Using Federal Administrative Data to Evaluate and Improve Economic Policy

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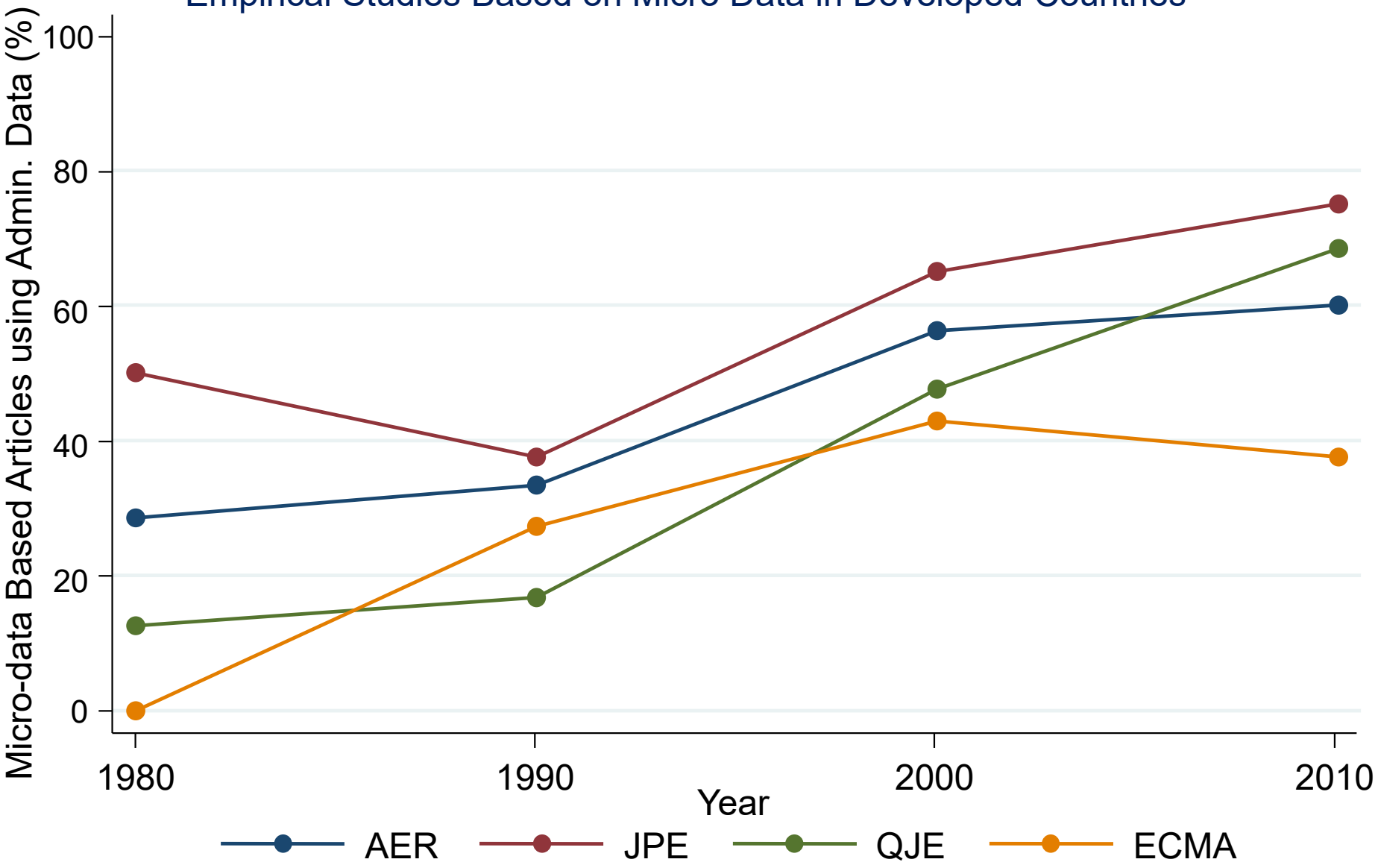
The opinions expressed in this paper are those of the authors alone and do not necessarily reflect the views of the Internal Revenue Service or the U.S. Treasury Department. This work is a component of a larger project examining the effects of eliminating tax expenditures on the budget deficit and economic activity, approved under IRS contract TIRNO-12-P-00374.

Use of Administrative Data in Publications in Economics Journals, 1980-2010

Empirical Studies Based on Micro Data in Developed Countries



Note: "Administrative" datasets refer to any dataset that was collected without directly surveying individuals (e.g., scanner data, stock prices, school district records, social security records). Sample excludes studies whose primary data source is from developing countries.

Why the Shift Toward Administrative Data?

- Administrative data has great value for several reasons:

1. Comprehensive, high quality data → gold-standard descriptive statistics
2. Large samples → quasi-experimental methods of causal inference
3. Longitudinal tracking without attrition → long-term evaluations
4. Ability to link other datasets → rich set of outcomes

Administrative Data in the United States

- Researchers are shifting away from studying the U.S. because admin. data are more accessible in Europe
  - U.S. government agencies have made important strides to counter this trend in recent years, but more work is needed
- Goal of this talk: illustrate the benefits of administrative data and downstream impacts on policy in the U.S.
  - Discuss recent studies in our research group that analyze how to improve equality of opportunity in America
  - Part of a larger project studying tax expenditures in the U.S.

The American Dream?

- Probability that a child born to parents in the bottom fifth of the income distribution reaches the top fifth:

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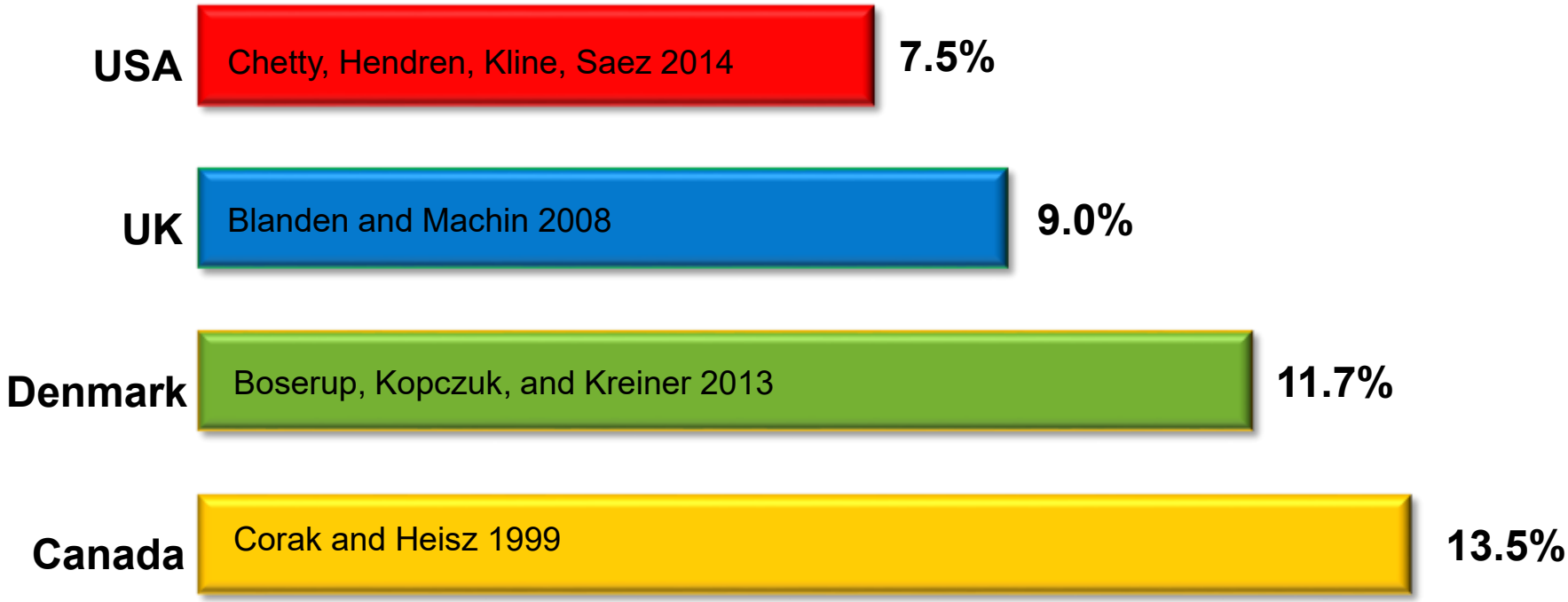

The American Dream?

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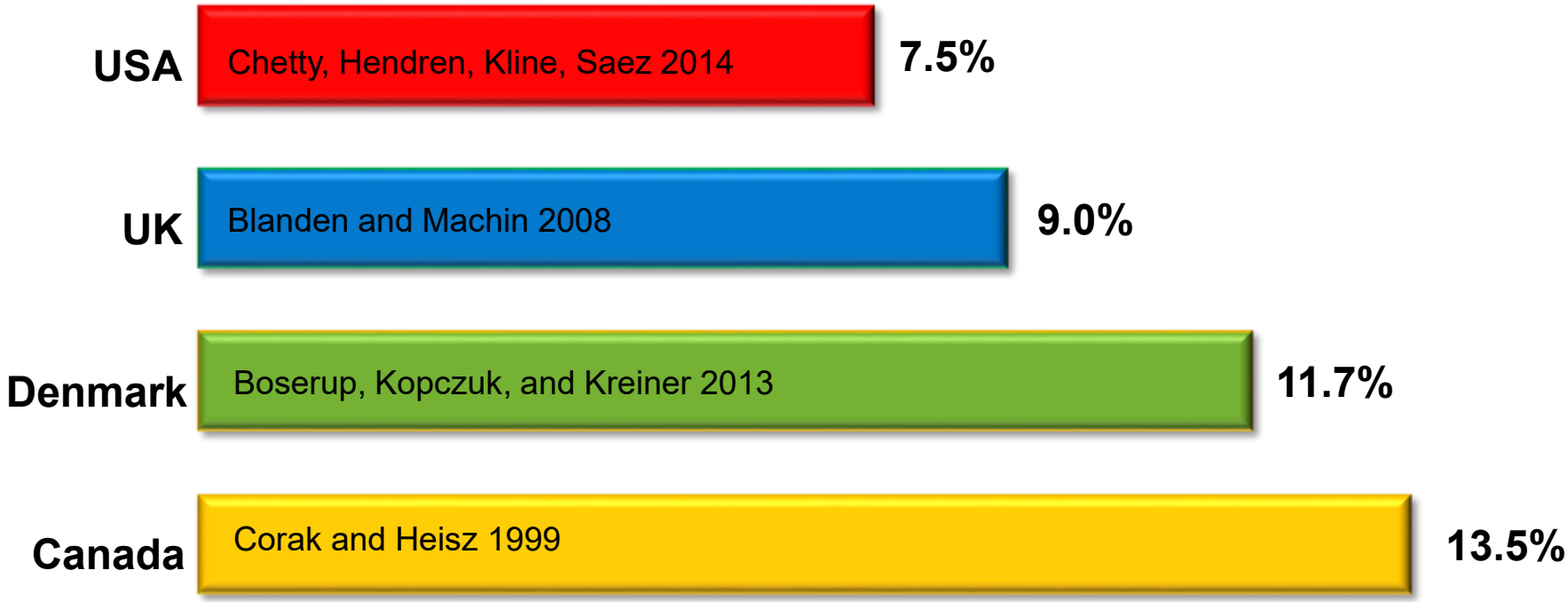


→ Chances of achieving the “American Dream” are almost two times higher in Canada than in the U.S.

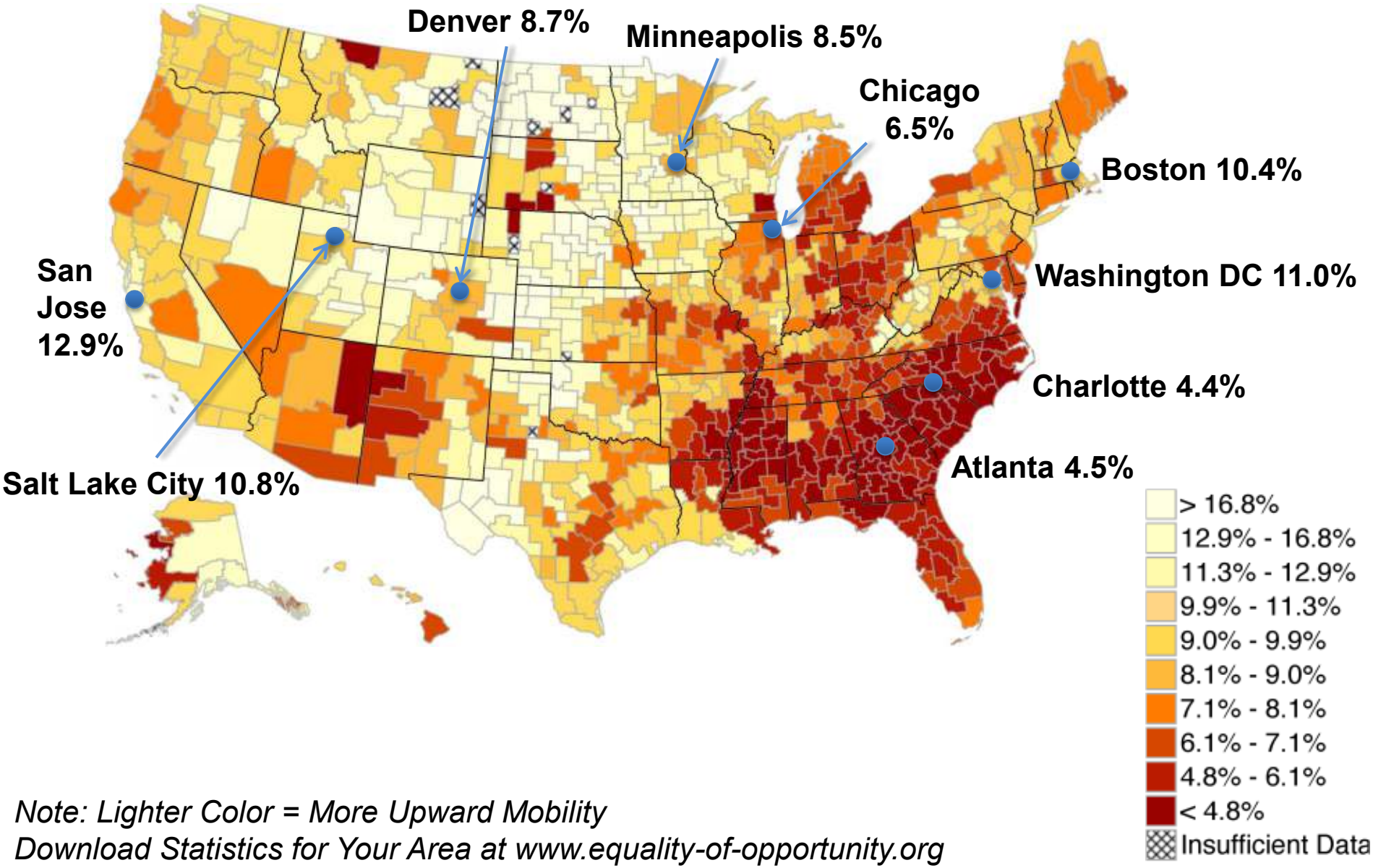
Differences in Opportunity Within the U.S.

- Research on mobility has traditionally focused on differences across countries
- But social mobility varies even more *within* the U.S.
- We calculate upward mobility for every metro and rural area in the U.S.
  - Use anonymous data on earnings draw from tax records on 40 million children born between 1980-1993

Source: Chetty, Hendren, Kline, Saez QJE 2014: The Equality of Opportunity Project

The Geography of Upward Mobility in the United States

Chances of Reaching the Top Fifth Starting from the Bottom Fifth by Metro Area

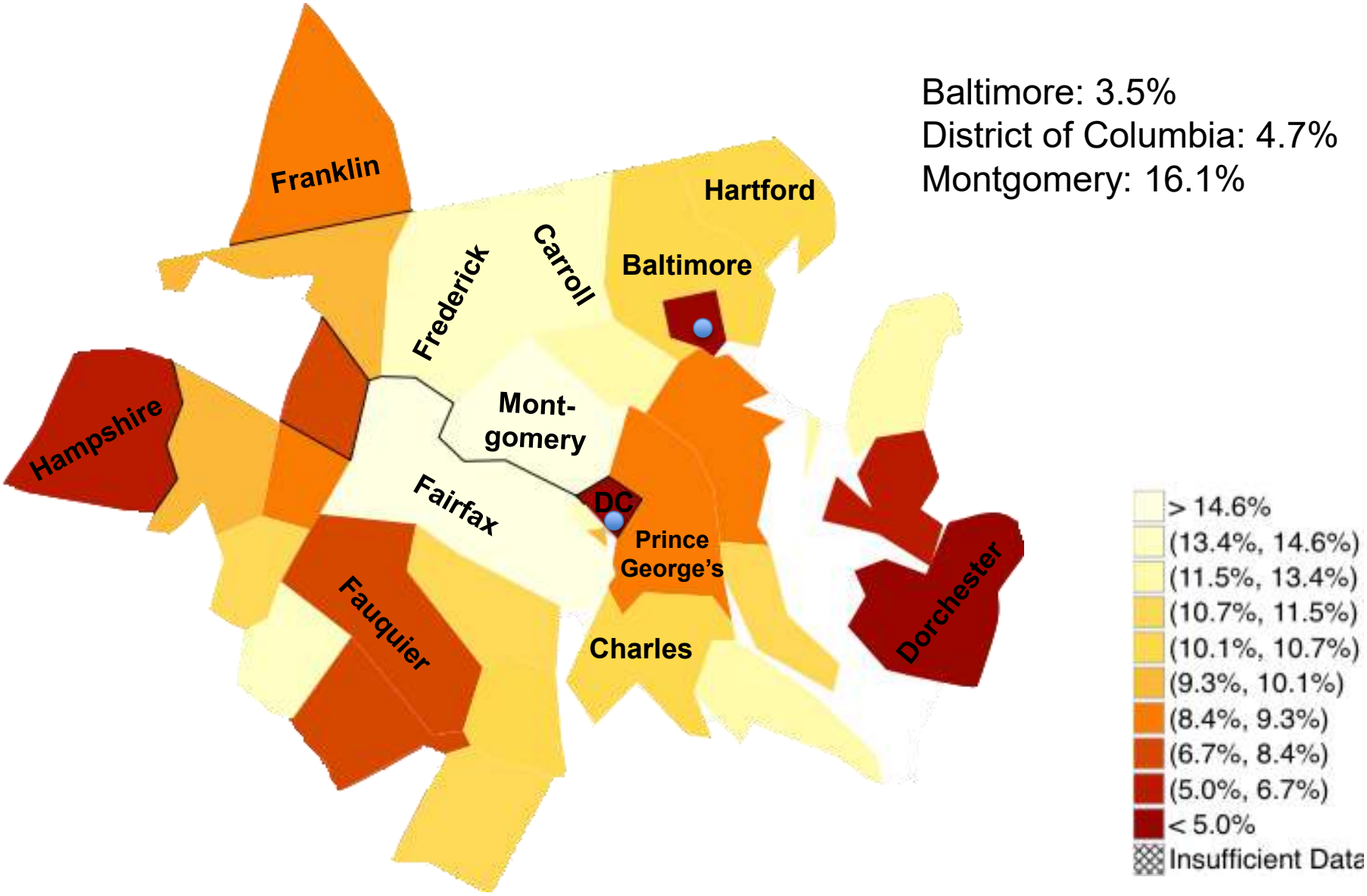


Note: Lighter Color = More Upward Mobility

Download Statistics for Your Area at www.equality-of-opportunity.org

The Geography of Upward Mobility in the Washington Metro Area

Odds of Reaching the Top Fifth Starting from the Bottom Fifth by County



Causal Effects of Place vs. Sorting

- Two very different explanations for variation in children's outcomes across areas:

  1. Heterogeneity: different people live in different places

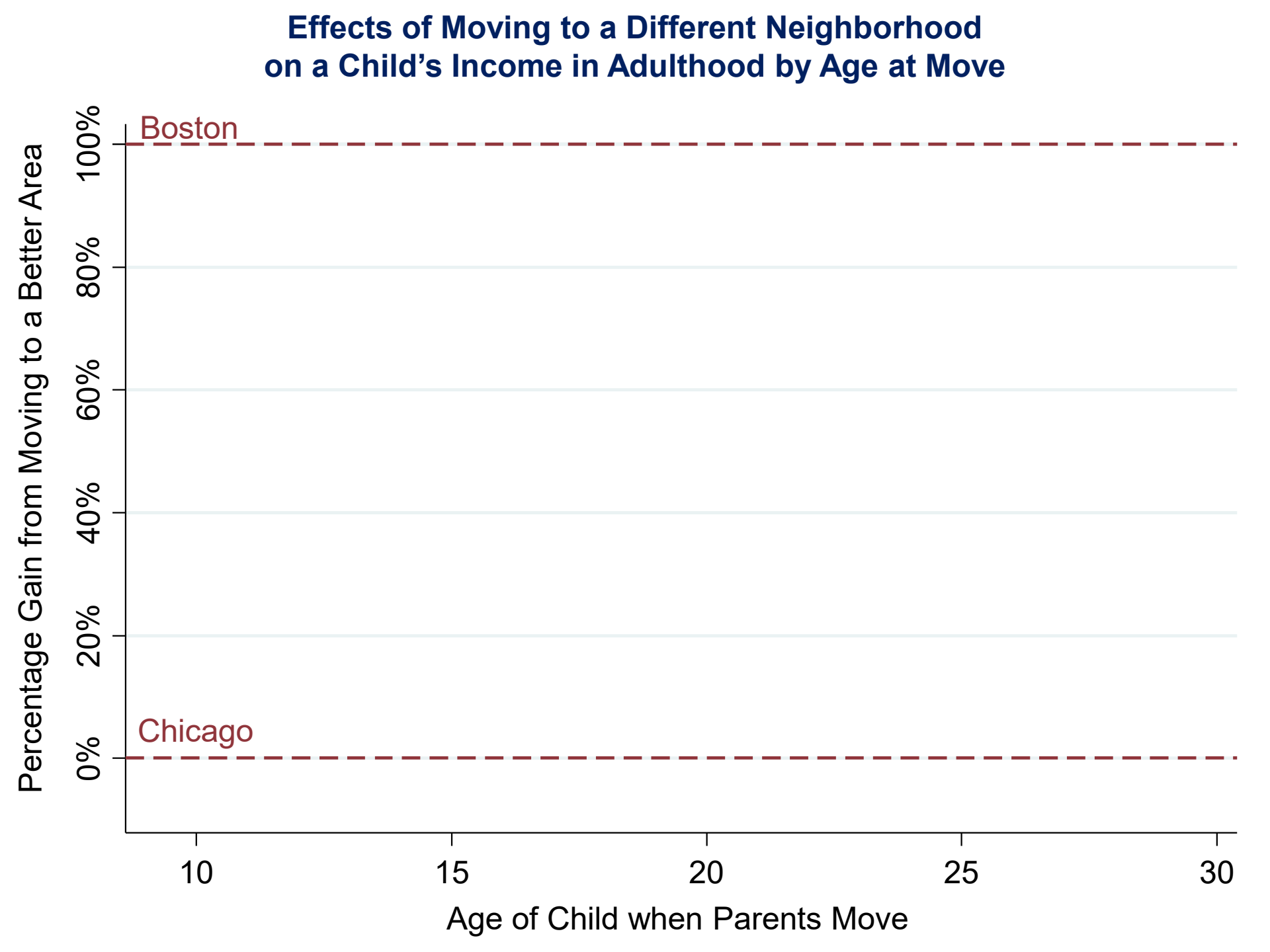
  2. Neighborhood effects: places have a *causal* effect on upward mobility for a given person

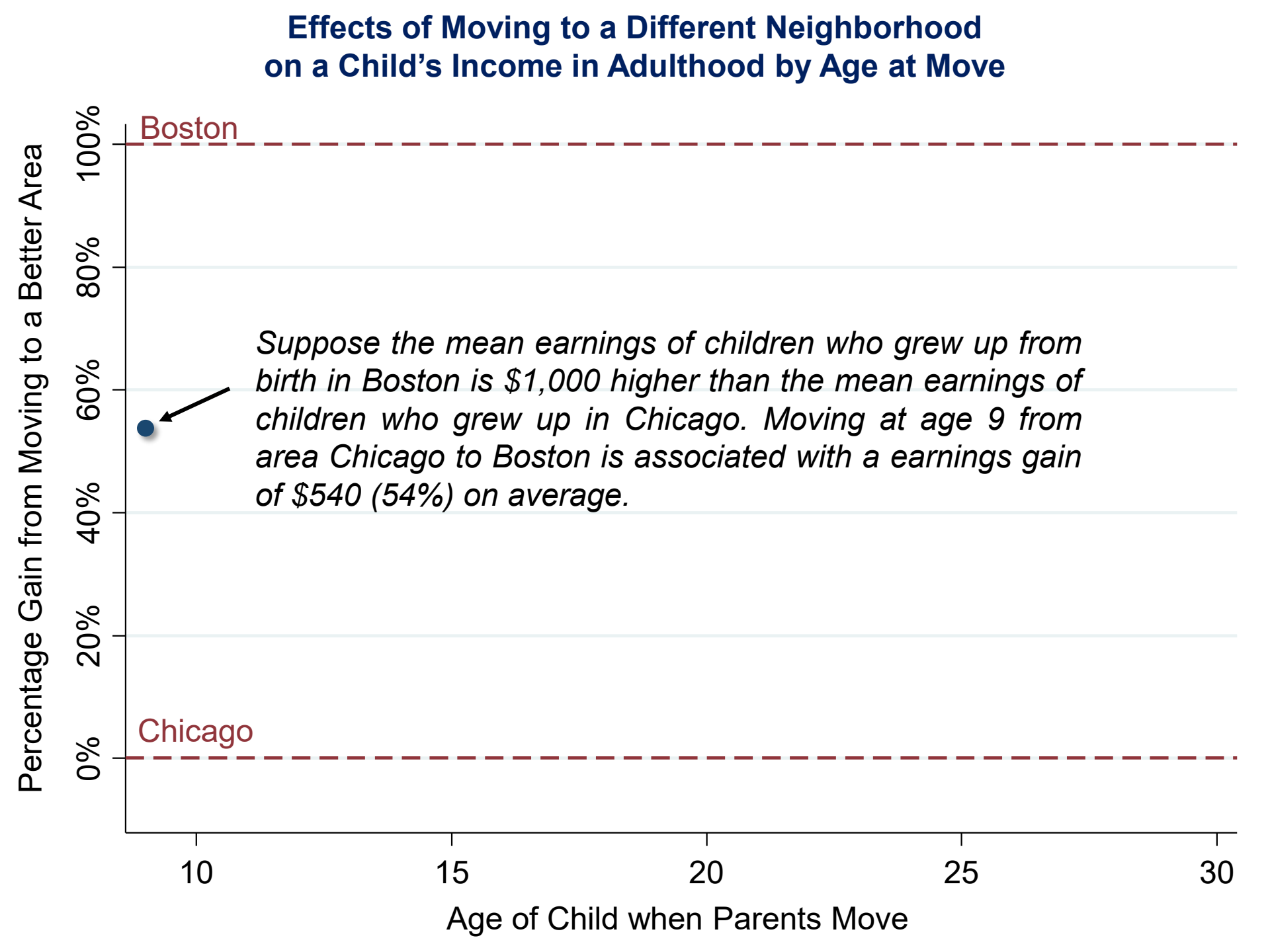
Causal Effects of Place vs. Sorting

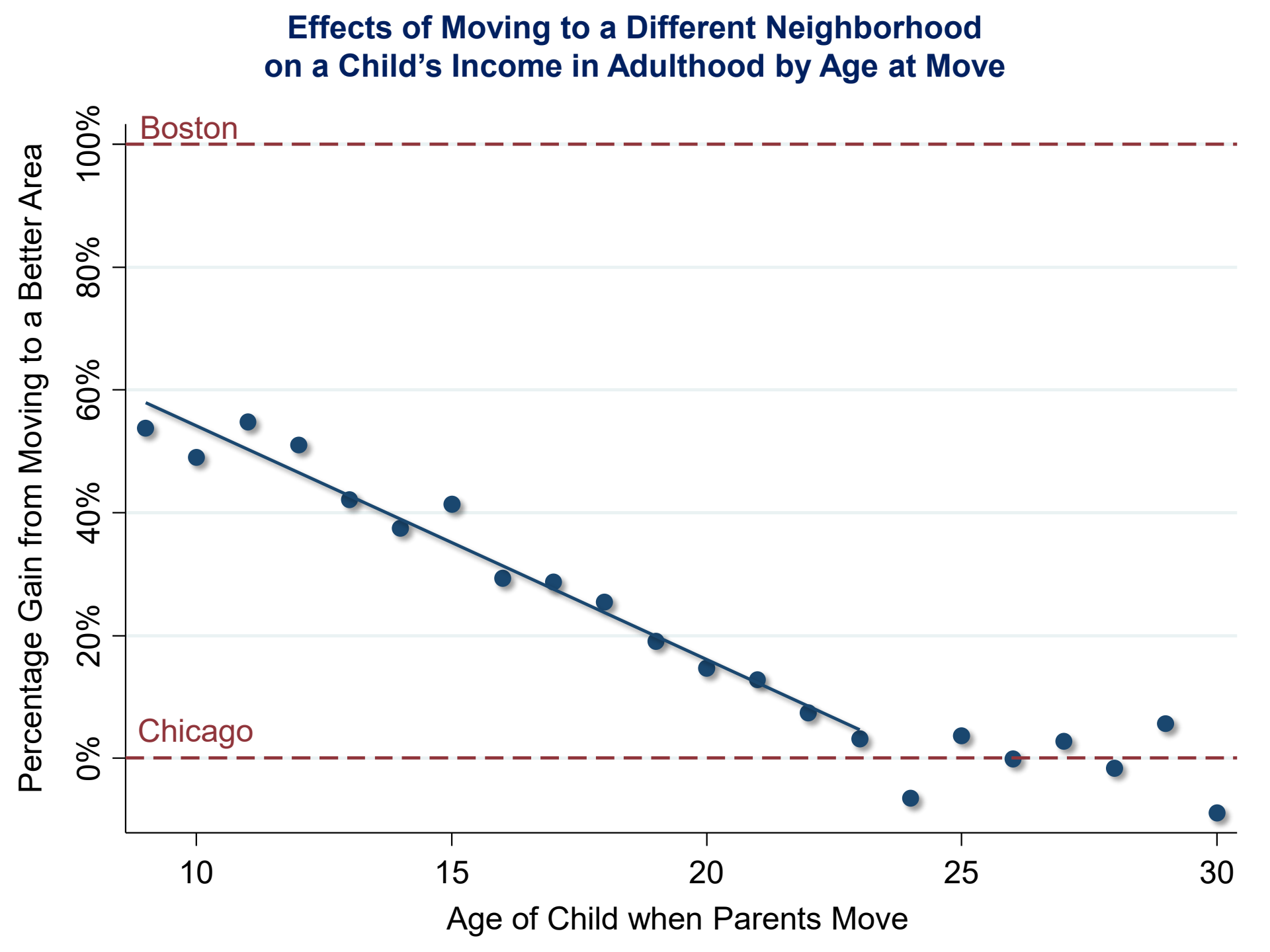
- Ideal experiment: randomly assign children to neighborhoods and compare outcomes in adulthood

- We approximate this experiment using a quasi-experimental design [Chetty and Hendren 2015]

  – Study families who move across areas with children of different ages in observational data


Effects of Moving to a Different Neighborhood
on a Child's Income in Adulthood by Age at Move
Boston
Chicago
100%
80%
60%
40%
20%
0%
Percentage Gain from Moving to a Better Area
10
15
20
25
30
Age of Child when Parents Move


Effects of Moving to a Different Neighborhood
on a Child's Income in Adulthood by Age at Move
Boston
Chicago
Suppose the mean earnings of children who grew up from birth in Boston is $1,000 higher than the mean earnings of children who grew up in Chicago. Moving at age 9 from area Chicago to Boston is associated with a earnings gain of $540 (54%) on average.
Percentage Gain from Moving to a Better Area
0%
20%
40%
60%
80%
100%
10
15
20
25
30
Age of Child when Parents Move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Identifying Causal Exposure Effects

- Key assumption underlying quasi-experimental design: selection effect does not vary with child's age at move

- This assumption could be violated through two channels:

  1. Parents who move to good areas when their children are young may invest more in their children in other ways

  2. Moving may be correlated with other factors (e.g. change in parent income) that affect children directly

Identifying Causal Exposure Effects

- Address these concerns using two approaches:

1. Sibling comparisons: replicate baseline analysis with family fixed effects

   – When a family movers to a better area, we find that younger sibling does better than older sibling on avg., in proportion to age gap

2. Placebo tests exploiting heterogeneity across subgroups

   – Some areas produce better outcomes for boys than girls

   – When a family moves to an area that produces better outcomes for boys but not girls, son's outcomes improve but daughter's do not

Two Policy Approaches to Improving Upward Mobility

- Importance of place for mobility suggests two types of policy approaches:

  1. Help people move to better areas

  2. Invest in places with low levels of opportunity to replicate successes of areas with high upward mobility

Policy Approach 1: Moving to Opportunity

- One way to help low-income families move to better neighborhoods: housing vouchers

- HUD Moving to Opportunity Experiment: gave such vouchers using a randomized lottery [Ludwig et al. 2013]
  - 4,600 families in Boston, New York, LA, Chicago, and Baltimore in mid 1990's

Most Common MTO Residential Locations in New York

MTO Experiment: Exposure Effects?

- Prior research on MTO (including HUD's Final Impacts Evaluation) found no economic gains from moving
  - But that work focused on adults and older youth at point of move
- We analyze long-term impacts of MTO on children who moved when young by linking MTO data to tax data

Moving to Opportunity Experiment

- Children who moved to low-poverty areas when young (e.g., below age 13) do much better as adults:
  - 30% higher earnings = $100,000 gain over life in present value
  - 27% more likely to attend college
  - 30% less likely to become single parents
- But moving had little effect on the outcomes of children who were already teenagers
- Moving also had no effect on parents' earnings
- Reinforces conclusion that *childhood exposure* is a key determinant of upward mobility

Policy Approach 2: Improving Neighborhoods

- Limits to scalability of policies that move people
  - Also need policies that improve existing neighborhoods
- Challenging to identify causal effects of local policies
  - But we can characterize the features of areas that generate good outcomes

What are the Characteristics of High-Mobility Areas? Five Strongest Correlates of Upward Mobility

1. Segregation

   - Racial and income segregation associated with less mobility
   - Long commute times (sprawl) associated with less mobility

What are the Characteristics of High-Mobility Areas? Five Strongest Correlates of Upward Mobility

1. Segregation

2. Income Inequality

   – Places with smaller middle class have much less mobility

What are the Characteristics of High-Mobility Areas? Five Strongest Correlates of Upward Mobility

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3. Family Structure

   - Areas with more single parents have much lower mobility
   - Strong correlation even for kids whose *own* parents are married

What are the Characteristics of High-Mobility Areas? Five Strongest Correlates of Upward Mobility

1. Segregation
2. Income Inequality
3. Family Structure
4. Social Capital
   - "It takes a village to raise a child"
   - Putnam (1995): "Bowling Alone"

What are the Characteristics of High-Mobility Areas? Five Strongest Correlates of Upward Mobility

1. Segregation
2. Income Inequality
3. Family Structure
4. Social Capital
5. School Quality
   - Greater expenditure, smaller classes, higher test scores correlated with more mobility
   - Clear evidence of causal effects here

Using Administrative Data to Study Teachers' Impacts

School district records

2.5 million children

18 million test scores

Tax records

Earnings, College Attendance, Teen Birth

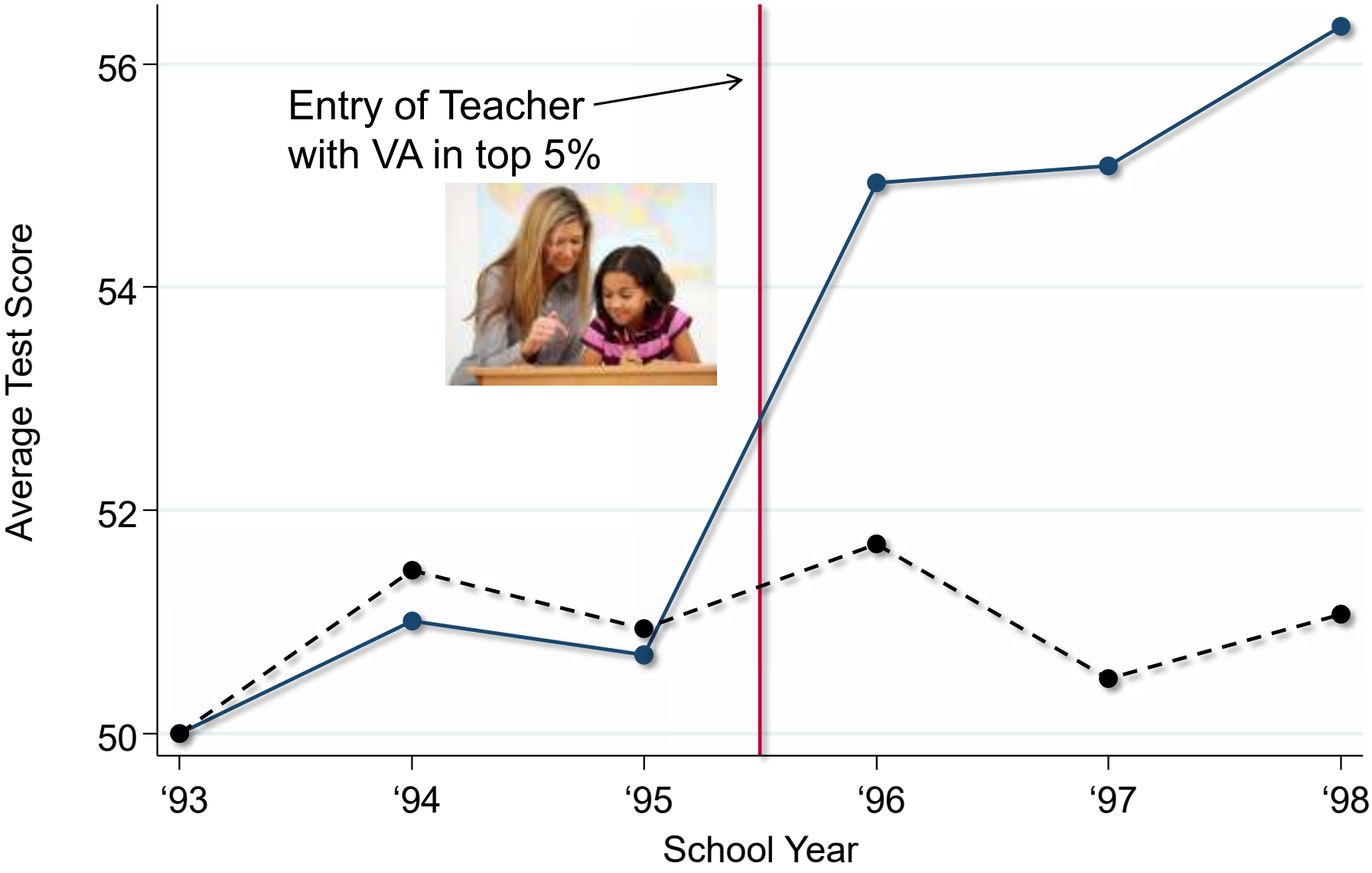
Source: Chetty, Friedman, Rockoff 2014a,b

Measuring Teacher Quality: Test-Score Based Metrics

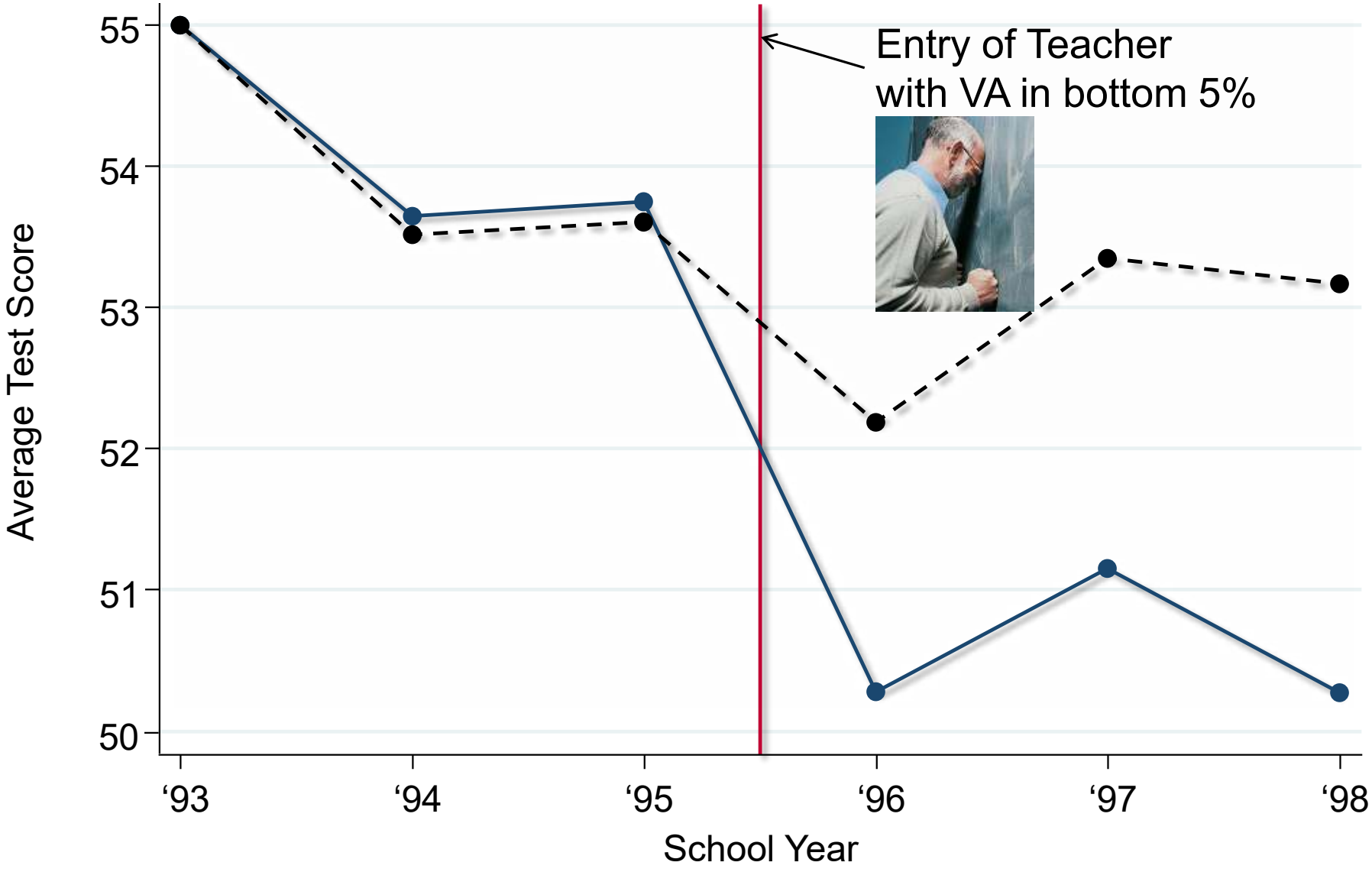
One prominent measure of teacher quality: teacher *value-added*

How much does a teacher raise her/his students' test scores on average?

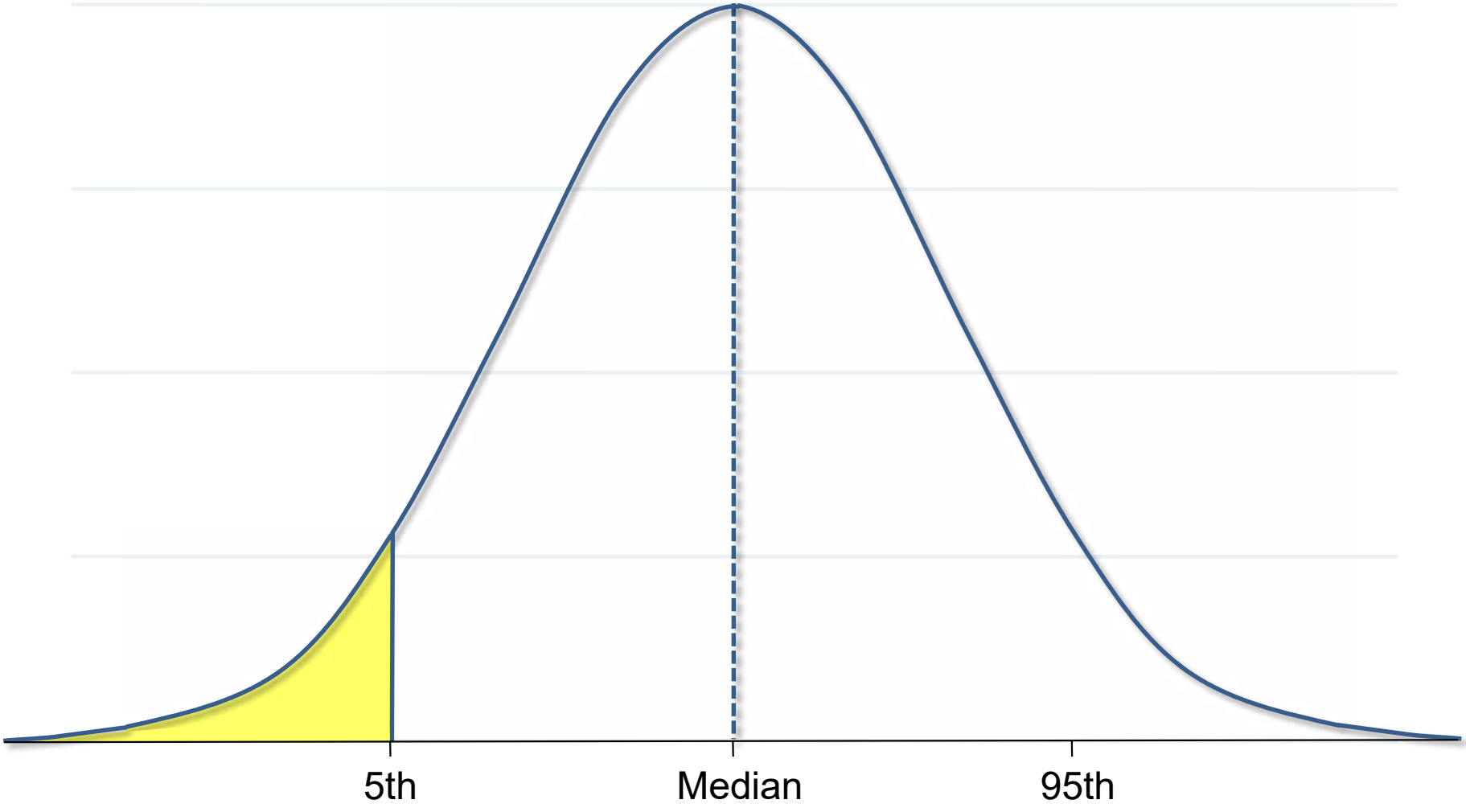
A Quasi-Experiment: Entry of High Value-Added Teacher



A Quasi-Experiment: Entry of Low Value-Added Teacher



The Value of Improving Teacher Quality



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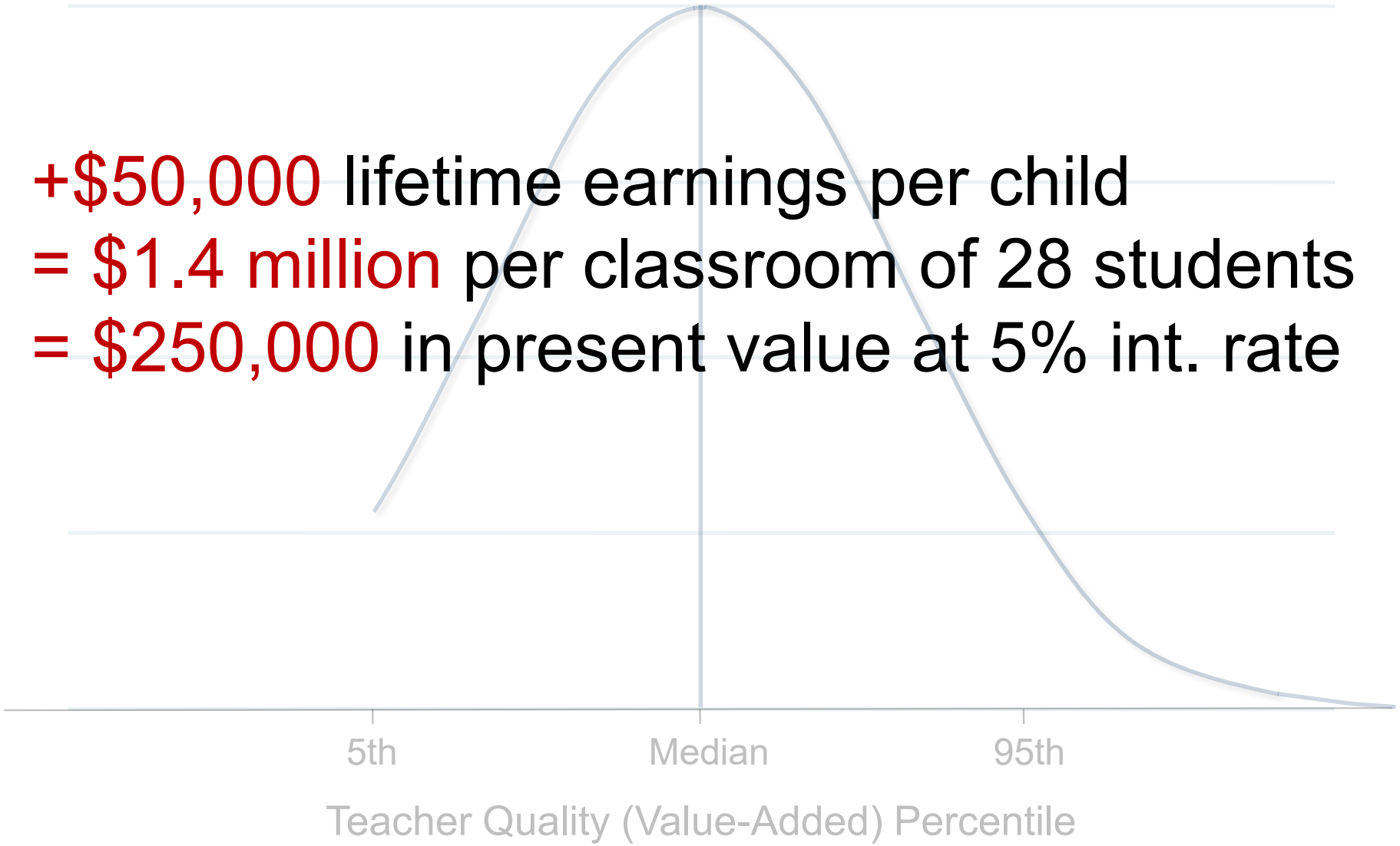
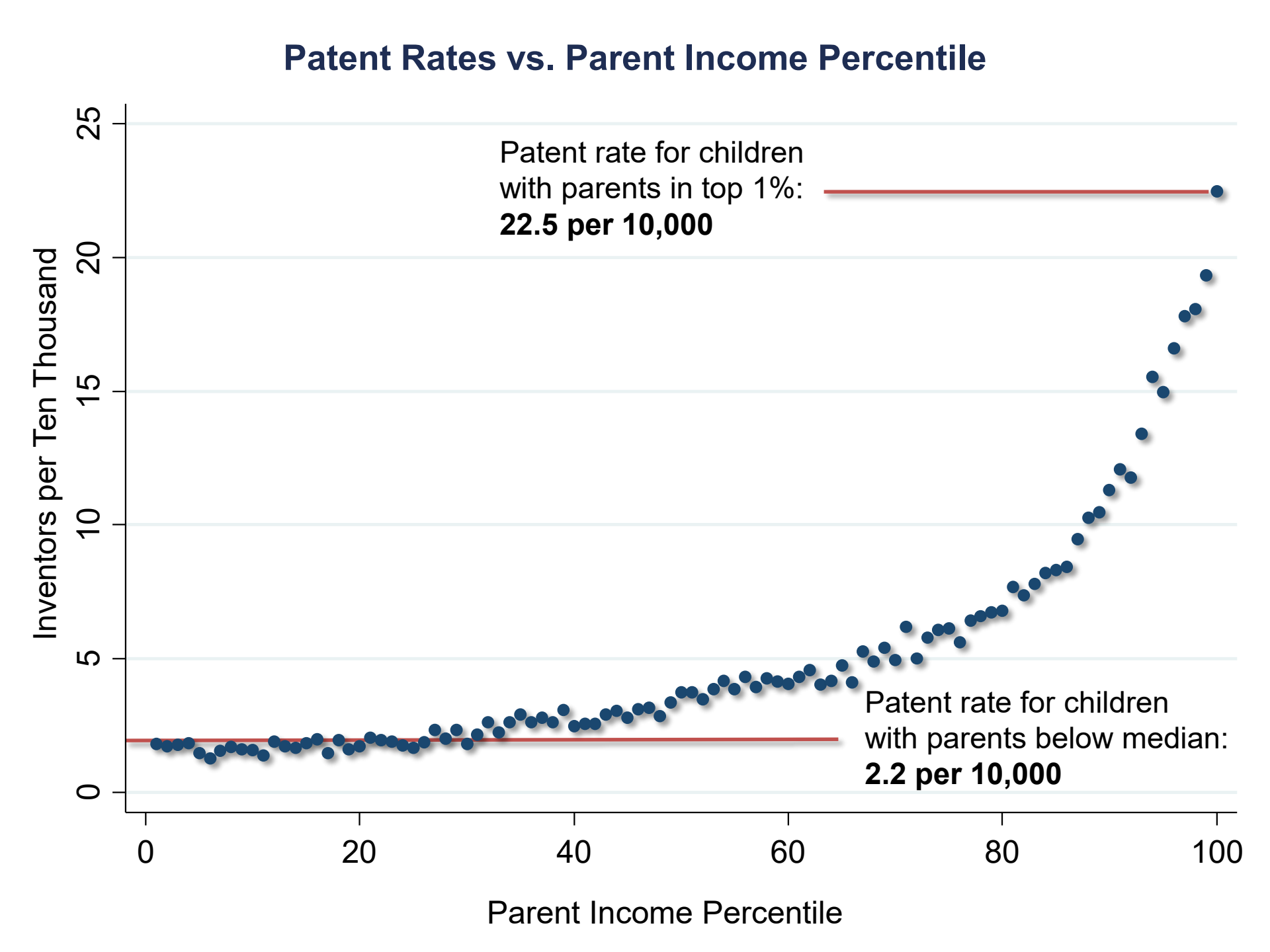
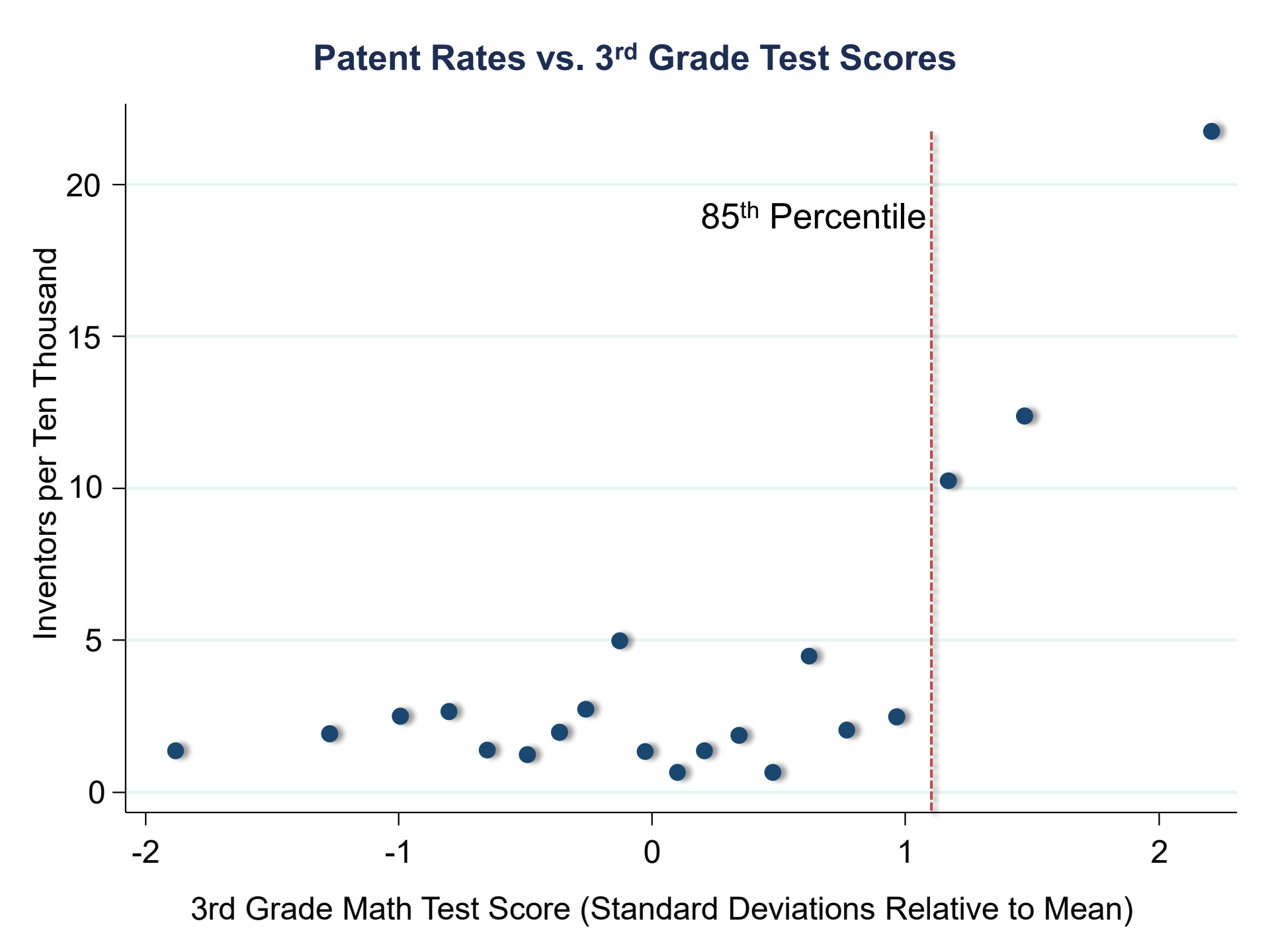


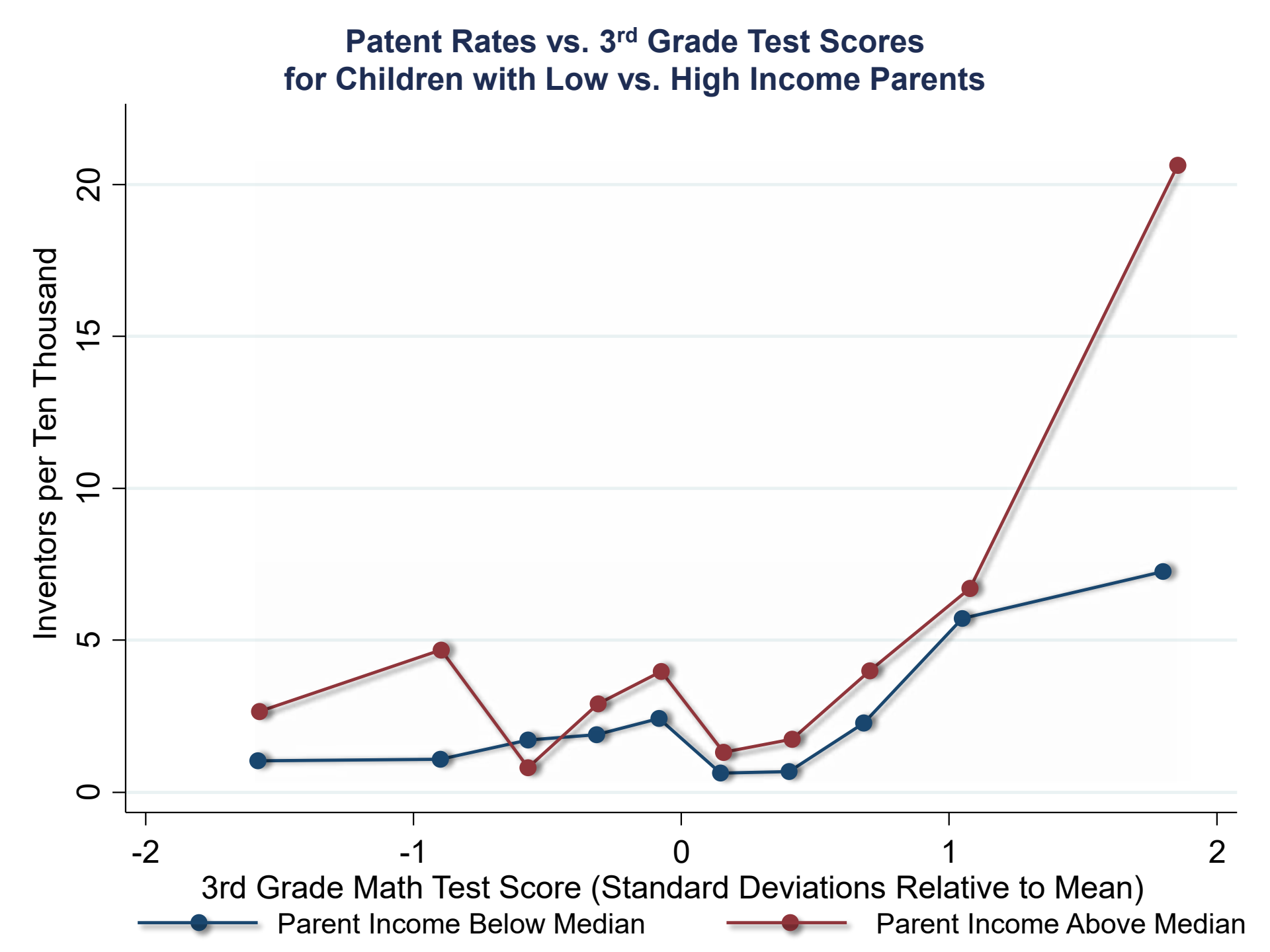
Equality of Opportunity and Economic Growth

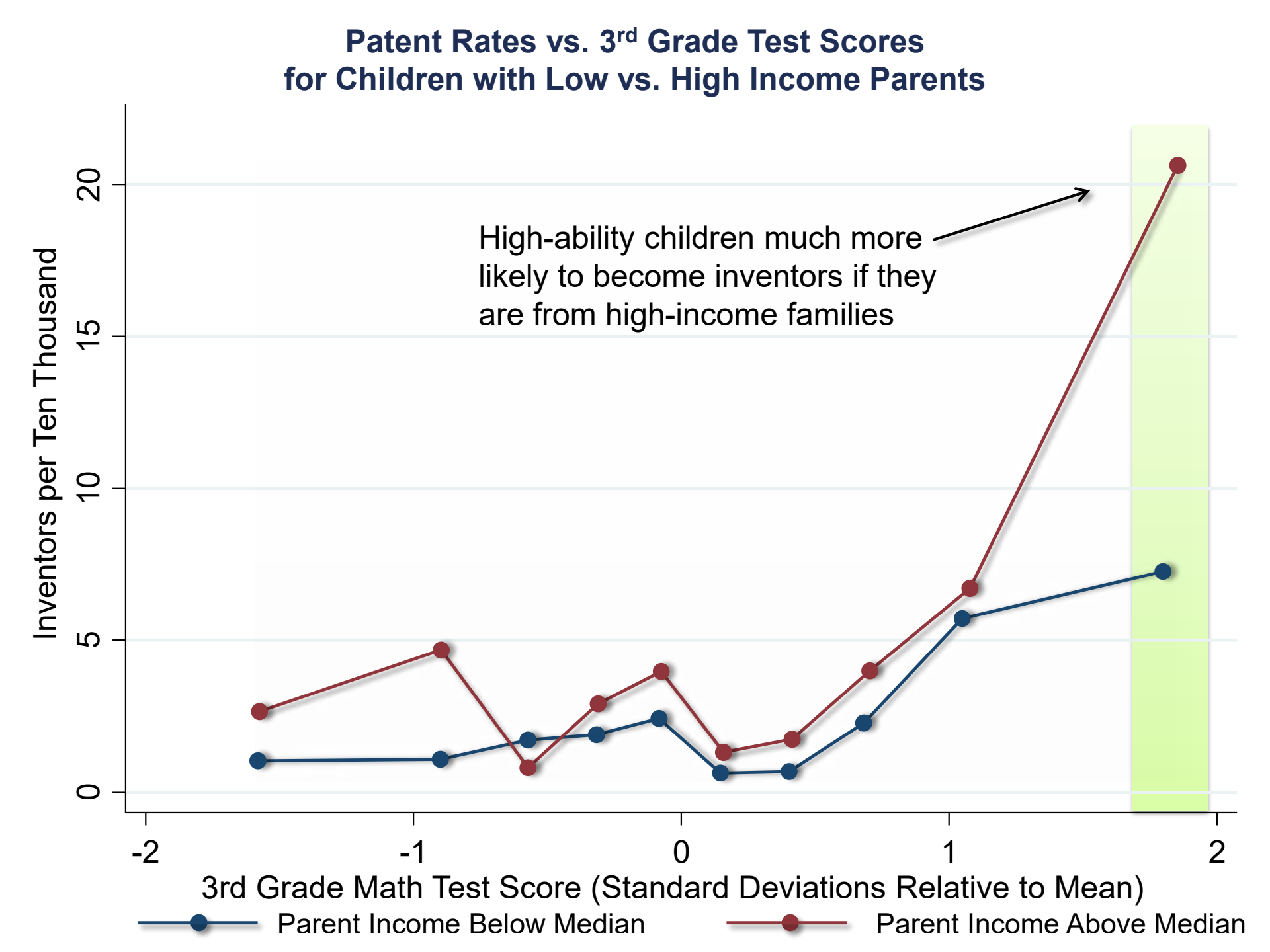
- Traditional argument for greater social mobility is based on principles of justice
- But improving opportunities for upward mobility can also increase size of the economic pie
  - One child's success need not come at another's expense
- To illustrate, focus on innovation
  - Study the lives of 750,000 patent holders in the U.S. by linking universe of patent data to tax records

Source: Bell, Chetty, Jaravel, Petkova, van Reenen 2015


Patent Rates vs. Parent Income Percentile
Patent rate for children with parents in top 1%: 22.5 per 10,000
Patent rate for children with parents below median: 2.2 per 10,000
Inventors per Ten Thousand
0
5
10
15
20
25
0
20
40
60
80
100
Parent Income Percentile


Patent Rates vs. 3rd Grade Test Scores
85th Percentile
Inventors per Ten Thousand
0
5
10
15
20
-2
-1
0
1
2
3rd Grade Math Test Score (Standard Deviations Relative to Mean)


Patent Rates vs. 3rd Grade Test Scores
for Children with Low vs. High Income Parents
Inventors per Ten Thousand
0
5
10
15
20
-2
-1
0
1
2
3rd Grade Math Test Score (Standard Deviations Relative to Mean)
Parent Income Below Median
Parent Income Above Median


Patent Rates vs. 3rd Grade Test Scores
for Children with Low vs. High Income Parents
High-ability children much more
likely to become inventors if they
are from high-income families
Inventors per Ten Thousand
0
5
10
15
20
-2
-1
0
1
2
3rd Grade Math Test Score (Standard Deviations Relative to Mean)
Parent Income Below Median
Parent Income Above Median

Policy Lessons

1. Improve childhood environments and primary education

   - Not just spending more money: US already spends more than other developed countries with better outcomes

   - Instead, focus on key inputs such as attracting and retaining talented teachers (e.g., Finland)

Policy Impacts

"We know a good teacher can increase the lifetime income of a classroom by over $250,000.... Every person in this chamber can point to a teacher who changed the trajectory of their lives"

- Barack Obama, *State of the Union*, 2012

"A recent study by Harvard and Columbia economists found that students with effective teachers are less likely to become pregnant, more likely to go to college and more likely to get higher-paying jobs....Ineffective teachers are hurting our students' futures – we can't allow that."

- Michael Bloomberg, *State of the City*, 2012

Policy Impacts

Vergara v. California | Legal Claims

Civil Rights

- Under longstanding California Supreme Court precedents, Plaintiffs have a fundamental right to equal educational opportunity.

Harm to Students

- **Teacher quality is the key determinant of educational effectiveness and has a profound impact on students' lifetime achievement.**
- **The problem is worse for students who attend schools that serve predominantly minority and lower-income populations** because those schools are staffed by a disproportionate share of grossly ineffective teachers.
- In some school districts, **students of color are two to three times more likely to have bottom-quartile teachers than their white and Asian peers.**

Policy Lessons

1. Improve childhood environments and primary education

2. Tackle social mobility at a local, not national level

   - Focus on specific cities such as Baltimore and Chicago, and on specific neighborhoods within those cities
   - Help families with young children move to high opportunity areas using housing vouchers or tax credits
     - Working with HUD to develop ways to make Section 8 voucher program more effective in achieving this goal
   - Invest in improving neighborhoods with low mobility

Policy Lessons

1. Improve childhood environments and primary education

2. Tackle social mobility at a local, not national level

3. Harness administrative data to develop a scientific evidence base for economic and social policy

   - Identify which neighborhoods are in greatest need of improvement and which policies work

   - County-level data on mobility publicly available at www.equality-of-opportunity.org

Download County-Level Data on Social Mobility in the U.S.

www.equality-of-opportunity.org/data

Downloadable Data on Intergenerational Mobility

Data Description		
Preferred Mobility Measures by Commuting Zone	Stata file	Excel file
Online Data Table 1: National 100 by 100 Transition Matrix	Stata file	Excel file
Online Data Table 2: Marginal Income Distributions by Centile	Stata file	Excel file
Online Data Table 3: Intergenerational Mobility Statistics and Selected Covariates by County	Stata file	Excel file
Online Data Table 4: Intergenerational Mobility Statistics by Metropolitan Statistical Area	Stata file	Excel file
Online Data Table 5: Intergenerational Mobility Statistics by Commuting Zone	Stata file	Excel file
Online Data Table 6: Quintile-Quintile Transition Matrices by Commuting Zone	Stata file	Excel file
Online Data Table 7: Income Distributions by Commuting Zone	Stata file	Excel file
Online Data Table 8: Commuting Zone Characteristics	Stata file	Excel file
Online Data Table 9: Commuting Zone Characteristics Definitions and Data Sources		Excel file
Geographic Crosswalks (Tolbert and Sizer 1996, Autor and Dorn 2009 & 2013)	Zip file	
Replication Stata Code and Datasets	Zip file	
Downloadable Map of Absolute Upward Mobility		

Version 2.0, released January 17, 2014. For Version 1.0 (released on July 22, 2013), click here. Version 2.0 reports statistics using the 1980-82 birth cohorts (rather than 1980-81) and includes new data such as mobility statistics by county and MSA, new CZ-level covariates, and marginal income distributions for parents and children.

For more information on the data, please email info@equality-of-opportunity.org