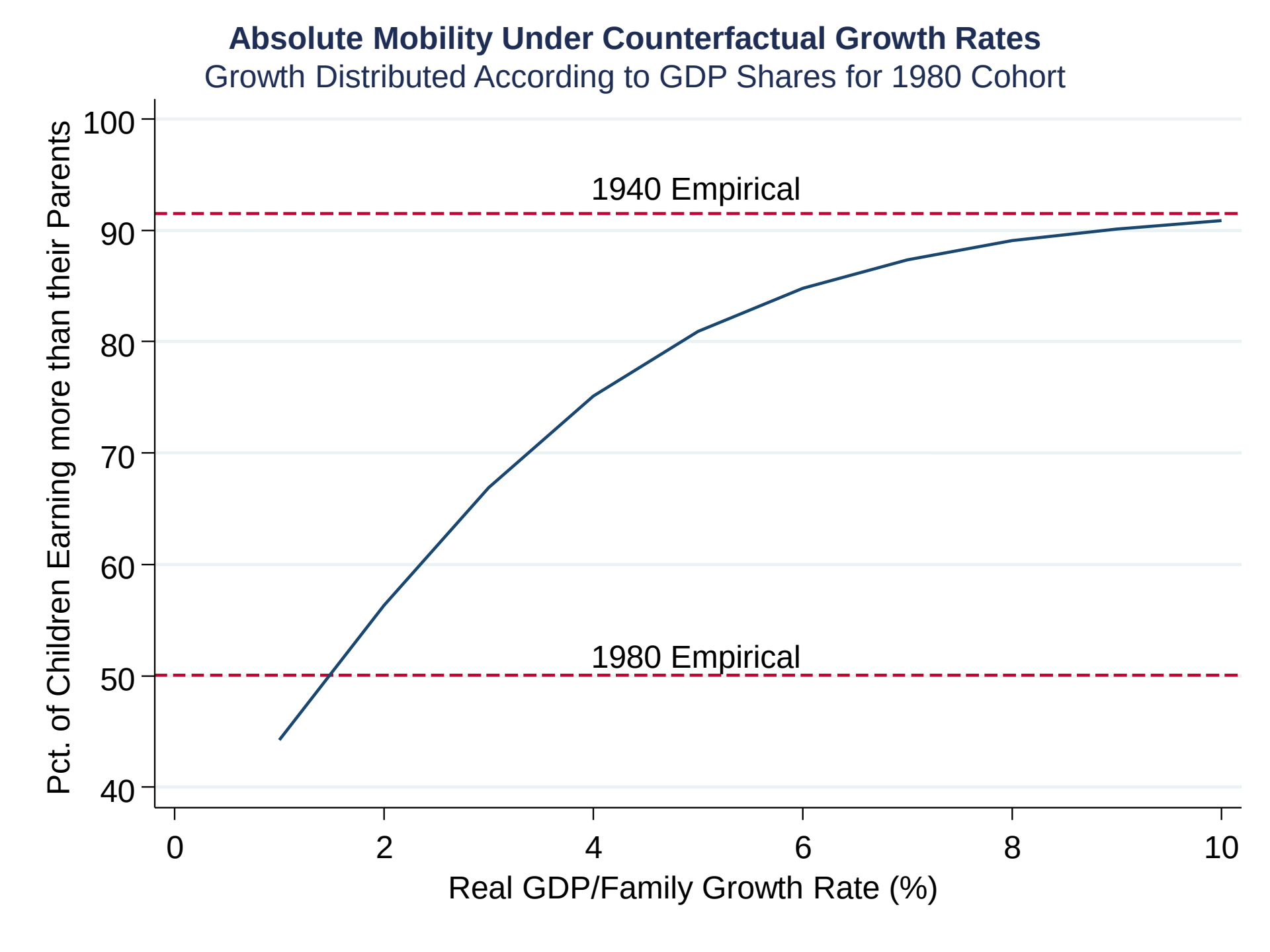
1. **Higher growth**: GDP growth since birth matching experience of 1940 cohort, with GDP distributed across income percentiles as in 2010

2. **More broadly shared growth**: Same GDP growth rate, but distribute GDP across income percentiles as in 1940 cohort


Counterfactual Rates of Absolute Mobility by Parent Income Percentile
Pct. of Children Earning more than their Parents
100
80
60
40
20
0
Mean AM:91.5%
1940 Empirical
Mean AM:50.0%
1980 Empirical
0
20
40
60
80
100
Parent Income Percentile (conditional on positive income)


Counterfactual Rates of Absolute Mobility by Parent Income Percentile
Pct. of Children Earning more than their Parents
100
80
60
40
20
0
Mean AM:91.5%
1940 Empirical
Mean AM:61.9%
Mean AM:50.0%
1980 Empirical
Higher growth: 1940 GDP/family growth rate (2.5%), 1980 shares
0
20
40
60
80
100
Parent Income Percentile (conditional on positive income)


Counterfactual Rates of Absolute Mobility by Parent Income Percentile
Pct. of Children Earning more than their Parents
100
80
60
40
20
0
Mean AM:91.5%
1940 Empirical
Mean AM:79.6%
Mean AM:61.9%
Mean AM:50.0%
1980 Empirical
More broadly shared growth: 1980 GDP/family growth rate (1.5%), 1940 shares
Higher growth: 1940 GDP/family growth rate (2.5%), 1980 shares
0
20
40
60
80
100
Parent Income Percentile (conditional on positive income)


Absolute Mobility Under Counterfactual Growth Rates
Growth Distributed According to GDP Shares for 1980 Cohort
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
40
1940 Empirical
1980 Empirical
0
2
4
6
8
10
Real GDP/Family Growth Rate (%)

Conclusions

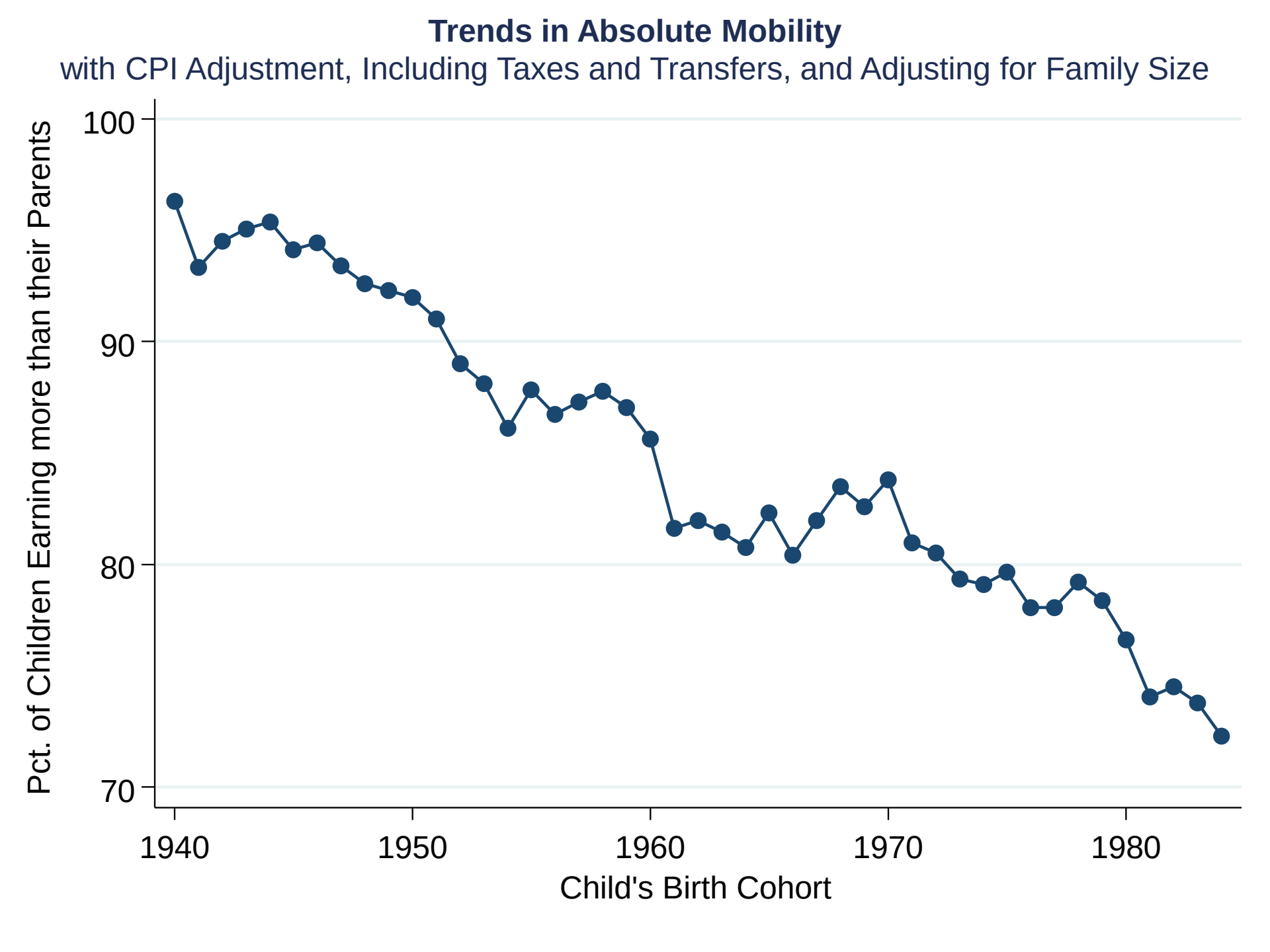
1. Rates of absolute mobility have fallen from ~90% for 1940 birth cohort to ~50% for children entering labor market today

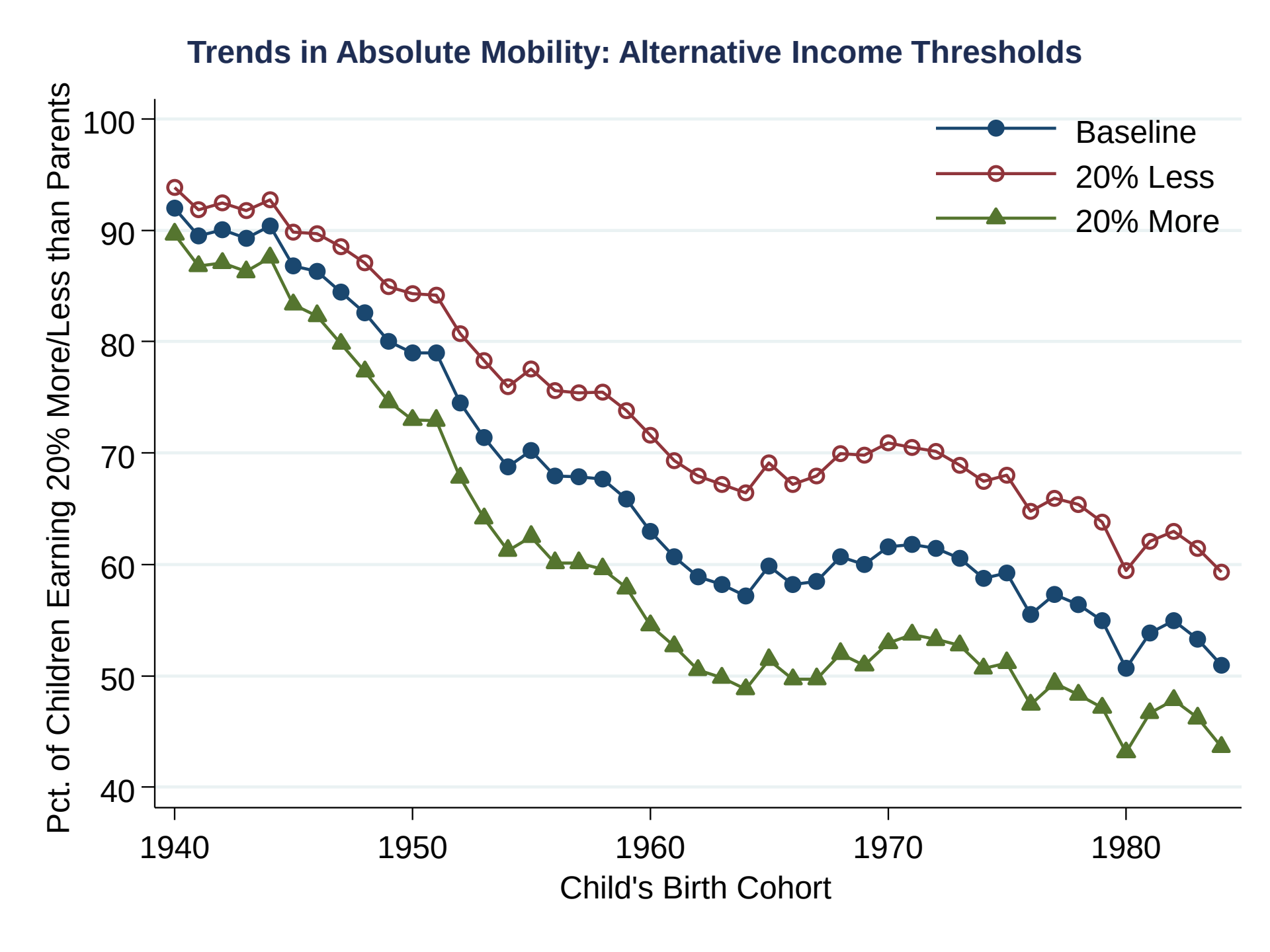
2. Absolute mobility has fallen primarily because of growing inequality in distribution of economic growth

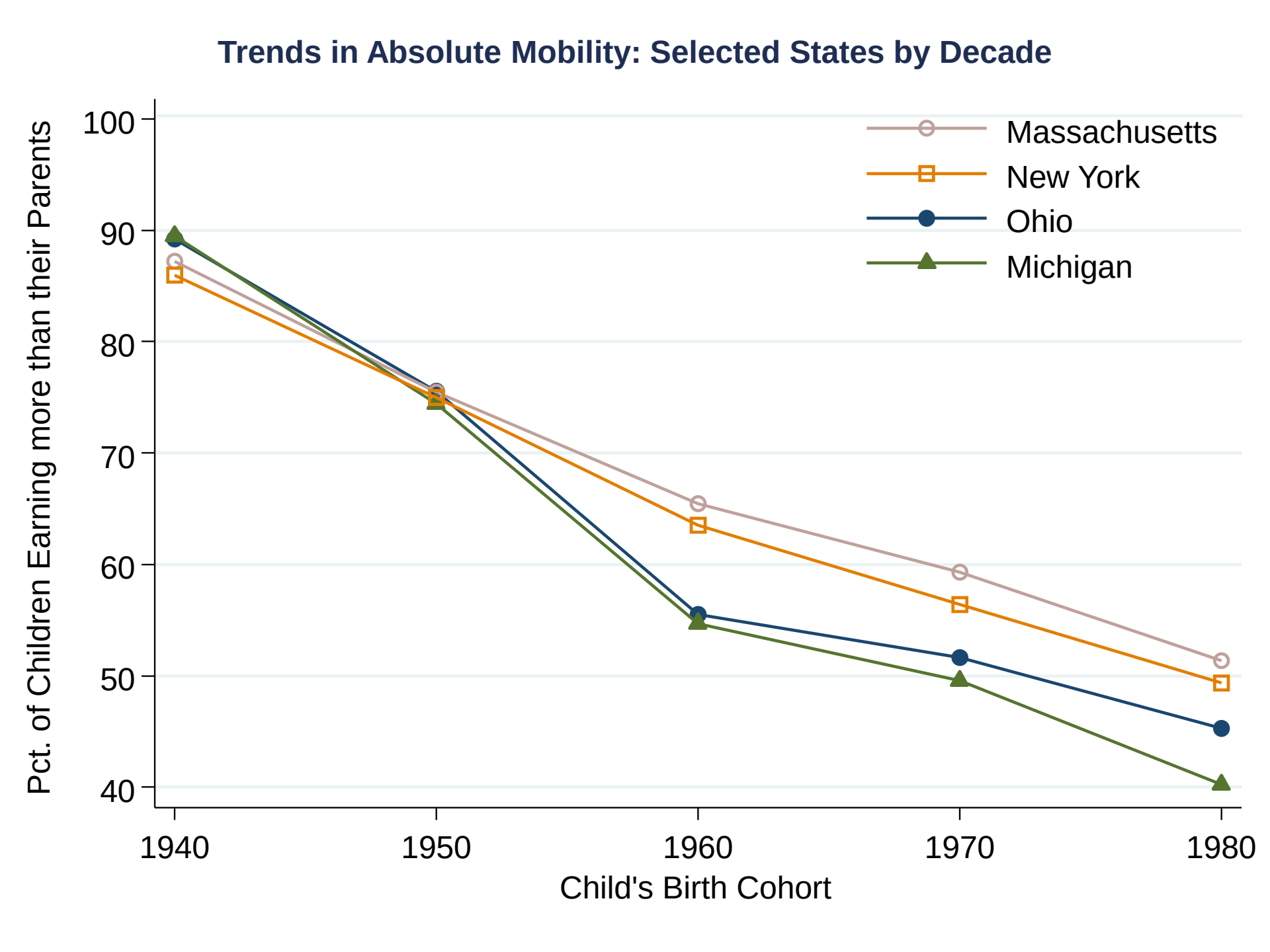
   - Inequality and absolute mobility are tightly linked

   → Those who are interested in reviving absolute mobility must be interested in more broadly shared economic growth

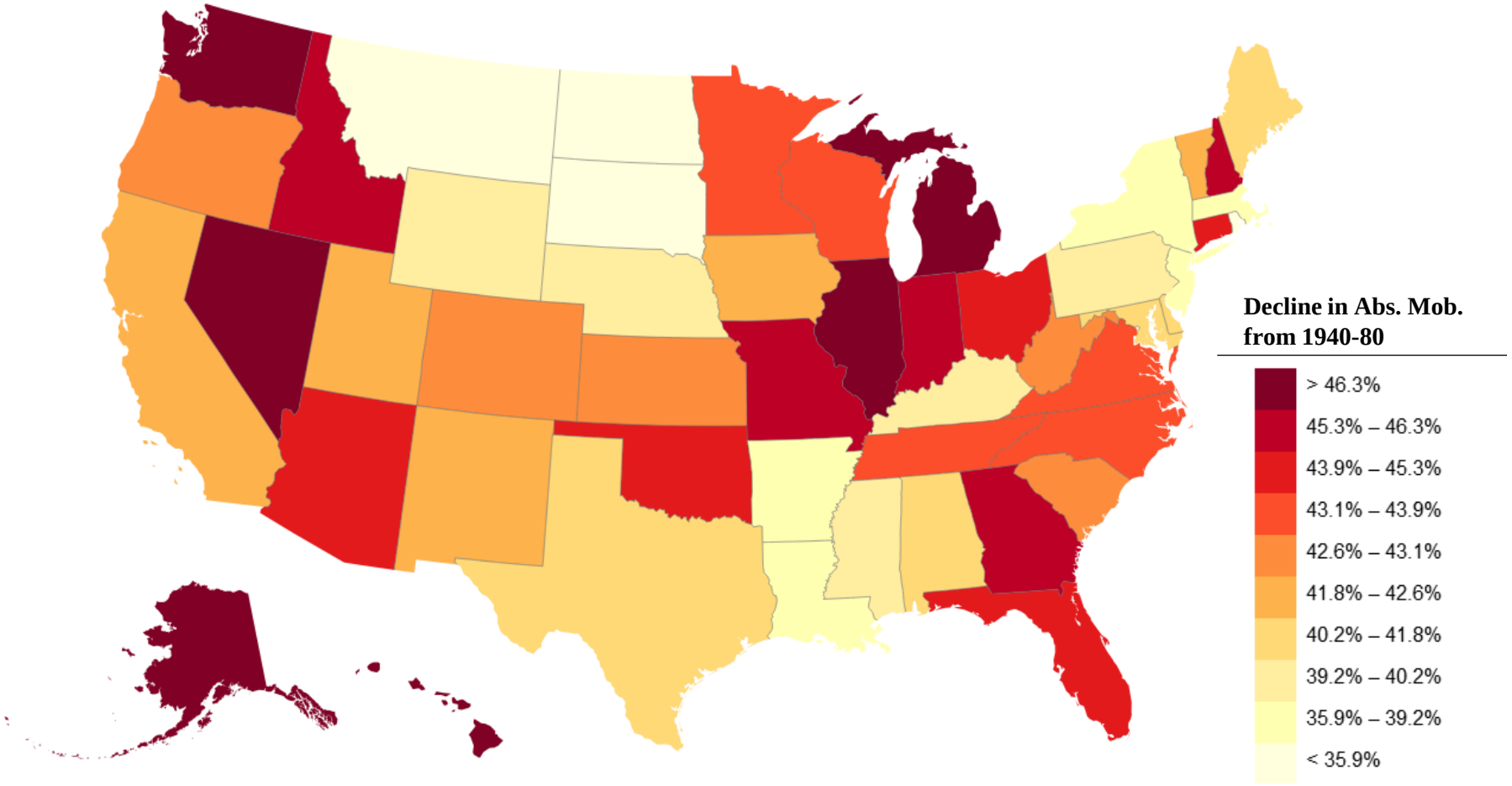
Appendix Slides

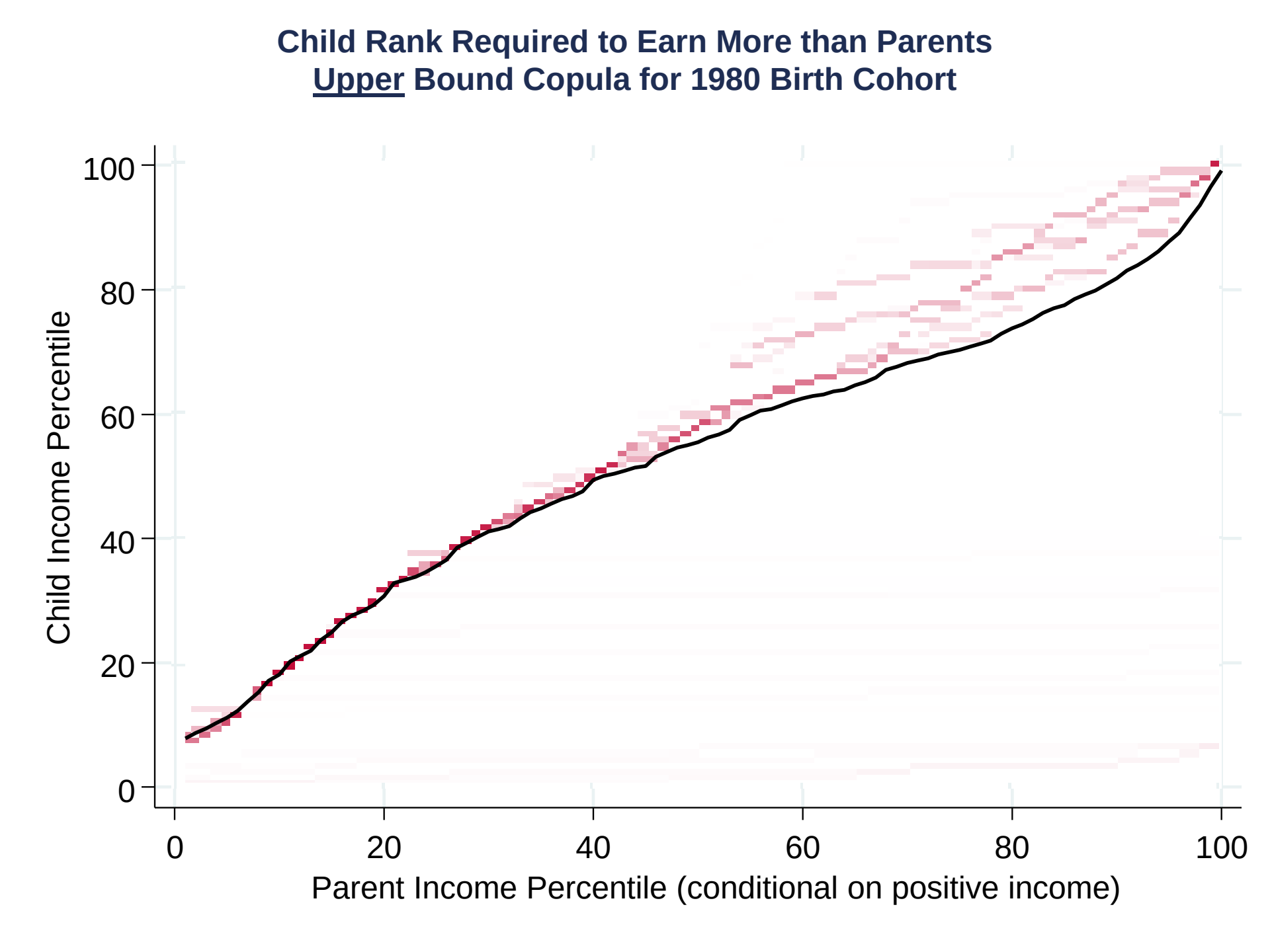

Trends in Absolute Mobility
with CPI Adjustment, Including Taxes and Transfers, and Adjusting for Family Size
Pct. of Children Earning more than their Parents
100
90
80
70
1940
1950
1960
1970
1980
Child's Birth Cohort

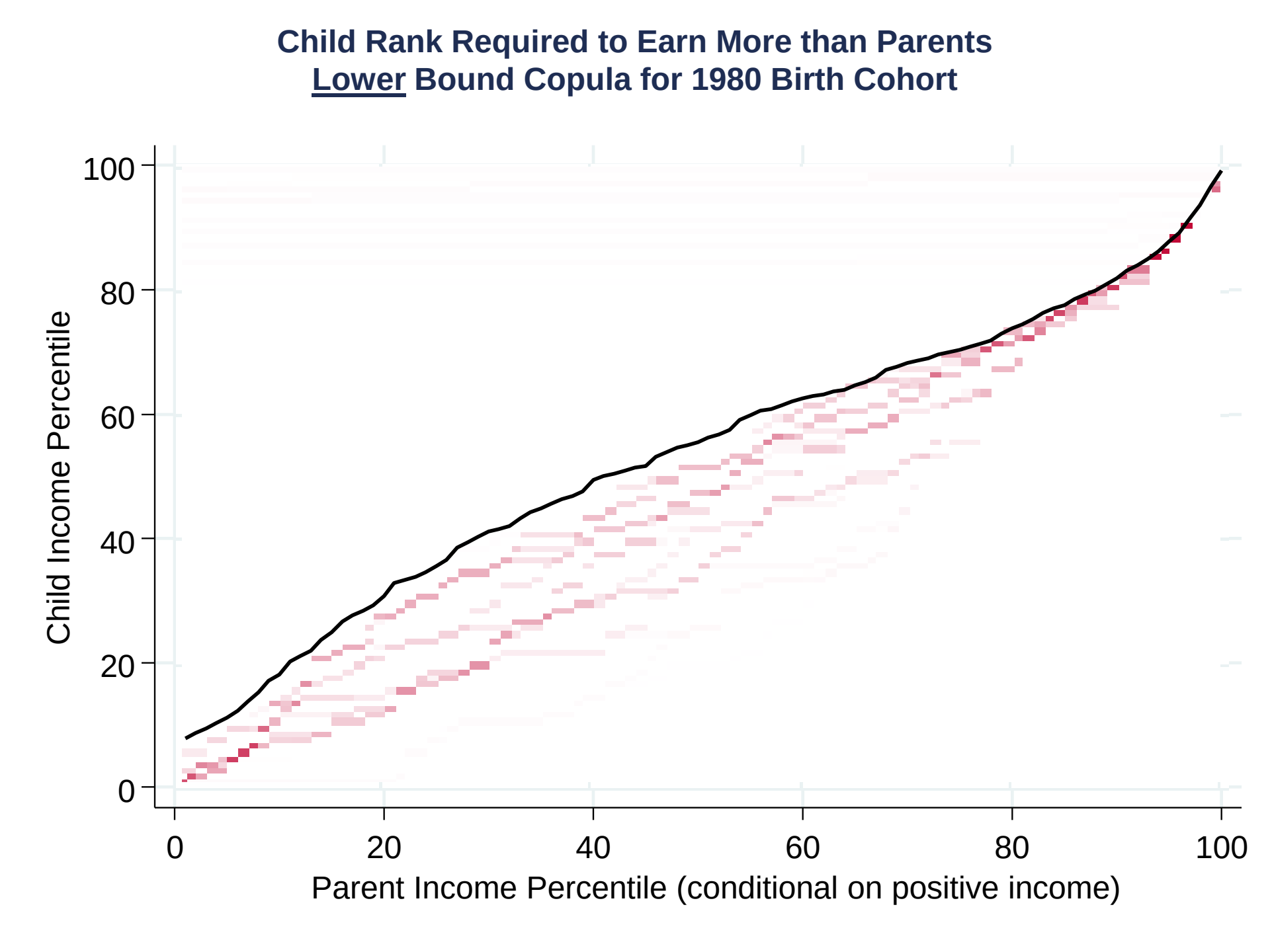

Trends in Absolute Mobility: Alternative Income Thresholds
Pct. of Children Earning 20% More/Less than Parents
100
90
80
70
60
50
40
1940
1950
1960
1970
1980
Child's Birth Cohort
Baseline
20% Less
20% More

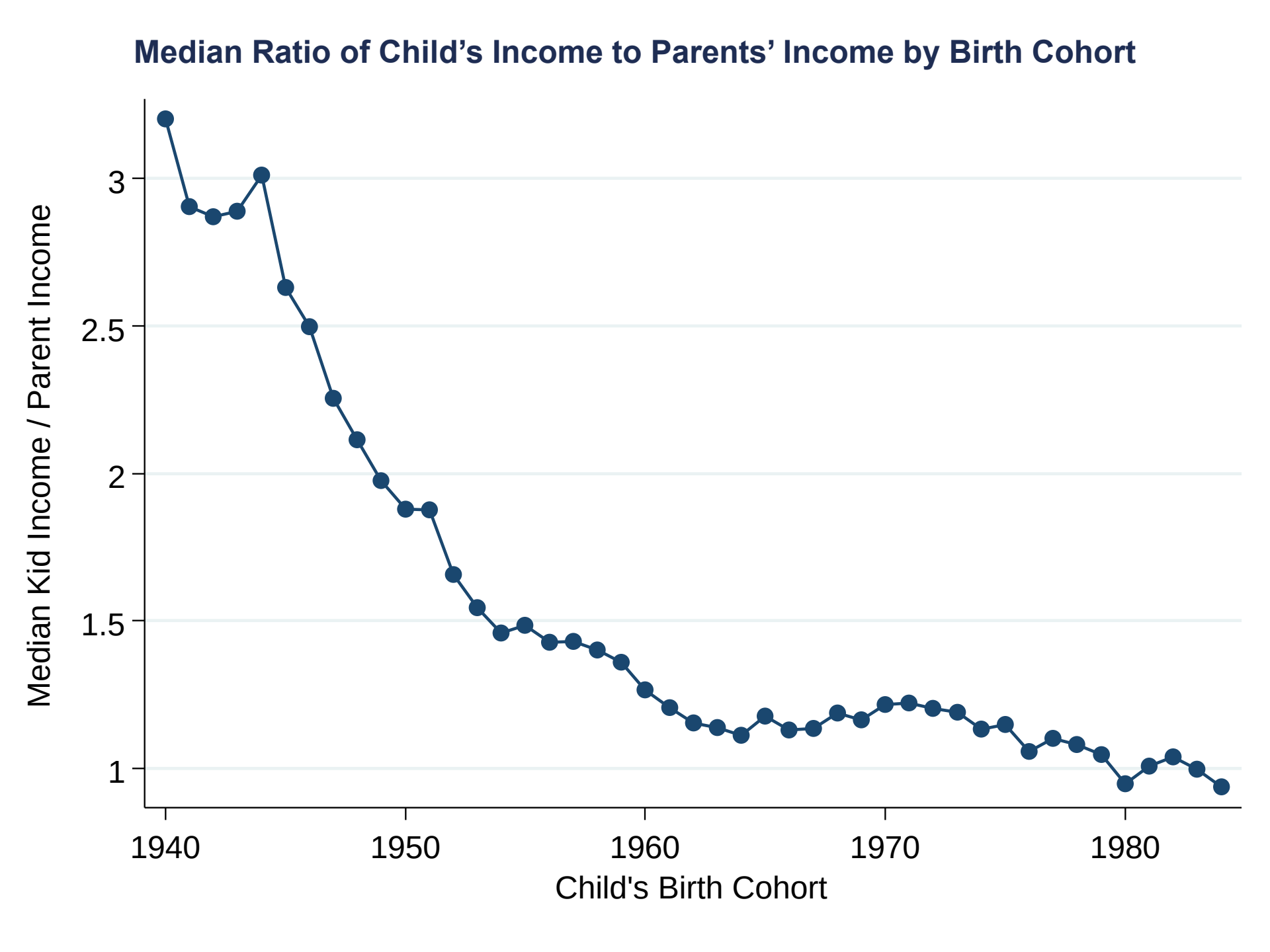

Trends in Absolute Mobility: Selected States by Decade
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
40
1940
1950
1960
1970
1980
Child's Birth Cohort
Massachusetts
New York
Ohio
Michigan

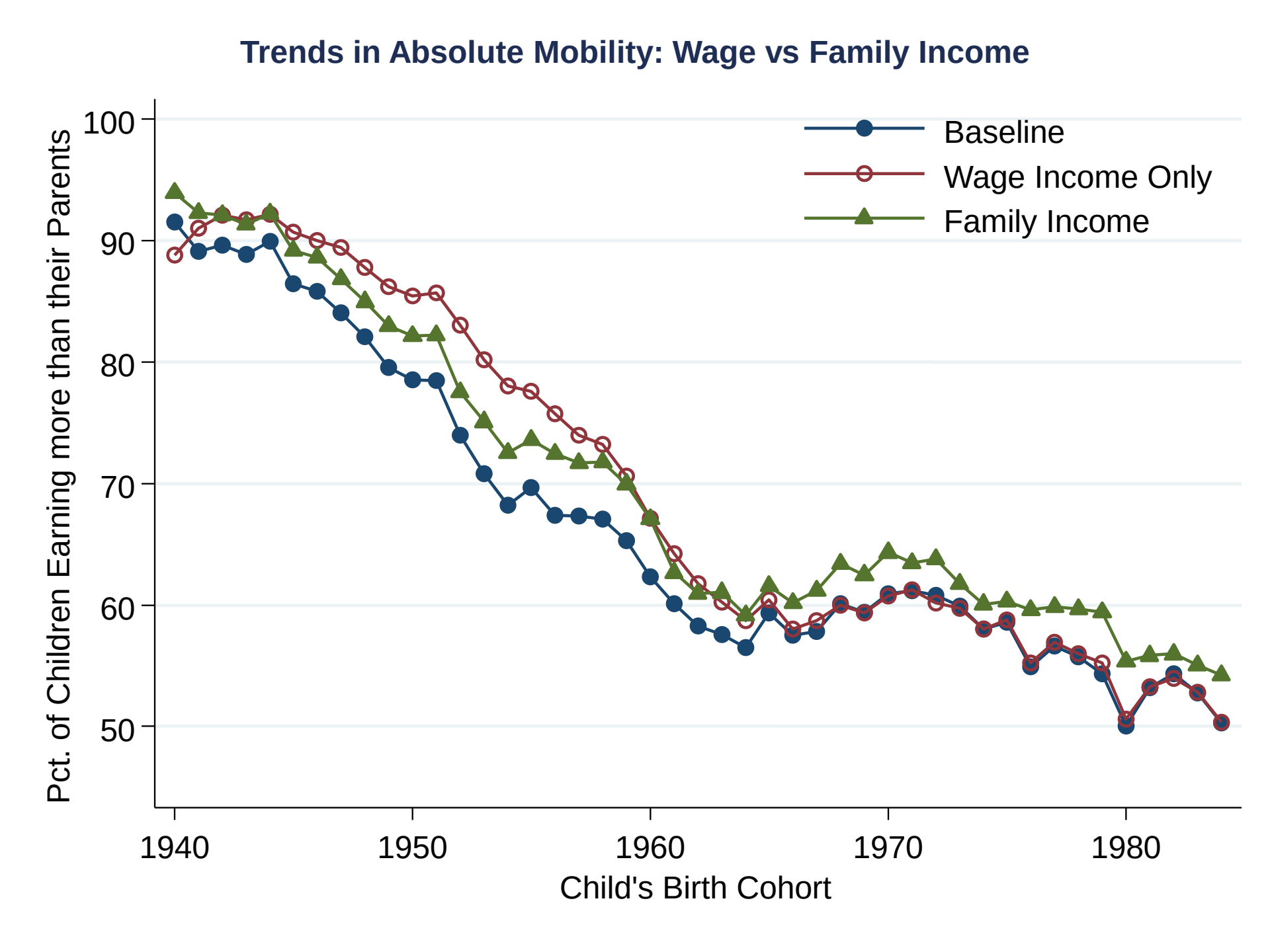
Trends in Absolute Mobility by State: Change from 1940-1980

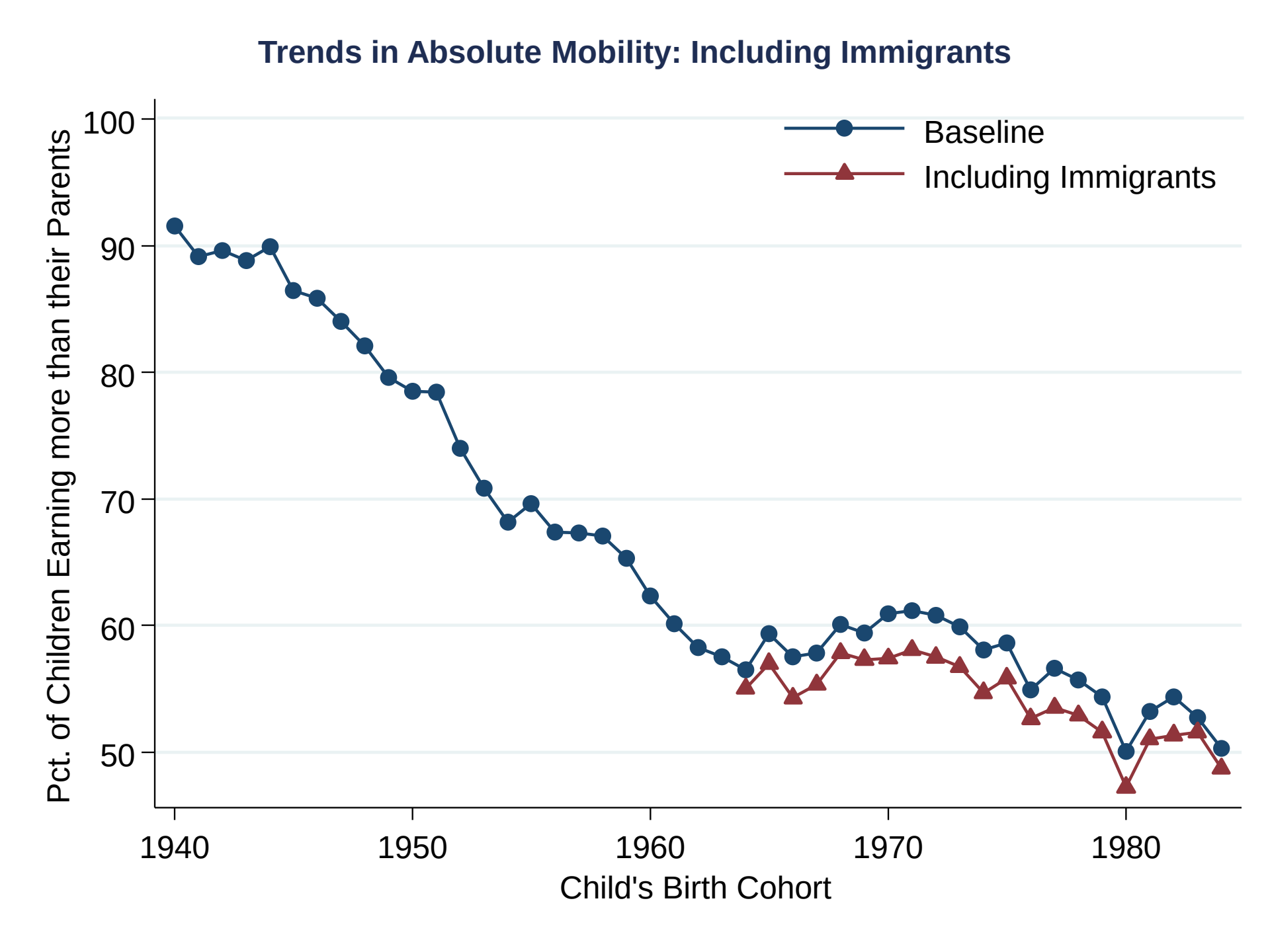


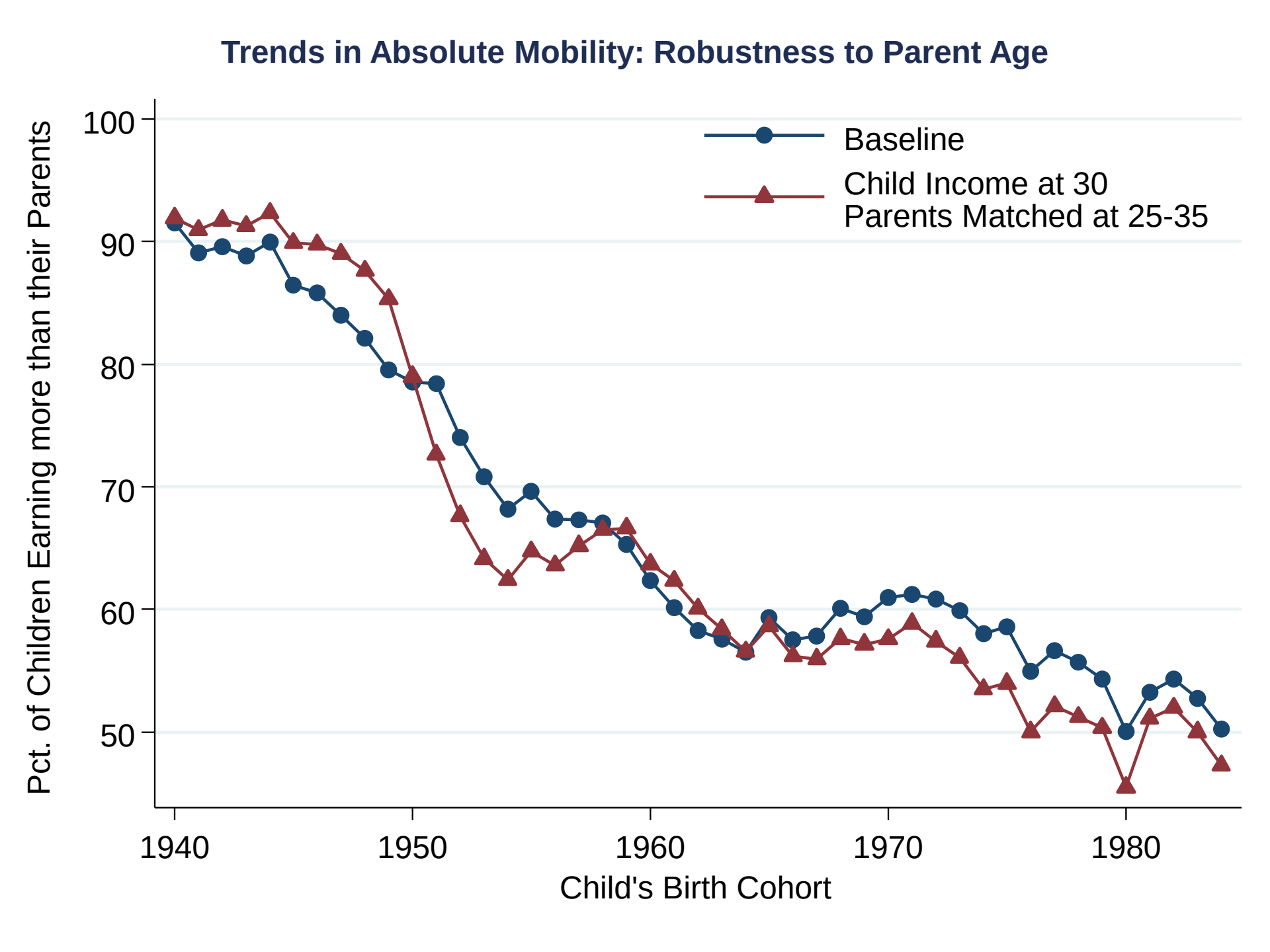

Child Rank Required to Earn More than Parents
Upper Bound Copula for 1980 Birth Cohort
Child Income Percentile
0
20
40
60
80
100
Parent Income Percentile (conditional on positive income)
0
20
40
60
80
100

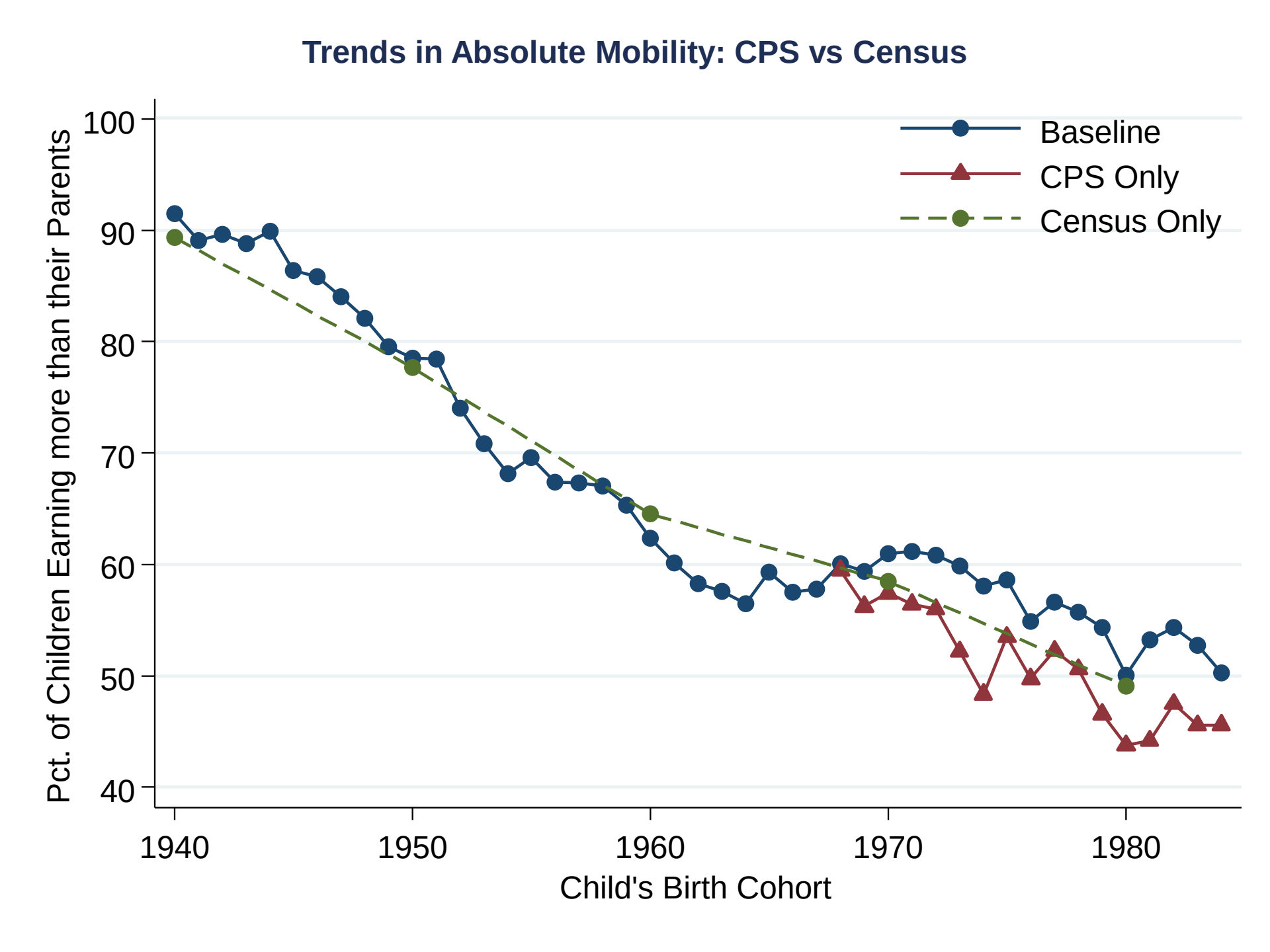

Child Rank Required to Earn More than Parents
Lower Bound Copula for 1980 Birth Cohort
Child Income Percentile
0
20
40
60
80
100
Parent Income Percentile (conditional on positive income)
0
20
40
60
80
100

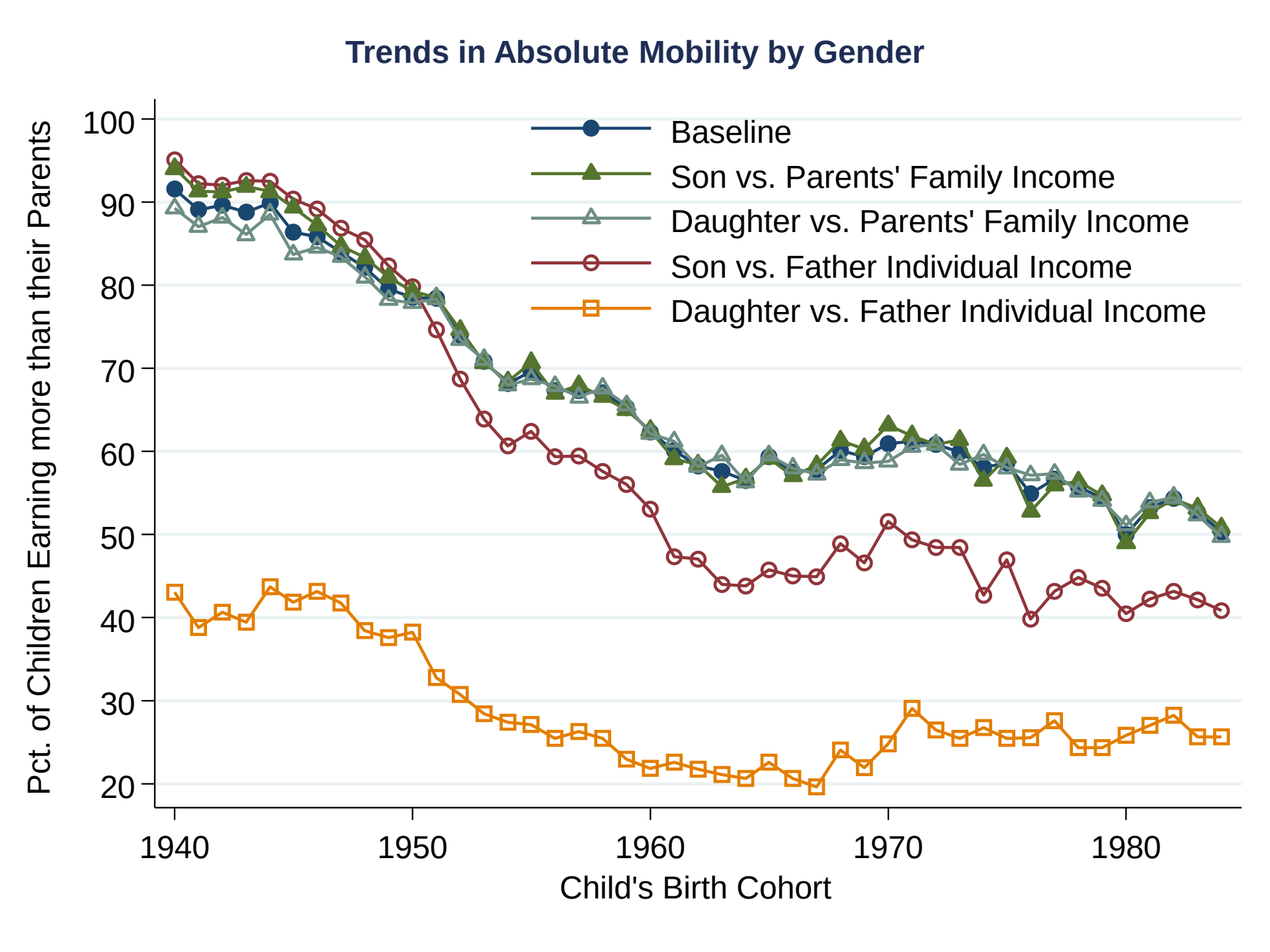

Median Ratio of Child's Income to Parents' Income by Birth Cohort
Median Kid Income / Parent Income
3
2.5
2
1.5
1
1940
1950
1960
1970
1980
Child's Birth Cohort

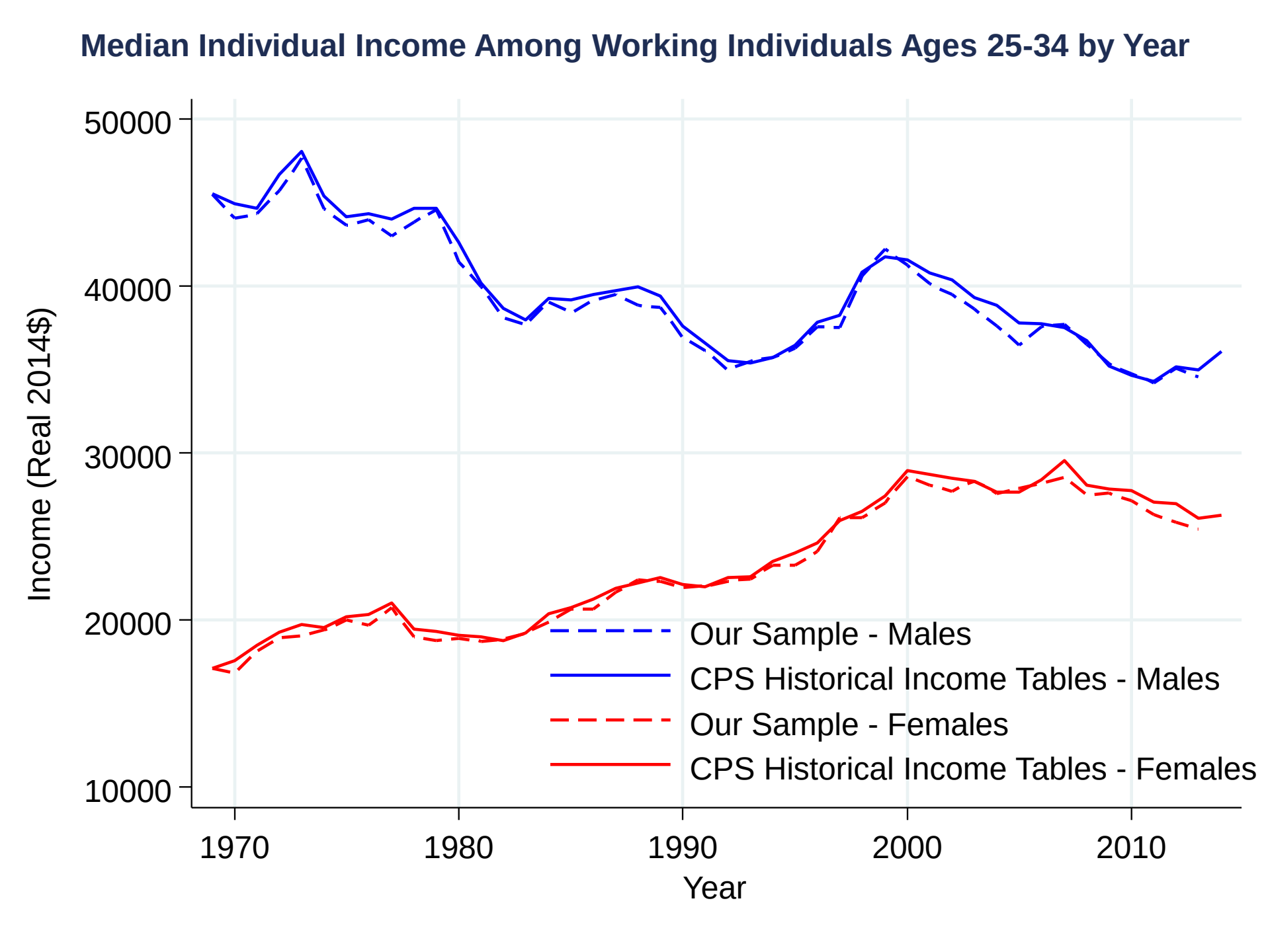

Trends in Absolute Mobility: Wage vs Family Income
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
1940
1950
1960
1970
1980
Child's Birth Cohort
Baseline
Wage Income Only
Family Income

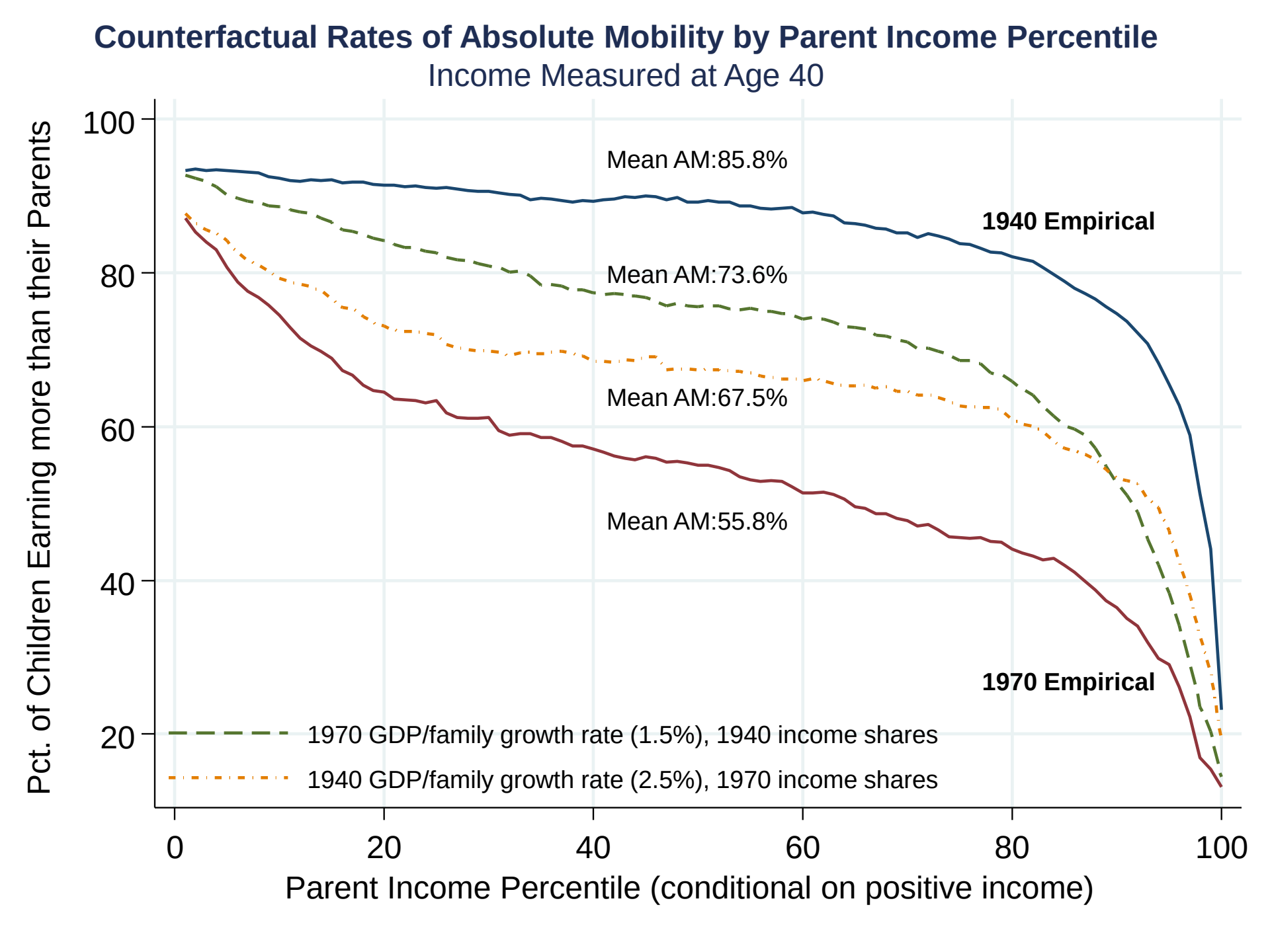

Trends in Absolute Mobility: Including Immigrants
Baseline
Including Immigrants
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
1940
1950
1960
1970
1980
Child's Birth Cohort

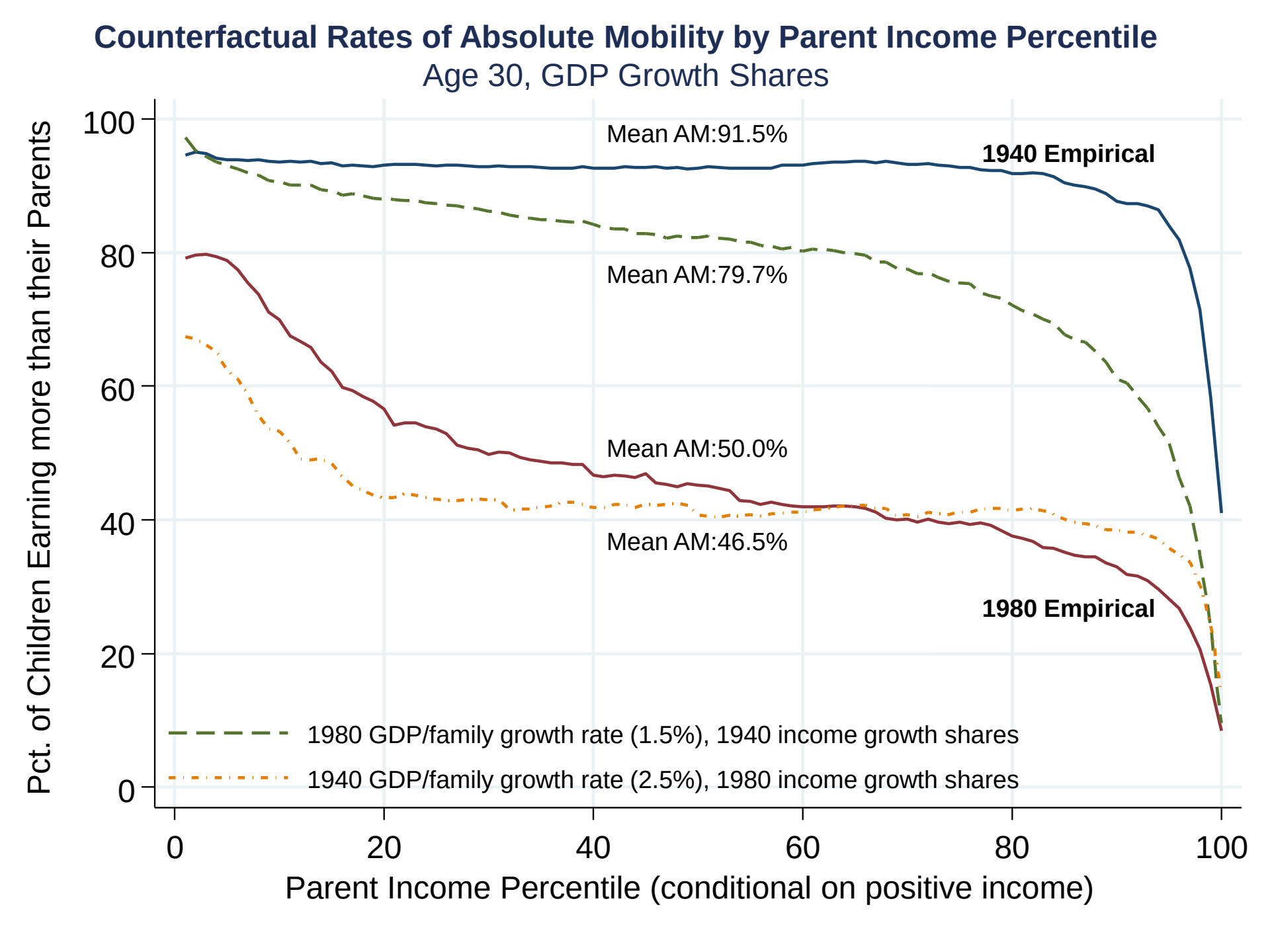

Trends in Absolute Mobility: Robustness to Parent Age
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
1940
1950
1960
1970
1980
Child's Birth Cohort
Baseline
Child Income at 30
Parents Matched at 25-35

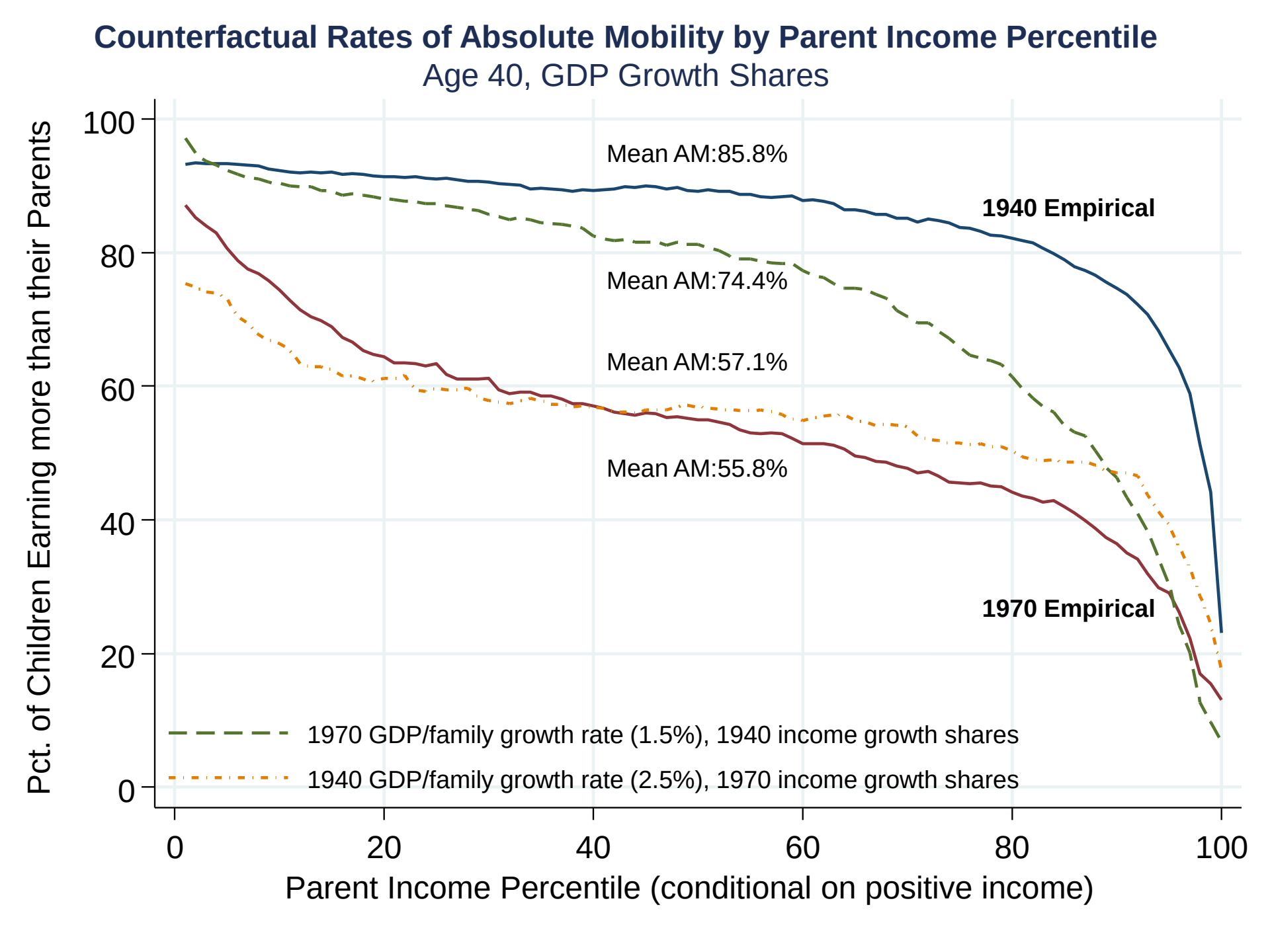

Trends in Absolute Mobility: CPS vs Census
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
40
1940
1950
1960
1970
1980
Child's Birth Cohort
Baseline
CPS Only
Census Only

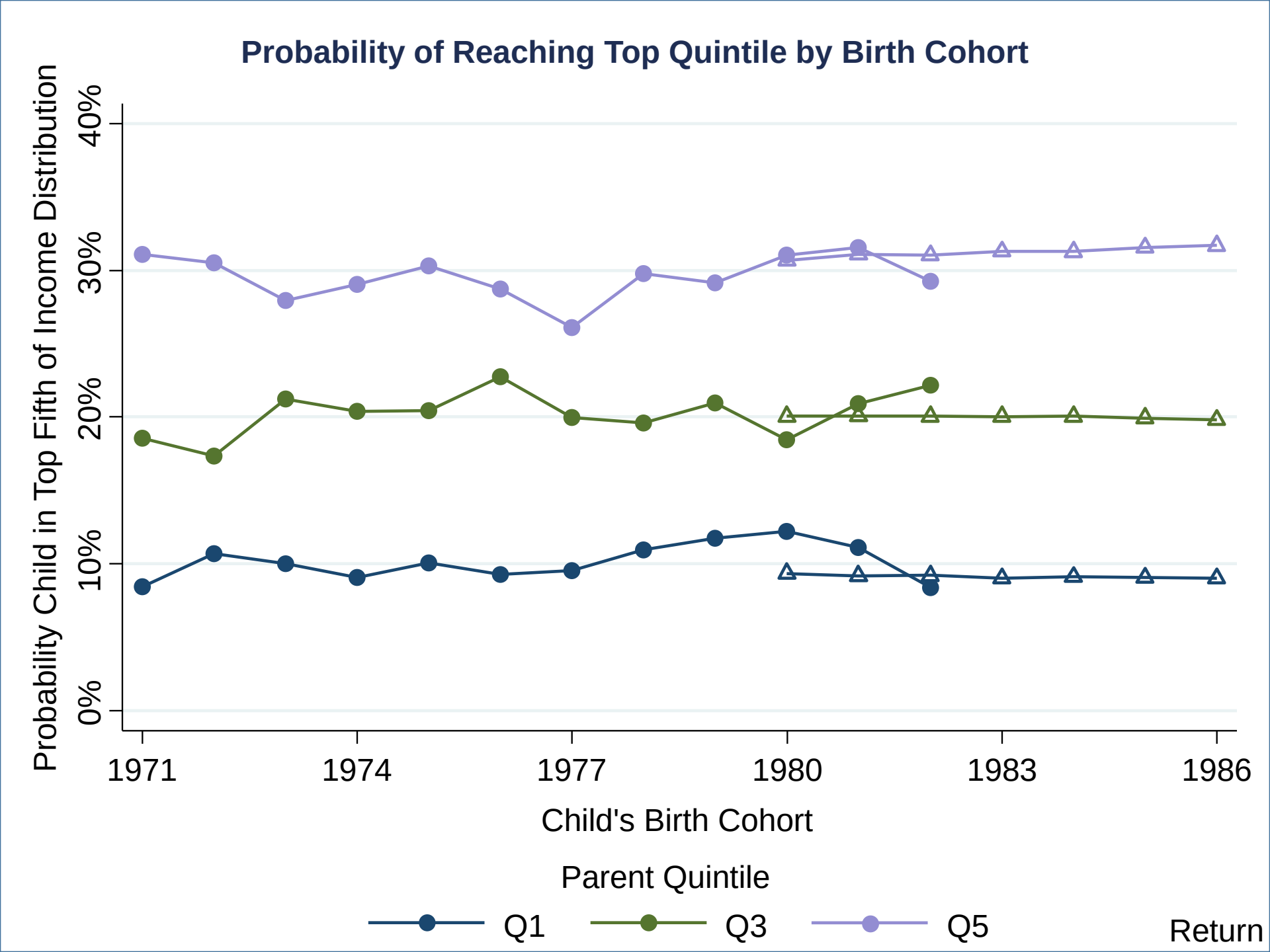

Trends in Absolute Mobility by Gender
Pct. of Children Earning more than their Parents
100
90
80
70
60
50
40
30
20
1940
1950
1960
1970
1980
Child's Birth Cohort
Baseline
Son vs. Parents' Family Income
Daughter vs. Parents' Family Income
Son vs. Father Individual Income
Daughter vs. Father Individual Income


Median Individual Income Among Working Individuals Ages 25-34 by Year
Income (Real 2014$)
50000
40000
30000
20000
10000
1970
1980
1990
2000
2010
Year
Our Sample - Males
CPS Historical Income Tables - Males
Our Sample - Females
CPS Historical Income Tables - Females


Counterfactual Rates of Absolute Mobility by Parent Income Percentile
Income Measured at Age 40
Pct. of Children Earning more than their Parents
100
80
60
40
20
0
20
40
60
80
100
Parent Income Percentile (conditional on positive income)
Mean AM:85.8%
1940 Empirical
Mean AM:73.6%
Mean AM:67.5%
Mean AM:55.8%
1970 Empirical
1970 GDP/family growth rate (1.5%), 1940 income shares
1940 GDP/family growth rate (2.5%), 1970 income shares


Counterfactual Rates of Absolute Mobility by Parent Income Percentile
Age 30, GDP Growth Shares
Pct. of Children Earning more than their Parents
Parent Income Percentile (conditional on positive income)
0
20
40
60
80
100
Mean AM:91.5%
1940 Empirical
Mean AM:79.7%
Mean AM:50.0%
Mean AM:46.5%
1980 Empirical
1980 GDP/family growth rate (1.5%), 1940 income growth shares
1940 GDP/family growth rate (2.5%), 1980 income growth shares


Counterfactual Rates of Absolute Mobility by Parent Income Percentile
Age 40, GDP Growth Shares
Pct. of Children Earning more than their Parents
100
80
60
40
20
0
Mean AM:85.8%
1940 Empirical
Mean AM:74.4%
Mean AM:57.1%
Mean AM:55.8%
1970 Empirical
1970 GDP/family growth rate (1.5%), 1940 income growth shares
1940 GDP/family growth rate (2.5%), 1970 income growth shares
0
20
40
60
80
100
Parent Income Percentile (conditional on positive income)


Probability of Reaching Top Quintile by Birth Cohort
Probability Child in Top Fifth of Income Distribution
0%
10%
20%
30%
40%
1971
1974
1977
1980
1983
1986
Child's Birth Cohort
Parent Quintile
Q1
Q3
Q5
Return