



# Every State's Economic Future Lies with School Reform

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## Key Points

- A key element of any successful economy, whether a nation or a state, is the quality of its workforce.
- The economic gains to each state from improving its schools are enormous and justify significant changes in state policies.
- Simply increasing funding for schools, one oft-proposed solution, is unlikely to lead to increased academic performance unless more attention is given to how money is spent. If improvements are to be realized, existing incentives for teachers and leaders must be changed instead.

Education has long been thought of as an important component of any economic development strategy. Because of the central role of workers' skills in local economies, people have always looked to schools to promote development. This attention is without doubt correctly placed, at least if proper attention is paid to quality issues.

Recent research highlights two dimensions to this discussion. First, there has been growing and correct appreciation of "high-quality" education. It is possible to push up graduation rates if there is no regard for graduates' skills and achievements, but if workers' skills are not appropriate for the modern economy, this solution will not be sufficient for economic development. Second, the relative quality of workers is an important element in explaining state income differences and determining future economic growth rates.

We know that workers' cognitive skills are a dominant factor in international differences in income and long-run growth.<sup>1</sup> Importantly, recent extensions of this to economic outcomes across

states shows the same dependence on a highly skilled workforce.<sup>2</sup>

One of the further implications of this research into the economic circumstances of states is that there is a clear metric for development: the measured achievement of workers, which in turn reflects the performance of schools. A corollary of this is that states should place their policy emphasis on improving schools. Even states that have historically faced a high rate of outmigration of skilled people can parochially benefit economically from improved schools because sufficient numbers of their own students will remain.

The route to this improvement will of course be difficult, but we also know that it is possible. Many past efforts have failed, but some states have done noticeably better than others and provide a guide to improvement. For example, we know that simply spending more on schools without changing policies and incentives has not been a successful strategy. *How* educational funds are spent proves to be more important than how *much* is spent.

## Cognitive Skills and Economic Gains

In simplest terms, a key element of any successful economy, whether a nation or a state, is the quality of its workforce. For state policy, two economic impacts of education are relevant. The first is simply the impact on individual citizens: How different are economic outcomes if an individual has more human capital? The second involves the macroeconomic outcomes for the state: How is state economic development altered by changing the human capital of the state? The impact of education on individuals has been extensively studied, so this discussion focuses on the aggregate picture.

While policy discussions of state economic development span a variety of topics, a primary state policy instrument is invariably the nature and performance of public schools. Unfortunately, most analysis of state development suffers from poor and indirect measures of schooling outcomes. Instead of actually measuring the skills of individuals, many studies rely on a simple proxy: school attainment, as measured by the average years of schooling of the population. This measure has prima facie support because a primary purpose of schooling is increasing the skills (e.g., ability to read, write, and do basic math) of citizens. But while it is a convenient measure to use because of its ready availability in individual, state, and national data, it is also an imprecise and potentially misleading measure of skills.

School attainment (in years) is not synonymous with skill attainment because time in school coincides with a wide range of learning outcomes. The National Assessment of Educational Progress (NAEP) provides a way to compare the learning accomplished in different states. By conventional estimates, the average difference in NAEP scores between students in the best- and worst-performing states corresponds to around three years of schooling; that is, the average eighth grader in Louisiana is at about the fifth grade level in Massachusetts. Using school attainment as a proxy for measurement of skills obscures the fundamental role of skills in determining economic growth. More importantly, it sidetracks discussion away from school quality.

This discussion builds on new estimates of the human capital stock of workers in each state that combine school attainment and achievement for workers. While school attainment of the labor force is readily available from census data, achievement

is not. Regularly testing students in each state with the NAEP provides information on workers who live in the same state in which they were educated, but this information gives an inaccurate picture of the overall skills of the adult workforce because of extensive migration across states and immigration of workers from abroad.

For the median state in 2007, less than 60 percent of those born in the state still live there as an adult. The variation is also substantial: States range from less than 20 percent (Nevada) to almost 80 percent (Louisiana). Similarly, immigration into the US has increased over time, and the pattern of immigrants across states has widened. The percentage of state residents not born in the United States in 2007 ranges from almost zero in West Virginia to over 30 percent in California.

While the details are beyond this discussion, it is possible to estimate the distribution of workers' skills across states by tracing workers back to their place of education. Such calculations use historic test scores for students in each state (NAEP) and in foreign countries (the Programme for International Student Assessment).

Once done, this information permits analysis of how aggregate income levels across states relate to workers' skills. For the nation as a whole, we find that differences in workers' human capital account for 20–35 percent of the current variation in per capita gross domestic product (GDP) among states, with roughly equal contributions by school attainment and cognitive skills. In some ways, this role of human capital in the variation in GDP is surprisingly large because both labor and capital are free to move across states and thus tend to equalize rewards to workers of different skills.

For policy purposes, however, it is more important to know how student performance filters into future economic development. It is possible to use the historic measures of the human capital stock that incorporate migration and immigration to explain state growth in GDP per capita from 1970 to 2010. The overall results of this growth estimation are remarkably similar to the international findings.

Figure 1 shows the net effect of cognitive skills on annual state growth in GDP per capita. The plotted relationship reflects an underlying statistical model that has controlled for 1970 GDP per capita in each state and for school attainment. Including initial state

income allows for the fact that states starting behind can grow faster just by copying what more advanced states are doing. Including attainment makes it possible for level of schooling to provide some additional information, but attainment is always statistically insignificant once measures of what is actually learned are included. Importantly, the estimated growth model for states produces exactly the same results as the international estimates explaining cross-country growth differences.

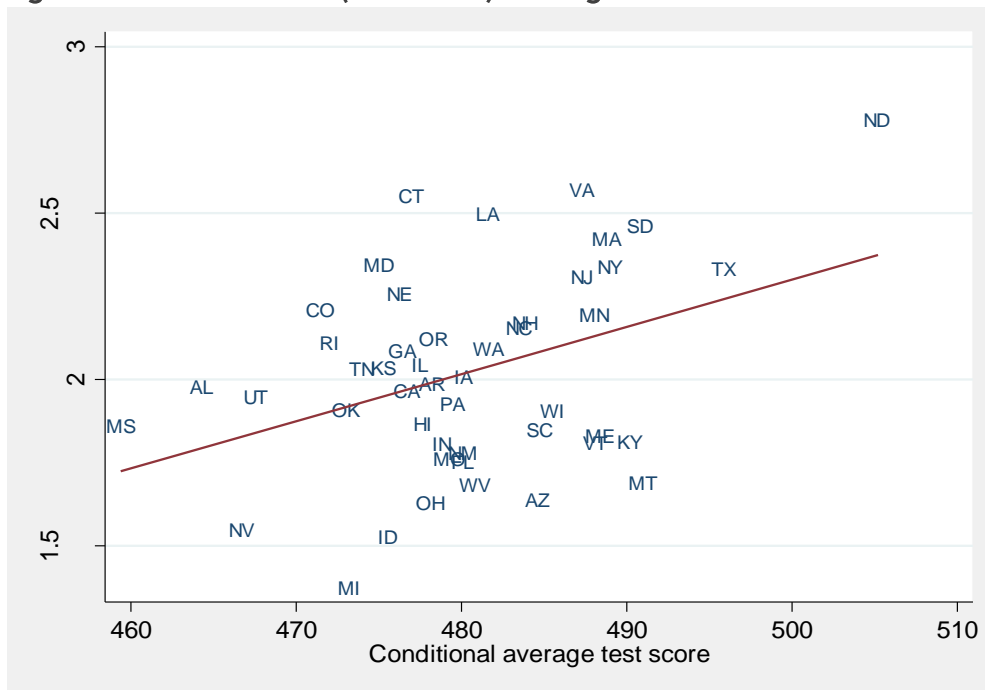
### Gains from School Improvements

It is possible to use this growth relationship to project economic impacts from improving the quality of schooling in each state. First, we can estimate the expected future growth of a state with the current worker skill level. This growth can then be compared to the growth that would be achieved with better schools according to various improvement scenarios.

The estimated impact uses the previously estimated state growth models and projects GDP per capita. The gains in GDP do accrue in the future, so in a standard way the calculations give more weight to near-term gains than gains in the more distant future (i.e., all are put into present-value terms).

The projections take school dynamics and their impacts on the economy seriously. Table 1 summarizes the projected impact of three alternative improvement plans for states.<sup>3</sup> In the simplest projection, each state is assumed to lift the level of performance to that of the best US state (currently Massachusetts, but it was Minnesota over the past two decades). This improvement is assumed to take 10 years so that programs and personnel can be changed. However, it also takes time for the higher-achieving students to enter the labor market and become a significant share of the labor force.

**Figure 1. Economic Growth (1970–2010) and Cognitive Skills Across States**



Note: This is an added-variable plot of a regression of the average annual rate of growth (in percentage) of real GDP per capita in 1970–2010 on the initial level of (log) real GDP per capita in 1970. The average test scores were adjusted for internal migrants by education and international migrants by selectivity, average years of schooling in 1970, and (log) real physical capital per worker in 1970 (mean of the unconditional variables added to each axis). Source: Eric A. Hanushek, Jens Ruhose, and Ludger Woessmann, “Economic Gains from Educational Reform by US States,” *Journal of Human Capital* 11, no. 4 (Winter 2017): 447–86.

**Table 1. Summary of Economic Impacts of School Improvement Across All States**

	Present Value of Reform (Billion Dollars)	In Percentage of Discounted Future GDP
All States to US Best	75,938	9.0
All States to Division Best	35,648	4.2
All Student to at Least NAEP Basic	32,229	3.8

Source: Eric A. Hanushek, Jens Ruhose, and Ludger Woessmann, "Economic Gains from Educational Reform by US States," *Journal of Human Capital* 11, no. 4 (Winter 2017): 447–86.

If all states rose to the level of Minnesota—which is feasible since Minnesota already reached that goal—then, using the historic growth relationship, the present value of the added GDP from growth is estimated to be some \$76 trillion. (Today’s US GDP is \$20 trillion.)

Clearly, getting all states to the nation’s best in 10 years would be difficult, so consider the alternative of each state improving to the best in its region. Here the present value of added GDP would still be a healthy \$36 trillion.

An alternative is bringing up the bottom of the distribution, as called for by No Child Left Behind (NCLB), the former federal accountability system. This improvement, if accomplished 10 years from now instead of in 2013 as called for in NCLB, is estimated to yield an average GDP over the remainder of this century that is almost 4 percent higher than what is expected with no improvement in schools. (Four percent is almost the same in present-value terms as getting all states to the regional best.)

## About the Author

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These projections consider a situation in which all states improve over the next 10 years, but the large gains hold for each state operating independently. If only one state improves, all the workers moving in from other states are not improved, and the state has to absorb the loss of its students who move out. Nonetheless, it still pays handsomely in terms of future economic gains if a state improves its schools.

## Some Conclusions

The gains from improvement, according to historical impacts on state economies, are enormous, and states should be willing to make substantial changes to achieve these gains. Improving the quality of schools is a difficult task that demands policy attention. Simply increasing funding for schools, one oft-proposed solution, is unlikely to improve academic performance unless more attention is given to how money is spent.

The gains from growth do take time to be realized. But one of the biggest threats to schools in many states is the insolvency of the pension funds for teachers. The pattern of rising pension costs also comes in the future, and the growth due to better schools mirrors the patterns of pension problems.

Without going into details, extensive research has shown that the key is improving the quality of the teachers and leaders in the schools.<sup>4</sup> In the past, however, salaries and incentives for these personnel have not been directly related to student performance. And the wave of teacher strikes and teacher salary increases recently seen in various states has done nothing to change this. If improvements are to be realized, past evidence indicates that existing incentives for teachers and leaders must be changed.

## Notes

1. Eric A. Hanushek and Ludger Woessmann, *The Knowledge Capital of Nations: Education and the Economics of Growth* (Cambridge, MA: MIT Press, 2015).
2. Eric A. Hanushek, Jens Ruhose, and Ludger Woessmann, “It Pays to Improve School Quality: States That Boost Student Achievement Could Reap Large Economic Gains,” *Education Next* 16, no. 3 (Summer 2016): 16–24; Eric A. Hanushek, Jens Ruhose, and Ludger Woessmann, “Economic Gains from Educational Reform by US States,” *Journal of Human Capital* 11, no. 4 (Winter 2017): 447–86; and Eric A. Hanushek, Jens Ruhose, and Ludger Woessmann, “Knowledge Capital and Aggregate Income Differences: Development Accounting for U.S. States,” *American Economic Journal: Macroeconomics* 9, no. 4 (October 2017): 184–224.
3. The projection methodology and its interpretation is discussed in detail in Hanushek, Ruhose, and Woessmann, “Economic Gains from Educational Reform by US States.”
4. See, for example, Eric A. Hanushek, “School Human Capital and Teacher Salary Policies,” *Journal of Professional Capital and Community* 1, no. 1 (2016): 23–40.

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