

Notes for VAM Simulation

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Background

1. Each test score is standardized to have mean of 0 and sd of 1. I take each score and subtract the CMS mean for that test that year and then divide by the standard deviation for that test that year. This is the metric for all the test score related variables.
2. I have attached the weights (regression coefficients) for each subject.

For the simulation, here's what I think would work:

1. Create data for a given class in a given school, for each student a value for each parameter. Multiply the values for each variable by the weight for that variable.
2. Sum the products of the multiplication of each weight x value to get the expected score for the student.
3. Subtract the actual score from the expected score (hereafter **deviation**)
4. Reduce the data to one row per teacher per year taking the average of all the variables by teacher and year and including a count of the number of students per teacher per year.
5. Now, estimate the variance of the -deviation- (hereafter **vardeviation**) as well as the covariance of the -deviation- (hereafter **covardeviation**). Not sure how excel does the covariance, but we are after the within-teacher covariance of the effect from year to year. This is the stable part of a teacher's value-added.
6. Generate a new variable called **noise** that is equal to the (square root of the square of **deviation**) divided by the number of students the teacher x year has.
7. Now get the average of **noise** across all observations (hereafter **avg_noise**)
8. Create a new variable called **random**=**vardeviation** -**covardeviation**-**avg_noise**
9. Create a new variable called **weight** that equals $1/(\text{random} + \text{noise})$
10. Now, reduce the dataset once more, taking the average of all the variables and the count of the students to get to one teacher per row (aggregating across years).
11. Create new variable called **var** that is $1/\text{weight}$
12. Create the teacher effect by multiplying **deviation** * $(\text{covardeviation}/\text{covardeviation}+\text{var})$. This is the teacher effect that is used to create the percentiles.