Equality of Opportunity and Education Policy: New Evidence from Big Data

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A Data-Driven Approach to Economic Policy

Analysis of economic and social policy is being transformed by new data and methods

- Traditional approach: theory-driven study of macro questions

- Current frontier: data-driven analysis of micro questions
The Big Data Revolution

This paradigm shift is being sparked by “big data”
- School records, tax data, health registers

Led by Denmark and Sweden, but expanding rapidly

This talk illustrates how we can use these data to obtain scientific evidence on policy questions
- Focus here on education policy

A Kindergarten Test

- I'll say a word to you
- You circle the picture that starts with the same sound

"Play"

Source: Chetty, Friedman, Hilger, Saez, Schanzenbach, Yagan 2012
Which Policies Improve Children’s Outcomes?

Correlations suggest that improving children’s school performance could have lasting benefits

But simply spending more on schools has little effect on outcomes [Hanushek 2001]

Which aspects of education are most important?
Using “Big 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 2012

Measuring Teacher Quality

One prominent measure of teacher quality: teacher \textit{value-added}

How much does a teacher raise her/his students’ test scores on average?
College Attendance vs. Teacher Quality

Earnings vs. Teacher Quality
The Value of Improving Teacher Quality

+$50,000 lifetime earnings per child
= $1.4 million per classroom of 28 students
= $250,000 present value with 5% int. rate

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
Lessons for Education Policy

1. Teacher quality matters: attract top talent to teaching (e.g., Finland)

2. Standardized testing can provide valuable input into identifying good teachers and schools

3. Teaching quality matters in all grades, not just at early ages

4. Teacher quality may be more important than class size

5. Non-cognitive/social skills are as important as cognitive skills

Translating the Lessons to Developing Countries

Simply improving teacher attendance has large impacts in India (Kremer et al. 2006)

Paying teachers based on performance significantly raised test scores in India (Muralidharan and Sundararaman 2011)
Lessons for Economic and Social Policy

1. Improving micro-level policy decisions can have great macro-level impacts

2. Harnessing big data can provide a scientific evidence base for designing many policies
   - Social safety nets
3. Simply collecting and disseminating performance data can spark social change
   - Pension policies
   - Tax policies

Intergenerational Income Mobility Across Areas in the U.S.
Probability Child Reaches Top 20% Given Parents in Bottom 20%

Lighter Color = Greater Upward Mobility
Source: Chetty, Hendren, Kline, Saez 2013