

Human Resources and Education

Manage the teachers

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- Introduction of teacher labor market (30 min)
- *Break (10 min)*
- Teacher effectiveness (75 min)
- *Break (10 min)*
- Performance pay (75 min)

Teacher labor market

- Supply
 - ▷ Who enters and remains in the teaching profession?
- Demand
 - ▷ How many and what types of teachers do schools/districts hire?
- Market equilibrium
 - ▷ Is this a free or competitive markets?

- Monopsony of teacher demand?
 - ▷ Small number of “buyers” of teacher labor
- Monopoly of teacher supply?
 - ▷ Unions: price set through collective bargaining
- Free market entry?
 - ▷ Teaching majors; Certification
- Free market exit?
 - ▷ Public system (insurance etc.)
 - ▷ School's authority to hire/fire teachers easily?

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- Teacher shortages
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 - always a warm body in front of a class
 - shortage of schools?
 - ▷ Shortage of effective or qualified teachers may exist
 - Why?

Qualifications vs. effectiveness

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 - Why?
 - Addressed by: larger class size, uncertified teachers, teaching out-of-field, reduce course offerings

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- Salary
 - ▷ Opportunity cost (greater shortages in STEM)
- Work conditions
 - ▷ Student composition
 - ▷ Compensating differentials
- Geography
 - ▷ Rural vs. urban; close to home

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- *What factors impact teacher demand (quantity and quality)?*
- *What factors impact teacher mobility (e.g., salary, working conditions)?*

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Very limited evidence

- Uniform salary increases
- More flexible teacher compensation
 - ▷ **Pay for performance**
 - ▷ Differential pay for hard-to-staff schools/subjects
 - ▷ Subsidies for teacher education (e.g., loan repayment)
- Reduce barriers to entry (e.g., certification)
- Changes to the occupational structure of teaching
 - ▷ Career ladders
 - ▷ Mentoring/instruction
 - ▷ More professional autonomy
 - ▷ More collaborative planning
- Other policies?

Teacher value-added

- Origins in the Coleman Report (1966) “Equality of Educational Opportunity”
 - ▷ Standard measures of resources such as class size and per pupil spending not associated with achievement
- Further research finds weak correlation between teacher “qualifications” such as certification and experience and student outcome
 - ▷ Push to look beyond “qualifications” to effectiveness
- Focus on “value-added measures” (VAM)
 - ▷ Controlling for factors “outside” a teacher’s control
 - ▷ The outcome could in theory be anything, but in practice is always student test scores

How to measure teacher effectiveness?

- Levels vs. gains
 - ▷ Teacher A: class average from 85 to 90
 - ▷ Teacher B: class average from 70 to 80
- Controls in VAM?
 - ▷ Student Xs?
 - ▷ Classroom Xs?
 - ▷ School Xs?
 - ▷ Lagged test score? (additional prior test scores help much)
- Teachers vary in their effectiveness, and variation within groups is much greater than across groups (teacher characteristics)
- vs. subjective evaluation by headmasters and peers

- Statistical concerns
 - ▷ Validity (selection bias)
 - ▷ Reliability (standard errors, precision of estimate)
- Practical concerns
 - ▷ Difficulty linking students to teachers
 - ▷ Testing is limited to certain grades and subjects
- Unintended consequences
 - ▷ Narrowing of the curriculum, shift away from conceptual learning, discourages collaboration

- Taylor. (2017). “Skills, job tasks, and productivity in teaching”
 - ▷ Research question
 - How teachers' assigned job tasks - the basic practices they are asked to use in the classroom - affect the returns to math skills in teacher productivity
 - ▷ RCT
 - Different math teaching methods: Conventional direct instruction vs. New student-led instruction
 - Codes of a set of day-to-day tasks
 - ▷ Results
 - Skills vs. productivity
 - Returns to skills
 - ▷ How does this paper differ from the original reports of this project?
 - Find original reports?
 - Appendix table A4

- Question 1: What is the difference between workers' skills, tasks and productivity?

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 - ▷ Identically-skilled workers assigned different tasks can have different output
- Question 2: Why important to understand the relationship of skills, tasks, and productivity in schools?
 - ▷ Substantial variation in teacher effectiveness
 - ▷ Little is know about the causes, which constrains teacher policy and management to improve schools

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- Question 4: Are there conclusive findings of the impact of skills on teacher productivity?
 - ▷ general cognitive ability
 - ▷ specific knowledge of the subject
 - ▷ teaching-specific skills (certification exams)
 - ▷ non-cognitive/interpersonal skills, personality

Hypotheses

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 - ▷ returns to specific skills depend on the job tasks
 - ▷ most easily-observable measures of teaching skills are empirically poor measures (e.g., noisy, little variation)
Example: “95% of U.S. teachers are above the average in teaching effectiveness”
 - composite indices
 - highly teaching-specific skills from formal classroom observations
- Question 6: How do job tasks impact teacher productivity?

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- Question 11: How to measure teachers' math skills?
- Question 12: In Table 1 and Table 3, why does the author check baseline covariate balance and attrition?

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- Question 14: In Table 5 and Appendix Table A7, why the author uses different model specifications? (particularly years of experience, interactions and quadratic terms)

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- Question 17: What are the potential mechanisms? (Table 6)
- Question 18: What are the policy implications and limitations of this paper?
 - ▷ How teachers are asked to teach matters?

Performance pay

- What is the purpose of performance pay for teachers?
- How to measure the performance (solely on VAM?)?
- How to design the pay plan?
 - ▷ What's the % of wage?
 - ▷ How large is the pay?
 - ▷ How to differentiate among teachers?

Next steps

- Work on your proposal/project
- Teacher value-added model
- Group discussion: Implications for research and practice

Appendix

Multilevel model 1

- Hierarchical linear model, nested data model, mixed model, random coefficient/effect/parameter model, split-plot design
 - ▷ Parameters vary at more than one level
 - E.g., student-class-school
 - ▷ Generalization of one level (non)linear models (e.g., OLS)
 - ▷ Alternative ways: *atomistic fallacy*, *ecological fallacy*
- “In the last 15-20 years multilevel modeling has evolved from a specialty area of statistical research into a standard analytical tool used by many applied researchers.”

Appendix

Multilevel model 2

- Why multilevel models?
 - ▷ Correct inferences
 - Traditional regression may overstate the statistical significance
 - ▷ Substantive interest in group effects
 - group-level residuals
 - ▷ Estimating the group effects simultaneously with the effects of group-level predictors
 - Fixed effects model is similar to OLS
 - Random effects model identify both effects
 - ▷ Inference to a population of groups
 - In a multilevel model the groups in the sample are treated as a random sample from a population of groups
 - Using a fixed effects model, inferences cannot be made beyond the groups in the sample

Appendix

Multilevel model 3

- **mixed** in Stata

- ▷ Manual: <https://www.stata.com/manuals14/me.pdf>
- ▷ A brief introduction: <http://blog.stata.com/2013/02/04/multilevel-linear-models-in-stata-part-1-components-of-variance/>
<http://blog.stata.com/2013/02/18/multilevel-linear-models-in-stata-part-2-longitudinal-data/>
- ▷ Example
 - Setup
webuse nlswork
 - Random-intercept model (xtreg)
mixed ln_w grade age || id:
 - Random-intercept and random coefficient model
mixed ln_w grade age || id: age