

Value-Added Modeling: The Kentucky Experience

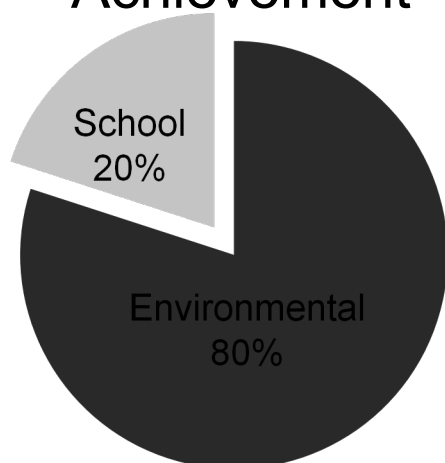
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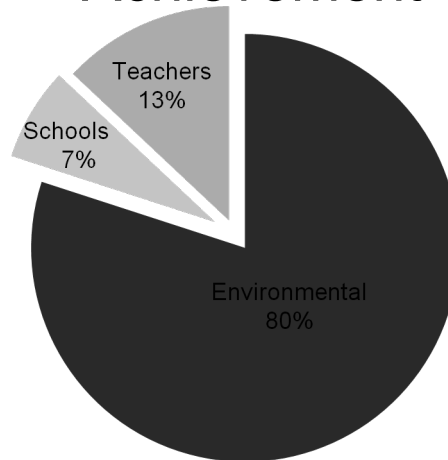
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% Factors Affecting Student Achievement



Adapted from Marzano, 2000

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Importance of the 20%

- Governmental policies can impact
- 13% due to teacher effectiveness
 - ✓ Over 1 grade equivalent improvement (Hanushek, 1992)

Value-Added Models (VAM)

- Section 1249: Student GROWTH to evaluate teachers/administrators
- Separate 80% of variation in learning due to external factors
- Isolate the information that we want to know about teachers' contributions

Value-Added Models (VAM)

- Estimates can be rank-ordered
 - ✓ Used to make formative decisions
- Intuitive idea finds support outside of education circles because of perceived fairness
- Separating the environmental, school factors from the teacher effects

Comparison Group

- Have to have a good notion of the appropriate comparison group of teachers
- Plausible groups
 - ✓ Other teachers in the same school, district, or state
 - ✓ Other teachers who teach similar types of students
- Current applications: teacher effects estimated in respect to average teacher effects in district

Teacher Sorting

- Consistent patterns in how teachers sorted across schools
- Teachers with weaker academic credentials, fewer years of experience tend to work in “at-risk” schools
- Comparison group challenge: 50% of teachers will look more effective, but the rate of student improvement may not meet expectations

Differential Teacher Contributions

- Teachers don't tend to be equally as successful with all groups of students (achievement levels, race, gender)
- Teachers <3 years of experience, on average, are less successful than teachers with more years of experience

Differential Teacher Contributions

- Correcting bad student habits – student achievement levels may not accurately reflect teachers' efforts in classroom
- Random assignment of teachers and students would turn these into non-issues
- But, random assignment doesn't happen (Ex: California, North Carolina, Kentucky, etc.)

Isolating the Teacher Effect

- Other educational factors (superintendent/principal leadership, curriculum policies, prior teachers) contribute + or - to student gains
- Students own characteristics (home environments, neighborhoods, family dynamics, peers) also contribute to gains

The Case of Kentucky

- Pilot project: Identify the universities that do the best job preparing teachers, using VAM
- The data challenge: student-teacher matches not available in a centralized, state location
 - ✓ urban school district agreed to provide 5th grade classroom rolls so that teacher-student matches could be made

The Kentucky VAM

- No gain score, used instead a history of student test scores
 - ✓ Testing schedule
 - ✓ Student achievement doesn't occur linearly (Rothstein, 2008)
- To differential teacher effectiveness with different groups of students
 - ✓ Controls for students' race, gender, gifted, IEP, subsidized lunch eligibility
 - ✓ Controls for teachers' race, gender, years of experience t

The Kentucky VAM

- Teacher Fixed Effects
 - ✓ Addresses the non-random sorting of teachers into certain types of schools
 - ✓ Gives us the estimate of teacher effectiveness in achieving standardized test gains
- School Fixed Effects
 - ✓ Addresses the leftover school effects that we didn't explicitly measure (superintendents, principals, peers, etc.)

Estimates of Teacher Effectiveness

| | Estimate | 95% Confidence Interval |
|-----------|-----------------|--------------------------------|
| Teacher 1 | -0.748 | -1.246, -0.25 |
| Teacher 2 | 0.778 | 0.373, 1.182 |
| Teacher 3 | -0.221 | -0.491, 0.047 |
| Teacher 4 | -0.835 | -1.282, -0.387 |
| Teacher 5 | 0.243 | -0.100, 0.585 |
| Teacher 6 | 1.129 | 0.595, 1.663 |
| Teacher 7 | 0.532 | 0.358, 0.707 |

Limitations

- Poor measures of students' socioeconomic status
- Testing structure
- Couldn't have used model evaluate the effectiveness of teachers in subjects that aren't tested

Conclusion

- A *single* element as part of a larger performance evaluation system
- Performance evaluation using student growth is difficult, but possible
- Financial incentive plans \Rightarrow positive results
 - ✓ Decreased dropout (Eberts et al., 2002)
 - ✓ Increased test performance (Lavy, 2002; Figlio and Kenny, 2006)

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THANK YOU!!!