

A Cost-Benefit Analysis for Expenditures and Academic Achievement

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Research Question:

Is there a relationship between how much is spent, per state, on P-12 education per student and the eventual achievement of those students?

Media portrayals

Those outside of education sometimes “cherry pick” data to try to illustrate that there is no relationship between expenditures and achievement.

Conservative news media may choose a couple of high-spending states and “rock bottom” states to try to show that differences in expenditures are not associated with differences in achievement.



Research vs. Sensationalism

This “reasoning” is convenient because it leads to an argument for lower education expenditures and lower taxes. The children are then “only along for the ride.”

If the “reasoning” included all available and relevant data, there wouldn’t be a problem with it. But the usual Main-Stream Media depiction does not include all available data. Including all data involves work. It involves a suspension of judgment rather than a rush to judgment. It involves letting the data speak for themselves. Real research involves the possibility of finding out that we have been wrong. Real research usually involves some plain old hard work.

There are some differences between scientific research and yellow journalism.



Q. Who has to deal with the outcome of “cherry-picked” data reporting?

A. Teachers and administrators, who have been getting told year after year to do more and more with less and less.

So what are the facts?

Data sources

ACT scores for all 50 states were obtained via www.publicagenda.org (2010).

... **All fifty**. Not just a few states that appeared to support a particular argument.

Financial data on per-pupil expenditures were obtained on the Internet from the *2009 Annual Survey of Local Government Finances-School Systems*. From **ALL** states . . .

Cautionary notes

Lest we stoop to the level of journalistic reporting, let us say that it is understood that correlation does not equal causation.

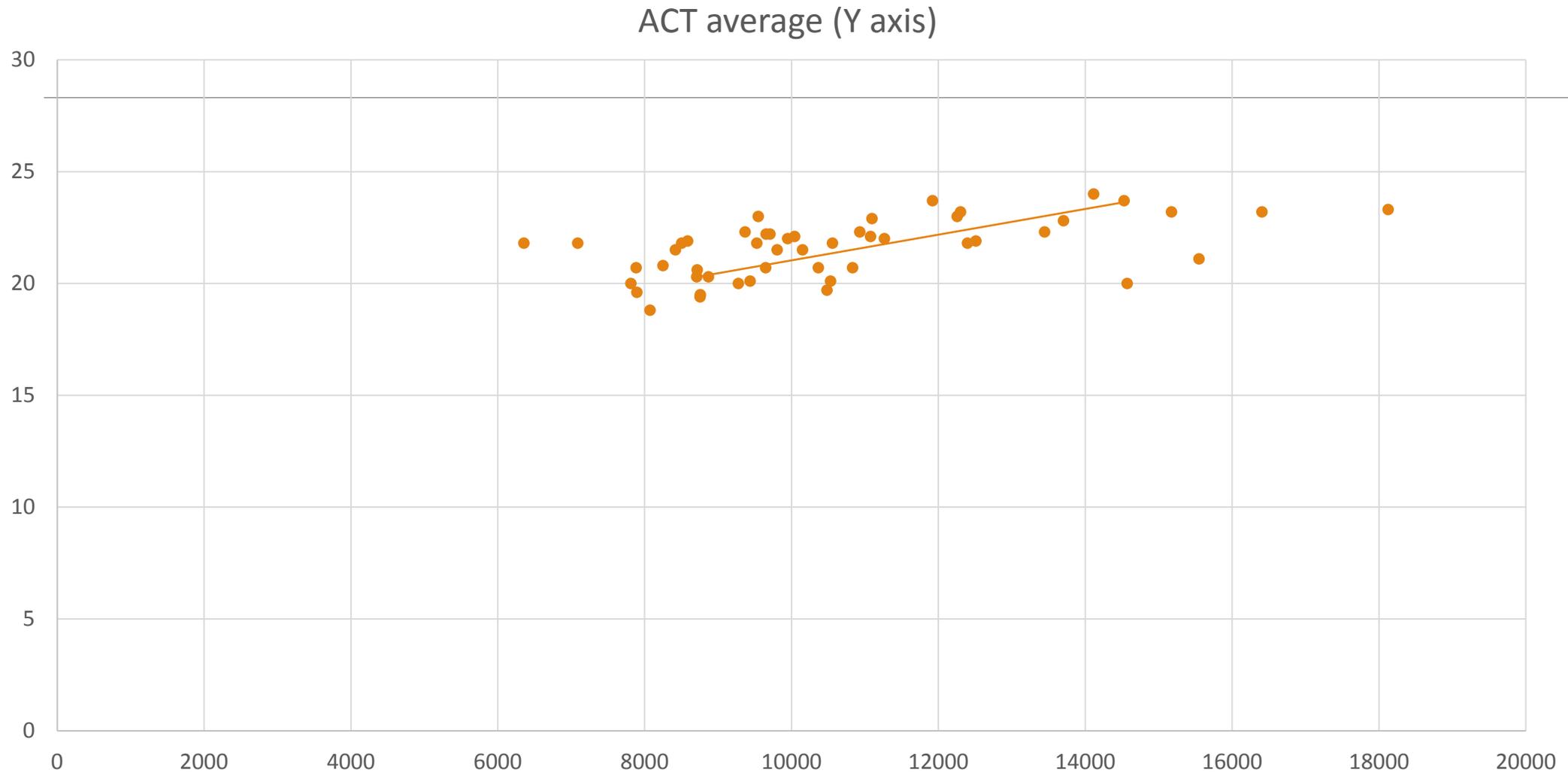
In the immediate case, even if expenditures are found to be correlated with ACT scores, one may not have caused the other. A “Z” factor may be causing one or both of them and Z may not have been included in the calculations.

When we spend an adequate amount of money on education, a third or other factor may get into play that actually causes the increased achievement.

But are expenditures and achievement related?

That’s the question this study sought to answer.

The plot thickens . . .



Expenditures per student in Average Daily Membership—all 50 states (X axis).

Findings

Simple correlation with per-pupil expenditures and ACT data from all 50 states is $r=0.55$, ($p<.0001$, ignoring that these are parameters and not statistics), R-square of 0.3025. This answers our original research question.

Extending our Learning . . .

What about ignoring the states with the five highest expenditures and re-calculating?

We did this by simple observation of the best plot line. $r=0.62$.

What about ignoring the five highest and five lowest-spending states and re-calculating? Again, using the plot line. $r=0.66$.

What about excluding the five highest and ten lowest-spending states? $r=0.69$, R-square = 48 % of the variance. BEST model. This leaves 35 states in the model.

Findings (2)

Out of those 35 states who were neither in the top five or bottom ten for expenditures per ADM in 2010, the lowest spending was Arkansas at \$8712 and the highest was Connecticut at \$14,531. Their ACT averages for the class of 2009 were 20.3 and 23.7, respectively.

Data for the ten lowest-expending or five highest-expending did not correlate significantly with ACT scores. States who spent less than \$8712 may have done some good with their efforts, but their expense per ADM was not sufficient to have any predictable results.

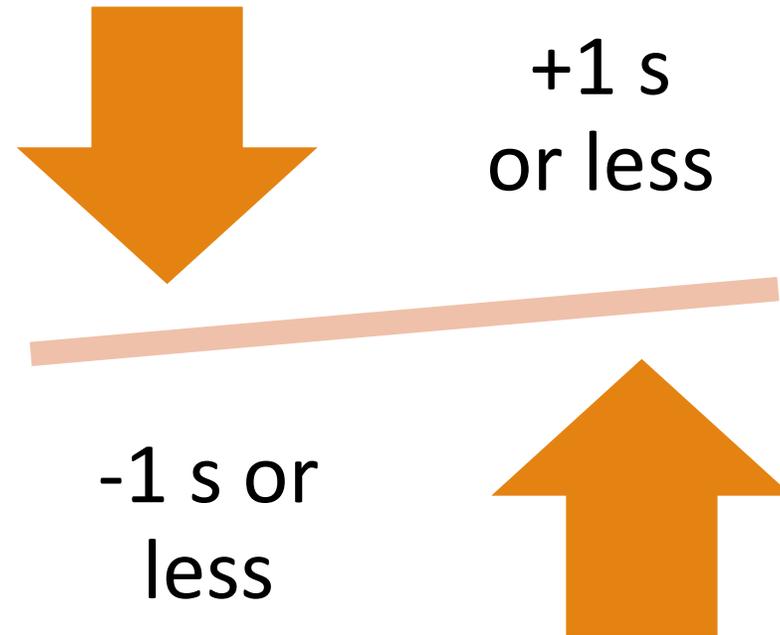
States who spent more than \$14531 per ADM may have experienced benefits of some kinds, but not benefits associated with greater achievement, as measured by the ACT.

Got what they paid for . . .

TWENTY-EIGHT STATES GOT WHAT THEY PAID FOR

On the prediction line, their average ACT scores were within a standard deviation of their expenditures, i. e., they were close to the prediction line.

These 28 states were the rule, not the exceptions.



Got less than they paid for . . .

Seven states got less achievement (at least a standard deviation) than their expenditures should have predicted. Two of those states were sparsely populated, suggesting that transportation costs and/or low student to teacher ratios may have had something to do with it.



More than they paid for. . .

Seven states got a standard deviation of achievement or more than their expenditures predicted.

They may have been highly efficient.

They may have had “underground economies,” as the Womack studies of 1990, 2002, and 2014 (Womack, Hanna, Pepper, Ibrahim, & Woodall) found in Arkansas . . .

Or they may be near the end of their momentum from earlier, higher spending, and be about to start downward because of the natural effects of a lack of resources. “Snapshot” investigations are not likely to find those emerging trends.

Paid more, got more . . .

Five states paid more than a standard deviation above the national average per ADM, and their students achieved more than a standard deviation above the national average ACT scores.

These are the stories the MSM media don't mention very often.



Spent Less, Got Less . . .

Three states spent less than within a standard deviation of the national average per ADM, and their students scored further than a standard deviation on the average below the national average.

Looking at which states those were, those tended to be states that chronically under-fund education in comparison to other states. Over long periods of time, they have usually ranked nearest the bottom in ACT achievement in state-to-state comparisons.

The cost of achievement

This reasoning is getting close to a cause-and-effect one, and we will apply some restraints. But using 35-state data, in the range between \$8712 and \$14531, each additional \$166.26 on the average was at least associated with an increase in average ACT scores of 0.13 ACT points.

One factor that bears watching is *how* we are spending the money. If test scores are what the public wants, we need to spend the money on academics that lead to test scores.

Pointers for purchases

Really scrutinize purchases for extra-curriculars. Dollars spent on things that have a distant relationship to ACT-measurable outcomes take money away from materials needed for student learning. We have been in an accountability environment since *The Nation at Risk* report of 1983s. It's more than time to recognize this.

Spend money on things that have a research link to increased test scores. The best publishers etc. are paying for research to demonstrate this. Their research becomes part of the purchase price. There is little reason to buy books etc. that have not demonstrated their effectiveness in student learning.

Discussion time

With those things said, what kinds of purchases can you think of that seem to meet those criteria?

What would you put in your library?

What kinds of software would you put on your Local Area Network?



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