

Achievement Growth:

International and U.S. State Trends in Student Performance

Eric A. Hanushek • Paul E. Peterson • Ludger Woessmann



This Report is available at:

www.hks.harvard.edu/pepg/PDF/Papers/PEPG12-03_CatchingUp.pdf

Condensed essay available at: <http://educationnext.org>

Purpose of Study

Identify variation in achievement growth in math, science and reading among countries and among states within the United States since the early 1990s.

Commitment to Achievement Growth

- Nation at Risk (1983)
 - Stem a rising tide of mediocrity.
- George H. W. Bush and all Governors (1989)
 - Bring U. S. achievement up to top of world by 2000.
- Clinton: Goals 2000:
 - “All Americans can reach international competitive standards.”
- Bush: No Child Left Behind
- Obama: “We know what it takes to compete for the jobs and industries of our time. We need to out-innovate, out-educate, and out-build the rest of the world.”

Importance of Study



“Human capital will determine power in the current century, and the failure to produce that capital will undermine America’s security.”

— *Independent Task Force Report,*
Condoleezza Rice, co-chair,
Council on Foreign Relations

Sources of Information

- 1) National Assessment of Educational Progress (NAEP), administered by the U.S. Department of Education;
- 2) Programme for International Student Assessment (PISA), administered by the Organisation for Economic Co-operation and Development (OECD);
- 3) Trends in International Mathematics and Science Study (TIMSS), administered by the International Association for the Evaluation of Educational Achievement (IEA); and
- 4) Progress in International Reading Literacy Study (PIRLS), also administered by IEA.

Methodology

- United States participated in both the NAEP 2000 tests and the PISA 2000 tests, and the United States also participated in TIMSS and PIRL, so it was possible to place all performances on a common scale.

Twin Analyses

International analysis:

Average student growth in math, reading and science between 1995 and 2009 for 49 countries on 28 international tests administered to students at ages between 9 and 15.

U. S. state analysis:

Reports for state average annual student growth in same subjects on NAEP between 1992 and 2011 for 41 states in 4th and 8th grade.

Growth calculated in standard deviations

- Statistical concept that allows for comparisons across tests.
- 100 % of standard deviation =
 - About 4 years worth of learning between 4th and 8th grade.
 - A bit larger than the difference in math performance between the United States and the top performing countries in world

Main Findings

Annual gains by U. S. between 1995 and 2009 are 1.6 percent of a standard deviation. Over 14-years that adds up to 22 percent of std. dev.

That is middling—24 countries do better, 24 countries do worse

Figure 1. Overall annual rate of growth in student achievement in math, reading, and science in 49 countries, 1995–2009



Countries with high achievement growth (% of std. dev. per year)

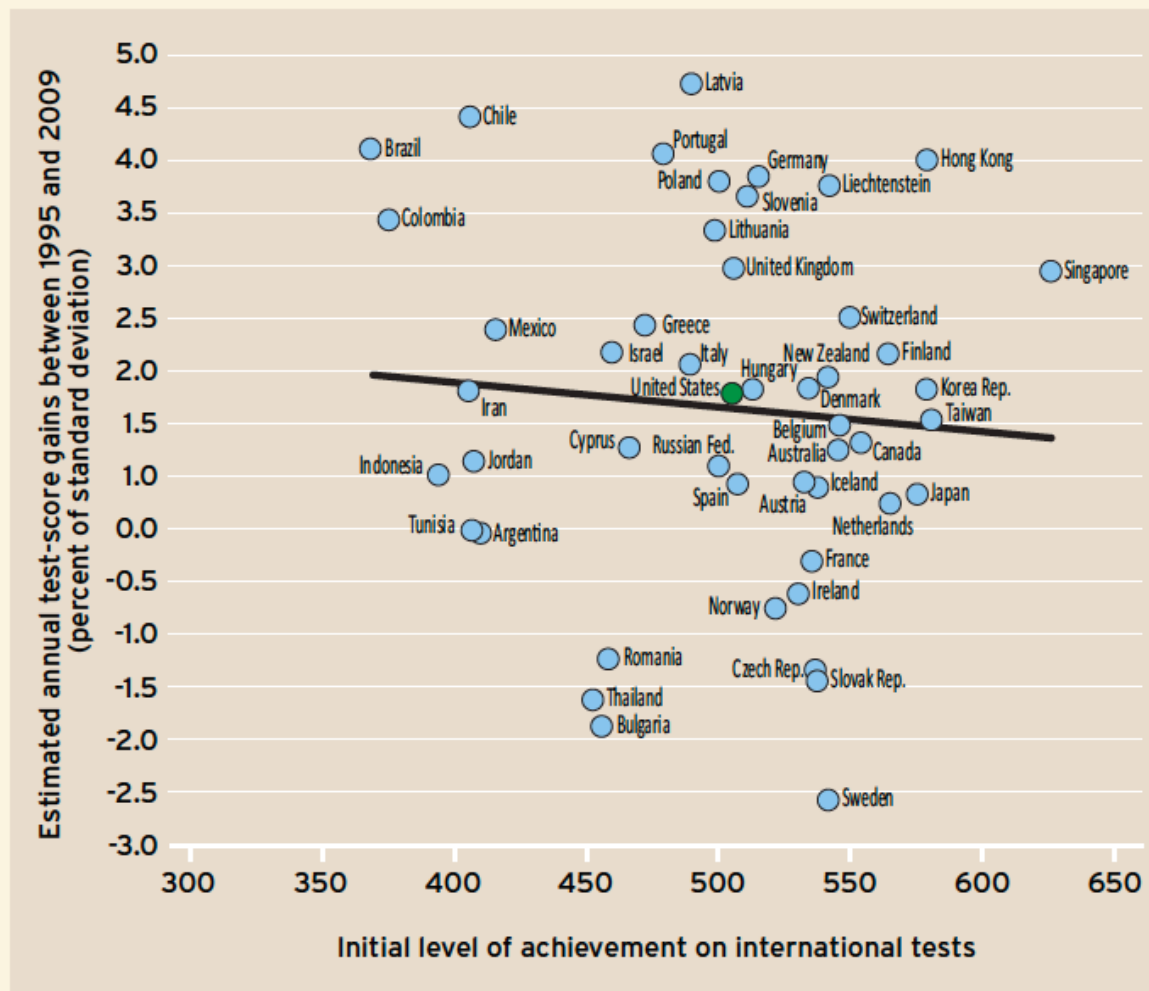
- Latvia (4.7% std.dev.)
- Chile (4.4)
- Brazil (4.0)
- Portugal (4.0)
- Hong Kong (3.9)
- Germany (3.8)
- Poland (3.7)
- Liechtenstein (3.7)
- Slovenia (3.6)
- Columbia (3.3)
- Lithuania (3.2)
- United Kingdom (2.8)

Have we painted too rosy a picture?

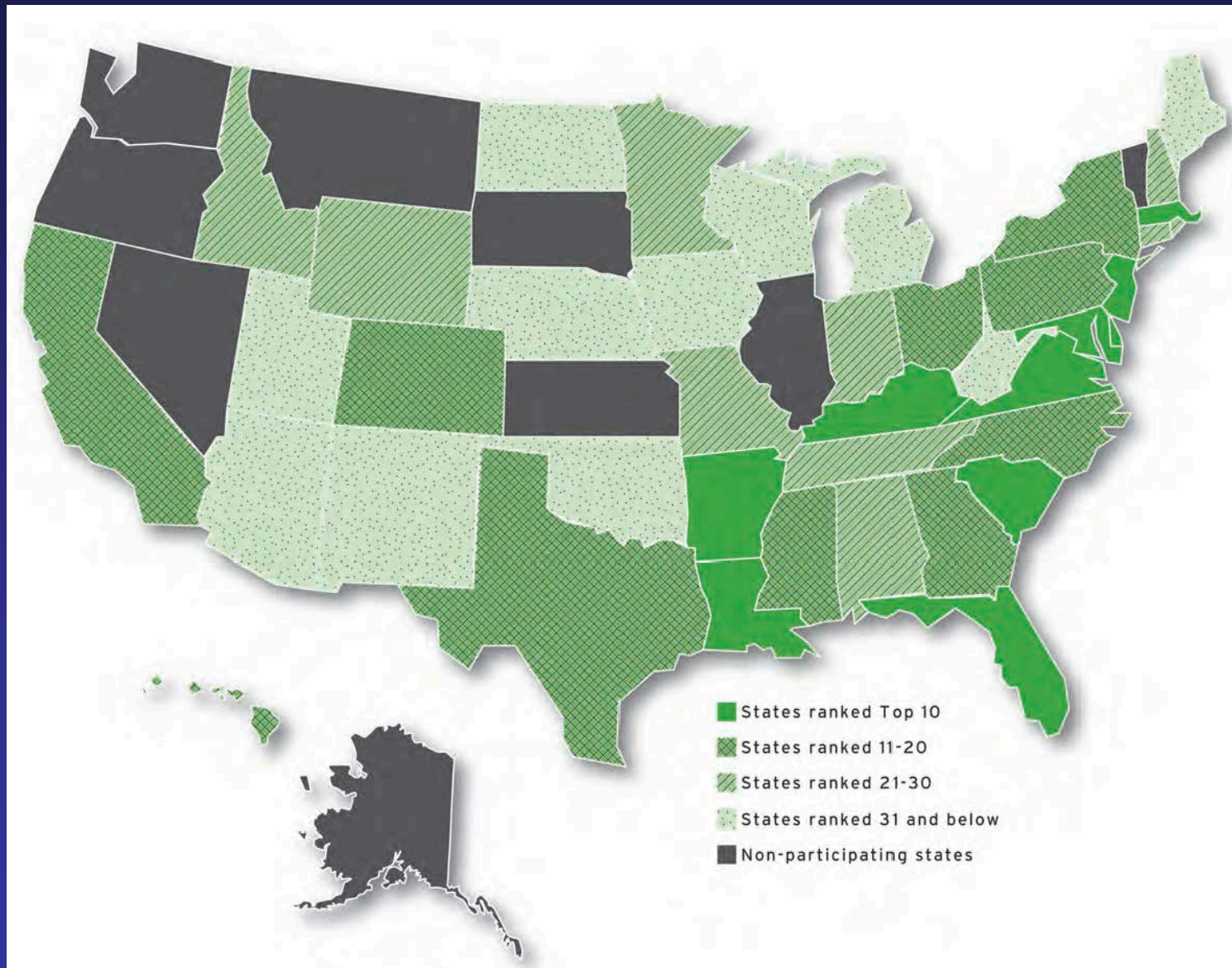
- U. S. growth:
 - All scores (NAEP standard): 1.6% s. d. annual growth; 29th place
 - 8th grade scores: 1.0% s. d. annual growth; 21st place.
 - All scores (PISA standard): 0.5 % s. d. annual growth; 26th place.

Does Catch-up explain Growth?

Figure 7. Relationship between a country's initial level of student achievement and its growth rate, 1995–2009



State Rankings on Growth Rates: 1992-2011



Which states did not participate?

Study based on 41 states. The following 9 states did not participate:

Washington

Oregon

Nevada

Montana

South Dakota

Illinois

Vermont

Alaska

Kansas

Which states performed best?

3.3% std. dev.



3.2% std. dev.

3.2% std. dev.

Massachusetts was a close 4th (3.1% std. dev.)

Which states gained the least?

Nebraska

Wisconsin

Oklahoma

Maine

Iowa

Achievement Growth in Selected States

State	Growth Rate (% of std. dev.)	Rank among 41 states
New Jersey	2.7 %	7
California	2.3	17
Texas	2.3	18
New York	2.2	19
Colorado	2.2	20

Do improving states treat high performing and low performing students equally?

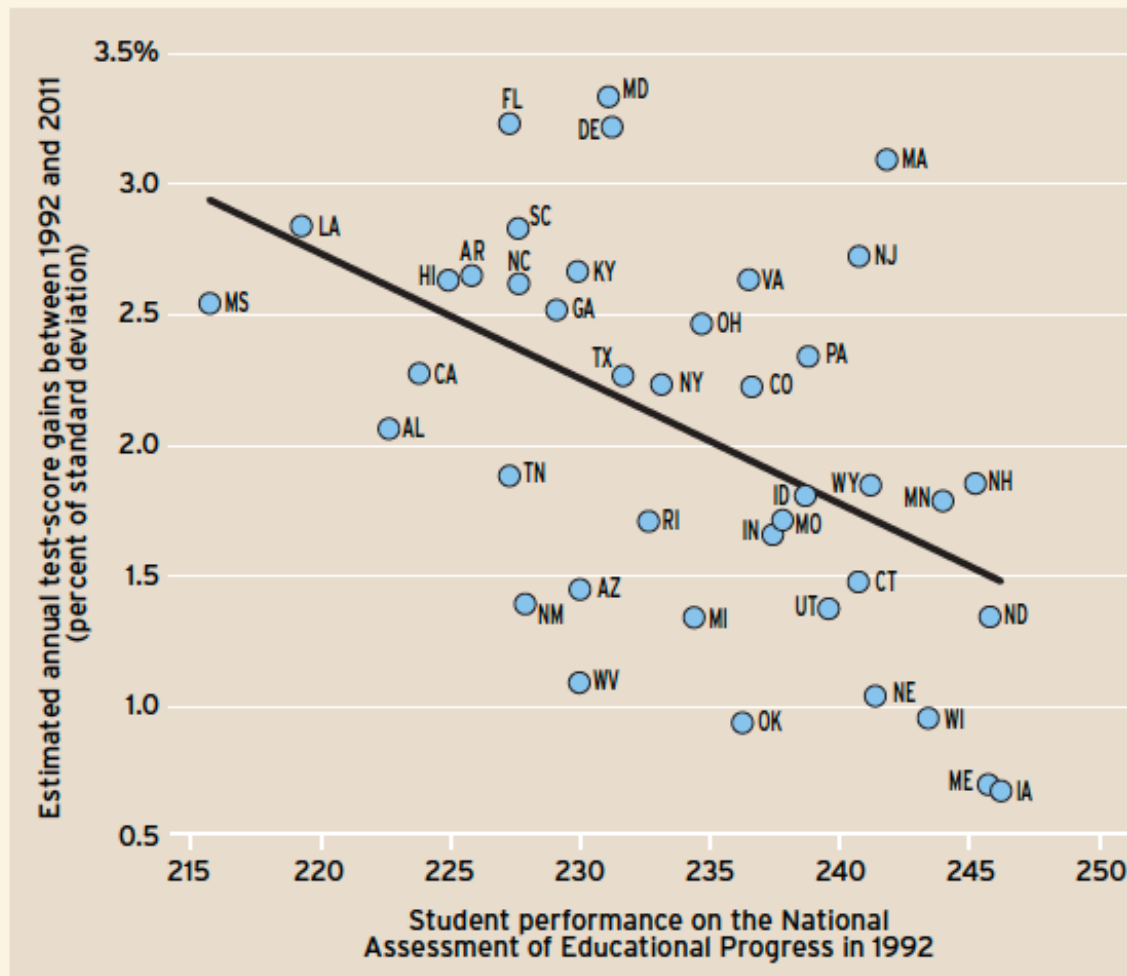
Figure 6. Relationship between percent reduction in percentage of students in state performing below basic and below proficiency in math at 8th grade on NAEP



* see Table B.2 for numerical value

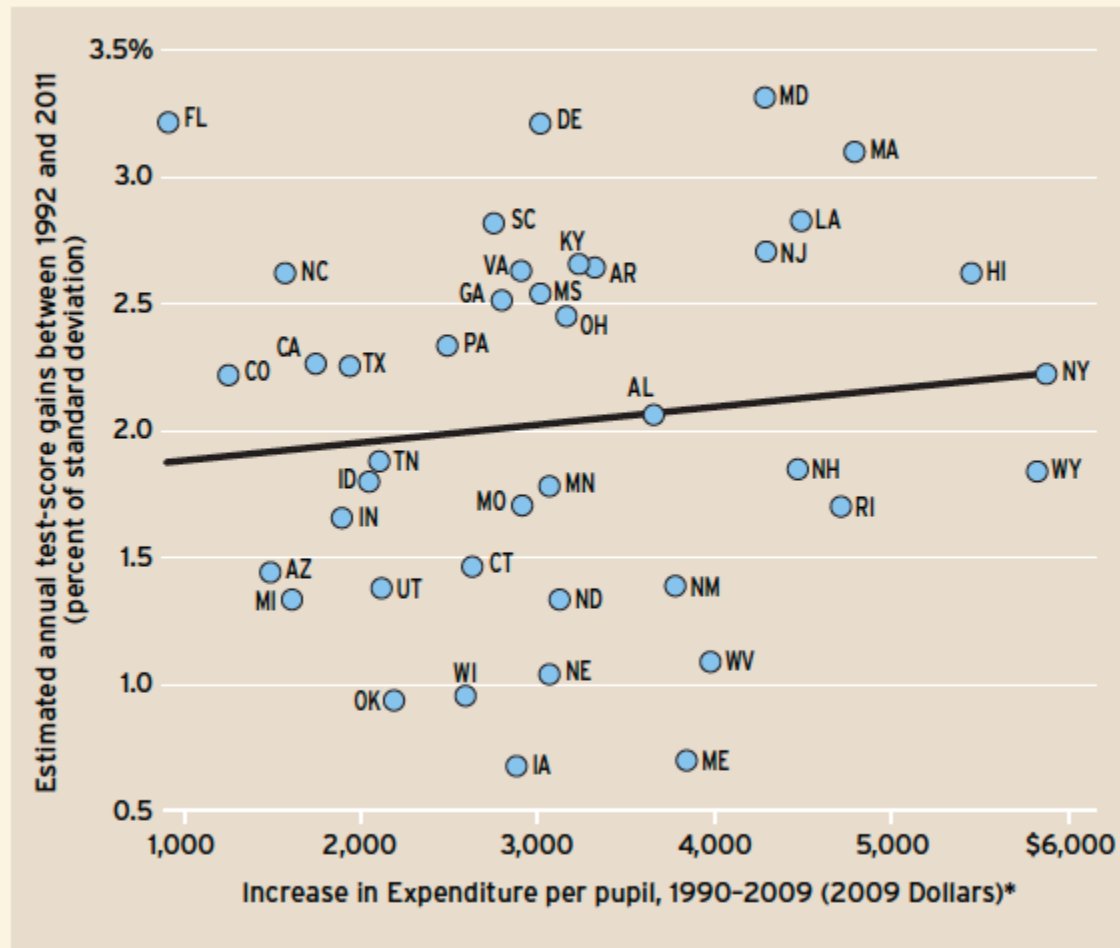
Does catch-up explain state growth?

Figure 8. Relationship between a state's initial level of student achievement and its growth rate, 1992–2011



Do additional expenditures explain growth

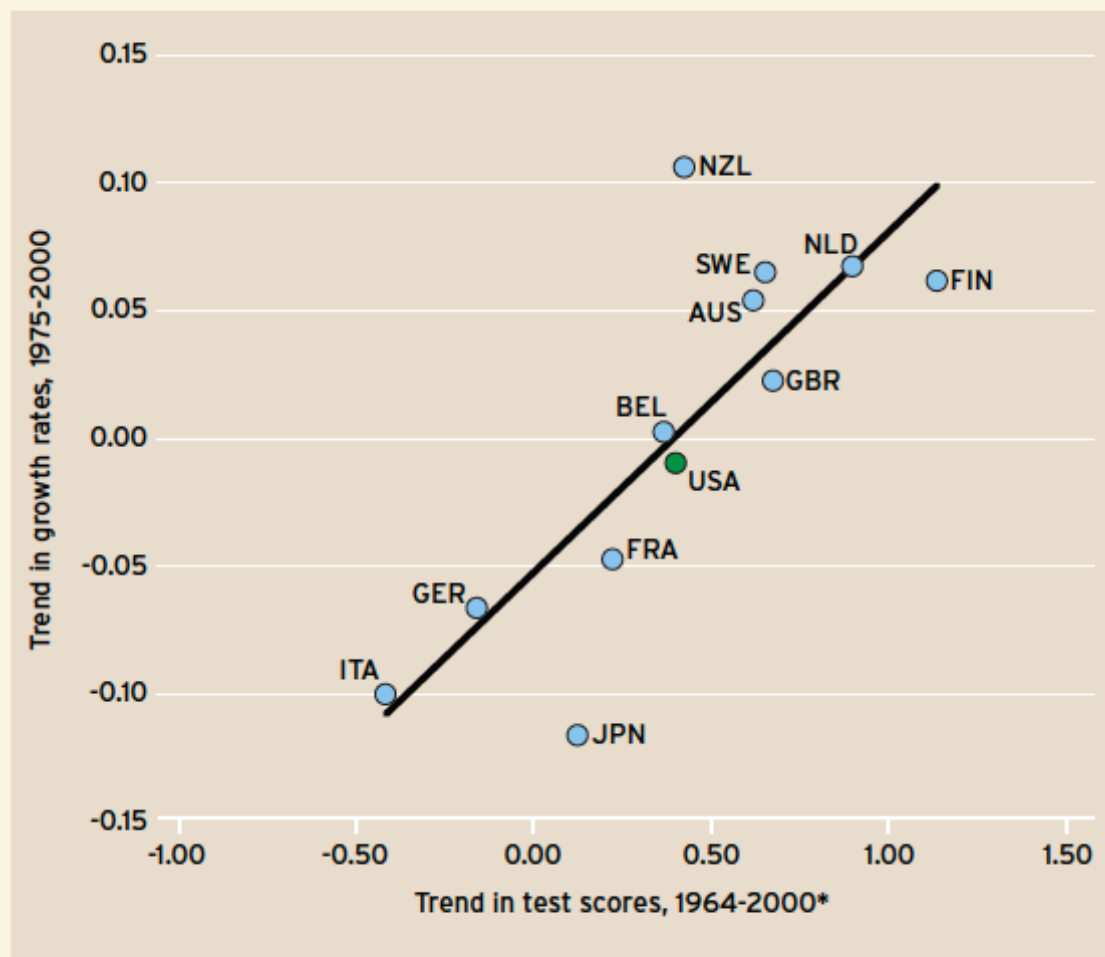
Figure 9. Relationship between increments in state expenditures per pupil and gains in student achievement, 1990–2008



*Change in expenditure per pupil adjusted for inflation; *Digest of Educational Statistics, 2011*

Achievement Growth and Economic Growth

Figure 10. International trends in test scores and trends in economic growth



SOURCE: Hanushek and Woessmann (forthcoming)

*Original test score observations in 1964; scores in some countries observed later

Importance of the Findings

“America faces many challenges...but the enemy I fear the most is complacency. We are about to be hit by the full force of global competition. If we continue to ignore the obvious task at hand while others beat us at our own game, our children and grandchildren will pay the price. We must now establish a sense of urgency.”

—Charles Vest, Former President,
Massachusetts Institute of Technology



What needs to be done?

- The purpose of this report is to document the nature and urgency of the situation.
- Elsewhere, the authors have identified a variety of strategies to improve school quality.

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