

# Great Teachers Create Lasting Value

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Many policymakers advocate increasing the quality of teaching, but there is considerable debate about the best way to measure and improve teacher quality. The so-called “value-added” approach evaluates teachers based on their students’ test-score gains. Recent research confirms that teachers with high value-added have substantial positive impact on student outcomes in adulthood. Improving the quality of teaching is likely to have large economic and social returns, and test-score impacts are helpful in identifying high-quality teachers.

The recent round of results on the PISA international student achievement test made policymakers in many European countries wonder how to best improve their students’ learning outcomes. A large body of research indicates that one way for a country to improve on its educational performance is to attract and retain excellent teachers.

## MEASURING THE IMPACTS OF TEACHERS

One method to evaluate the quality of teaching is to look at teachers’ impacts on their students’ test scores, commonly termed the “value-added” (VA) approach. A teacher’s value-added is defined as the average test-score gain for his or her students, adjusted for differences across classrooms in student characteristics such as prior scores. In the United States, school districts from Washington D.C. to Los Angeles have begun to use VA to evaluate teachers. But are teachers’ impacts on students’ test scores a good measure of their quality? Proponents argue that using VA can improve student achievement, while critics argue that test-score gains are poor proxies for a teacher’s true quality.

The debate about VA stems from two fundamental questions. First, does VA accurately measure teachers’ impacts on scores or does it unfairly penalize teachers who are assigned lower achieving students? Second, do high VA teachers improve their students’ long-term outcomes or are they simply better at teaching to the

test? Researchers have not reached a consensus about the accuracy and long-term impacts of VA because of data and methodological limitations.

## THE ACCURACY OF VALUE-ADDED MEASURES

In a recent extensive research project, we address these two questions by tracking one million children from a large U.S. urban school district from 4<sup>th</sup> grade to adulthood using school-district and tax records. We evaluate the accuracy of standard VA measures using several methods, including adjustment for previously unobserved parent characteristics and natural experiments that arise from changes in teaching staff.

We find that when a high VA teacher joins a school, test scores rise immediately in the grade taught by that teacher; when a high VA teacher leaves, test scores fall. Test scores change only in the subject taught by that teacher, and the size of the change in scores matches what we predict based on the teacher’s VA.

VA models which control for a student’s prior test scores thus exhibit little bias in forecasting teachers’ impacts on student achievement. These results establish that VA accurately captures teachers’ impacts on students’ academic achievement and thereby reconcile the conflicting conclusions of previous studies. Interestingly, more than 85% of the variation in teacher VA is within rather than between schools.

## TEACHERS AFFECT STUDENTS' LONG-TERM OUTCOMES

In a second step, we analyze whether high VA teachers also improve students' long-term outcomes. We find that students assigned to higher VA teachers in primary school are more successful in adulthood in many dimensions. They are more likely to attend college, earn higher salaries (see Figure), live in better neighborhoods, and save more for retirement. They are also less likely to have children as teenagers.

Teachers' impacts on students are substantial. Replacing a teacher whose true VA is in the bottom 5% with one of average quality in a single grade would generate cumulative earnings gains of more than \$1.4 million for the average classroom.

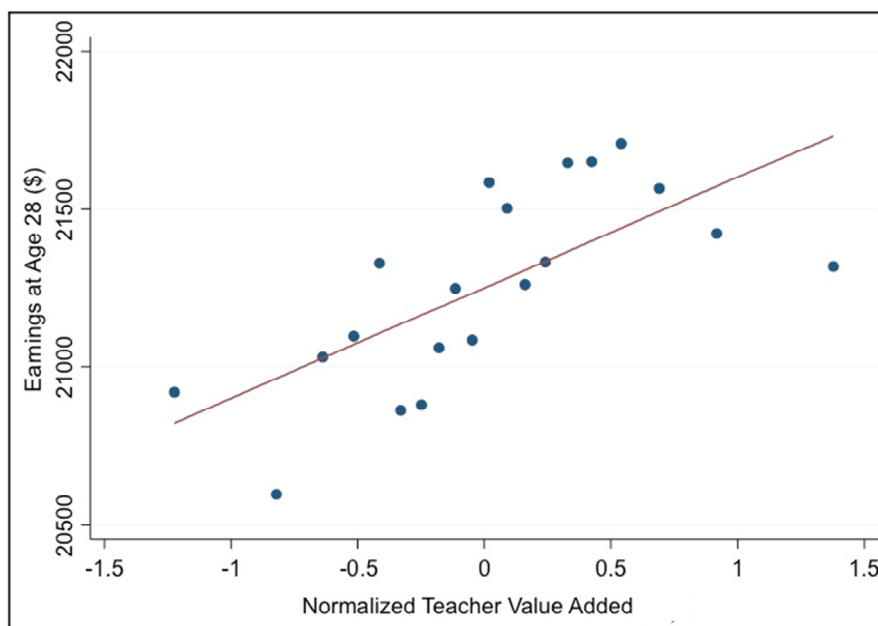
Discounting future earnings at a 5% interest rate, this yields a present value gain in students' lifetime income of approximately \$250,000 per classroom. What this means is that parents should be willing to pay a very large sum to switch their child from a below-average to an above-average teacher, based purely on the present value of the increase in their children's lifetime earnings.

Teachers have large impacts in all the grades we analyze (4 to 8). Teachers' impacts on earnings are also similar in percentage terms for students from low and high income families.

## IMPROVING THE QUALITY OF TEACHING HAS LARGE ECONOMIC AND SOCIAL RETURNS

Overall, our results show that great teachers create great value and that test score impacts are helpful in identifying such teachers. However, more work is

### Impact of teacher value-added on students' future earnings



The graph plots the average earnings of former students at age 28 (after extensive adjustment for characteristics of their former classrooms) against their teachers' value-added (i.e., the average test-score gains of these teachers' students), aggregated in 20 equally sized intervals. Source: see reference below.

needed to determine the best way to use VA for policy. For example, using VA in teacher evaluations could induce counterproductive responses that make VA a poorer measure of teacher quality, such as teaching to the test or cheating. There will be much to learn about these issues from U.S. school districts that start using VA to evaluate teachers.

Furthermore, more research needs to be done on what makes a good teacher. In fact, several recent studies indicate that teachers' value-added tends to be unrelated to such observable teacher characteristics as their experience (after a first few years), BA vs. MA degree, certification, or professional development.

Nevertheless, it is clear that improving the quality of teaching – whether using value-added or other tools – is likely to have substantial economic and social returns.

For more details see: Raj Chetty, John N. Friedman, Jonah E. Rockoff, *Measuring the Impacts of Teachers II: Teacher Value-Added and Student Outcomes in Adulthood*. *American Economic Review*, forthcoming (see [www.nber.org/papers/w19424](http://www.nber.org/papers/w19424)).