U.S. Math Performance in Global Perspective

How well does each state do at producing high-achieving students?

Eric A. Hanushek
Paul E. Peterson
Ludger Woessmann

Report Available:

www.hks.harvard.edu/pepg/PDF/Papers/PEPG10-19_HanushekPetersonWoessmann.pdf

Brief, interpretative article available at educationnext.org

educationnext.org provides a display that shows each state's ranking

Purpose of Study

Compares percentage of students performing at advanced level in math in U.S. and in each state with the percentage advanced in other countries.

Importance of the Study

"Leadership tomorrow depends on how we educate our students today, especially in math, science, technology, and engineering."

—Barack Obama

Methodology

- United States participated in both the NAEP 2005 math test and the PISA 2006 test, so it is possible to equate the two tests by looking at the PISA score that is equivalent to the score needed to be identified as advanced on the NAEP. PISA score of 617.1 points is equivalent to score needed for NAEP to identify student as advanced.

Why Compare U. S. Math rather than Reading or Science?

1) Substantive Reason: Research has shown that math skills especially critical for both an individual's and an economy's well being.

2) Methodological Reason: Performances in math are more readily compared across countries and cultures than are performances in other subjects.

Data for High School Graduating Class of 2009

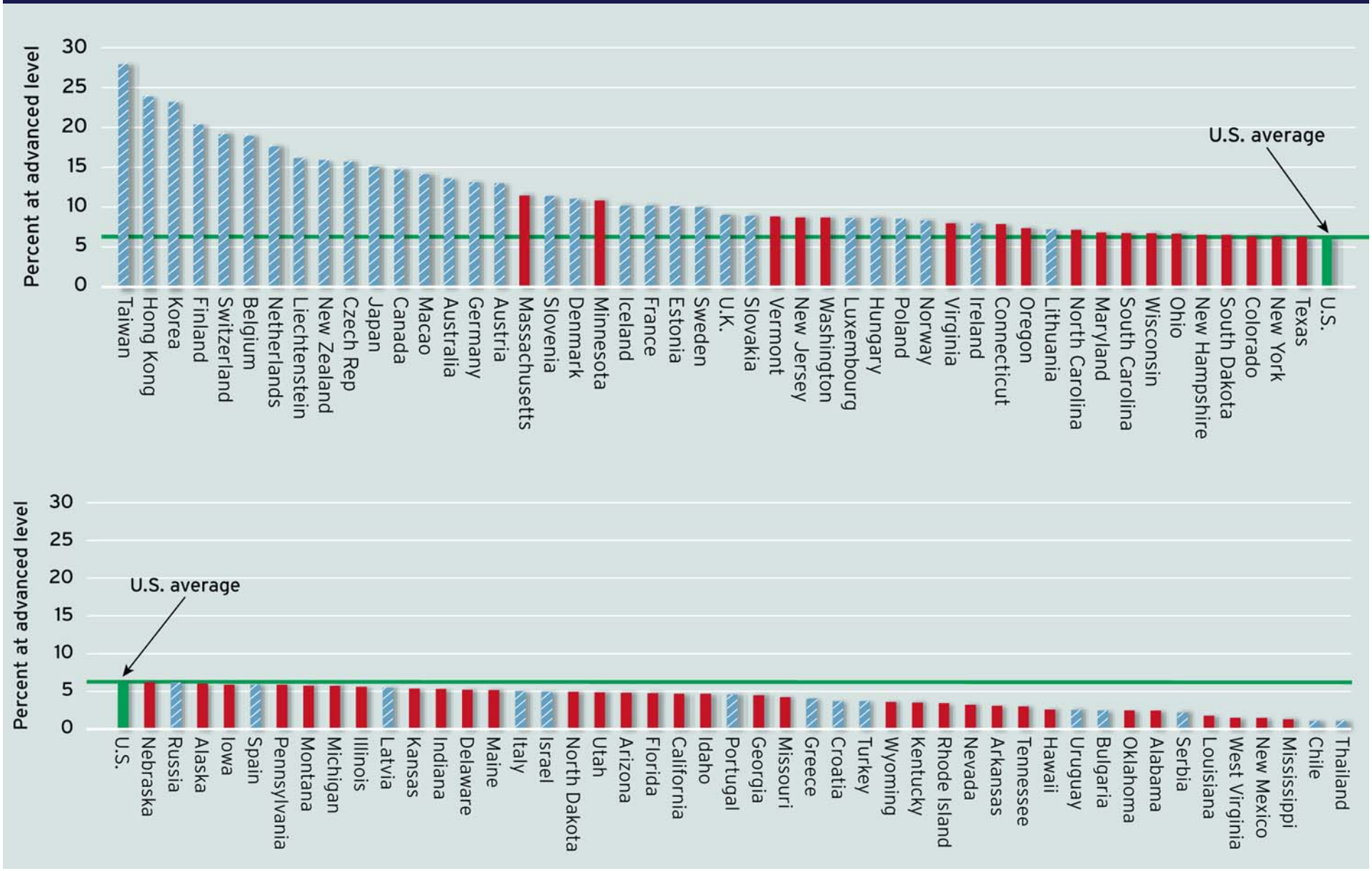
1) National Assessment of Educational Progress (NAEP), 2005, 8th graders

2) Program for International Student Assessment (PISA), 2006, 15 year-olds (9th grade)

Main Finding

Percent of U.S. students advanced is 6%, placing it in 31st place among 56 countries.

Figure 1: Percentage of students at advanced level in math in U.S. states and countries participating in PISA 2006.



Countries with more than twice as high a percentage of advanced students as United States

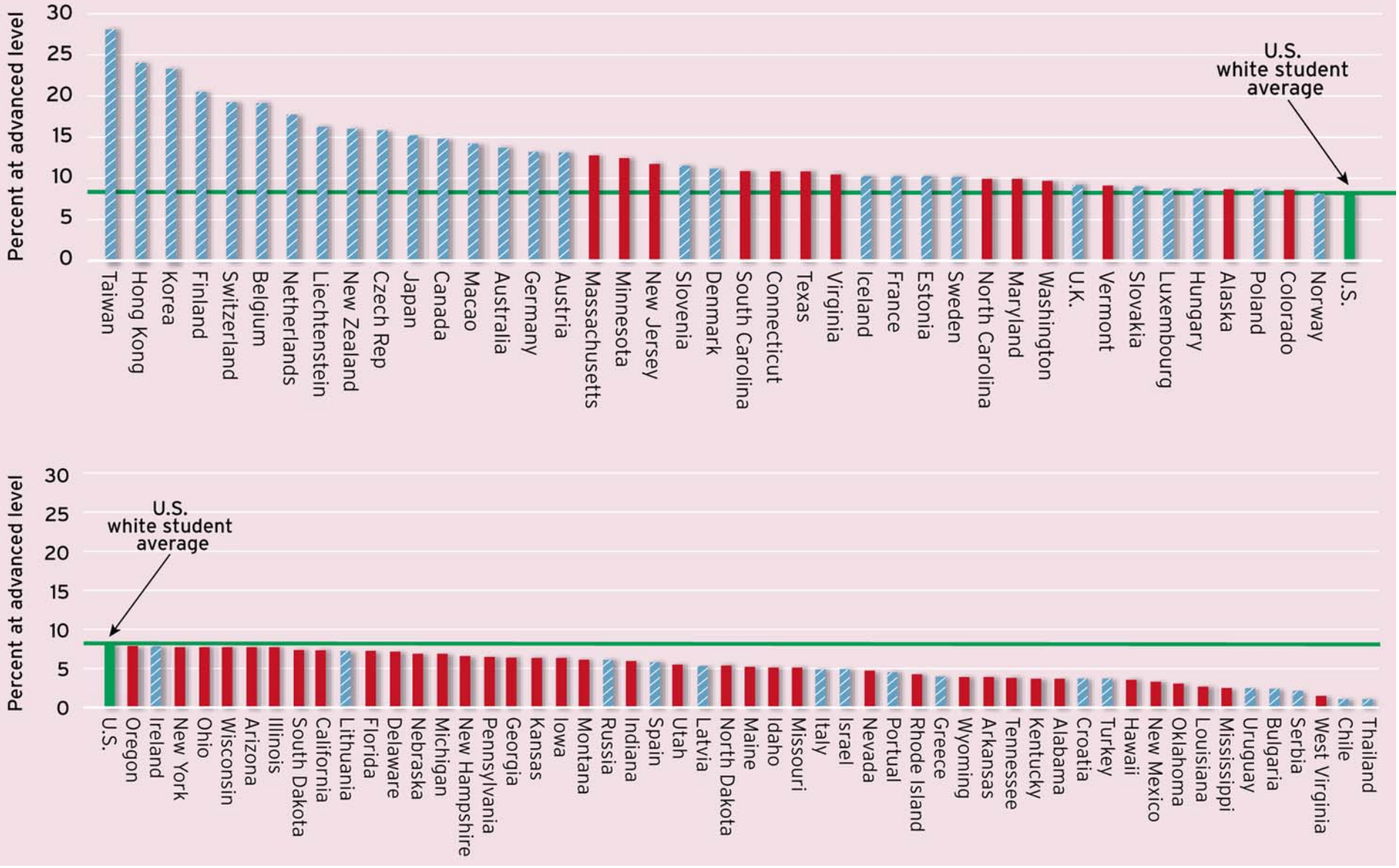
- Taiwan (28%)
- Hong Kong (24%)
- Korea (23%)
- Finland (20%)
- Switzerland (19%)
- Belgium (19%
- Netherlands (18%)
- Liechtenstein (16%)
- New Zealand (16%)
- Czech Republic (16%)
- Japan (15%)
- Canada (15%)
- Macao (14%)
- Australia (14%)
- Germany (13%)
- Austria (13%)

Rankings of Select States (all students)

State	Percent advanced	Significantly outperformed by
MA	11.4%	14
MN	10.8	16
VA	7.9	22
NY	6.3	29
TX	6.2	29
FL	4.6	32
CA	4.5	33
MS	1.3	42

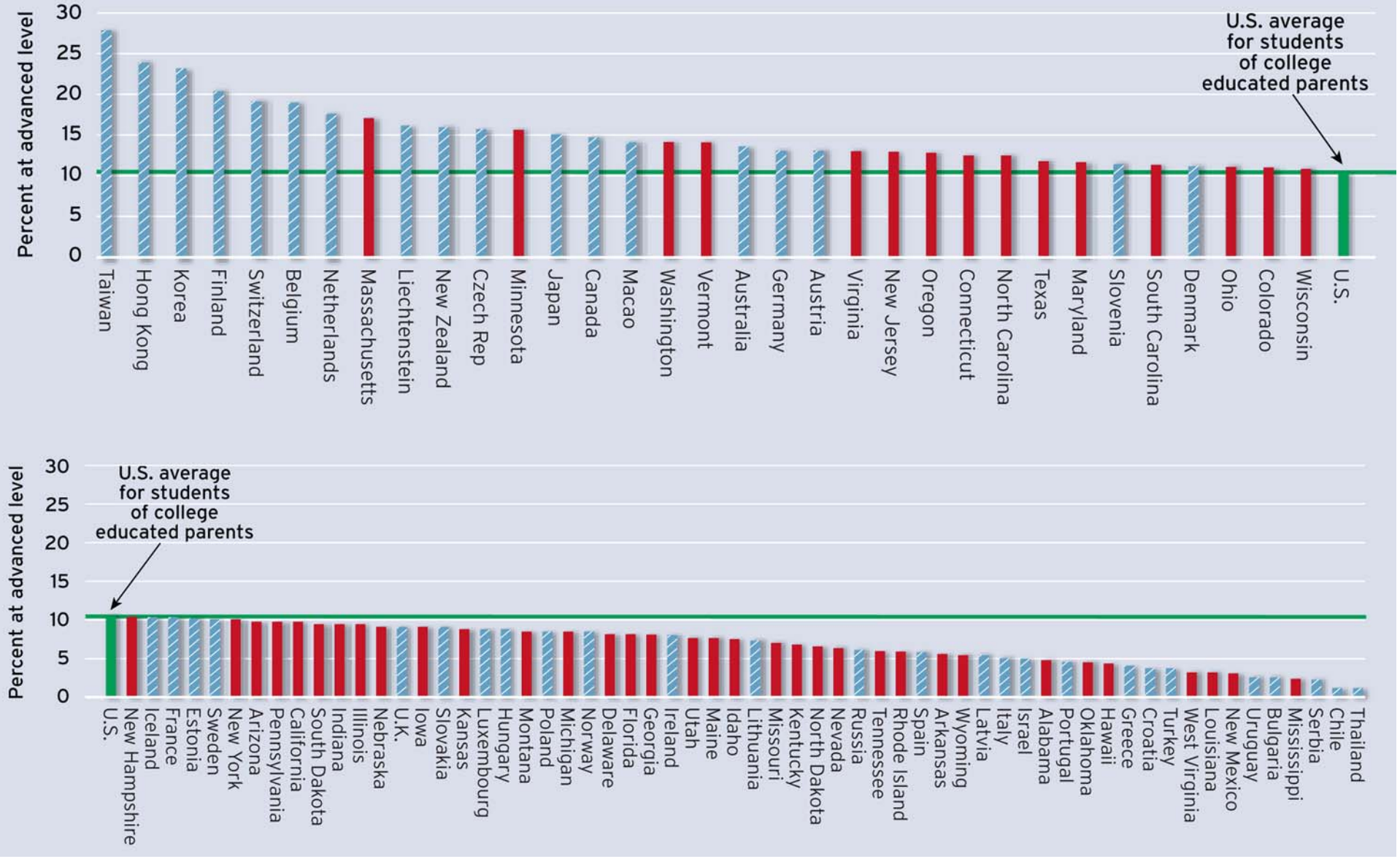
The low U.S. ranking is not simply due to its heterogeneous population. The percent of U.S. white students who are advanced is 8%, placing it in 29th place when compared to all students in the other countries.

Percentage of *white* students in U.S. states at advanced level in math and percentage of *all* students at that level in countries participating in PISA 2006.



The percent of U.S. students advanced among those from families where at least one parent has a college degree is 10%, placing it in 19th place when compared to all students in the other countries.

Percentage of *students with at least a college-educated parent* in U.S. states at advanced level in math and percentage of *all* students at that level in countries participating in PISA 2006.



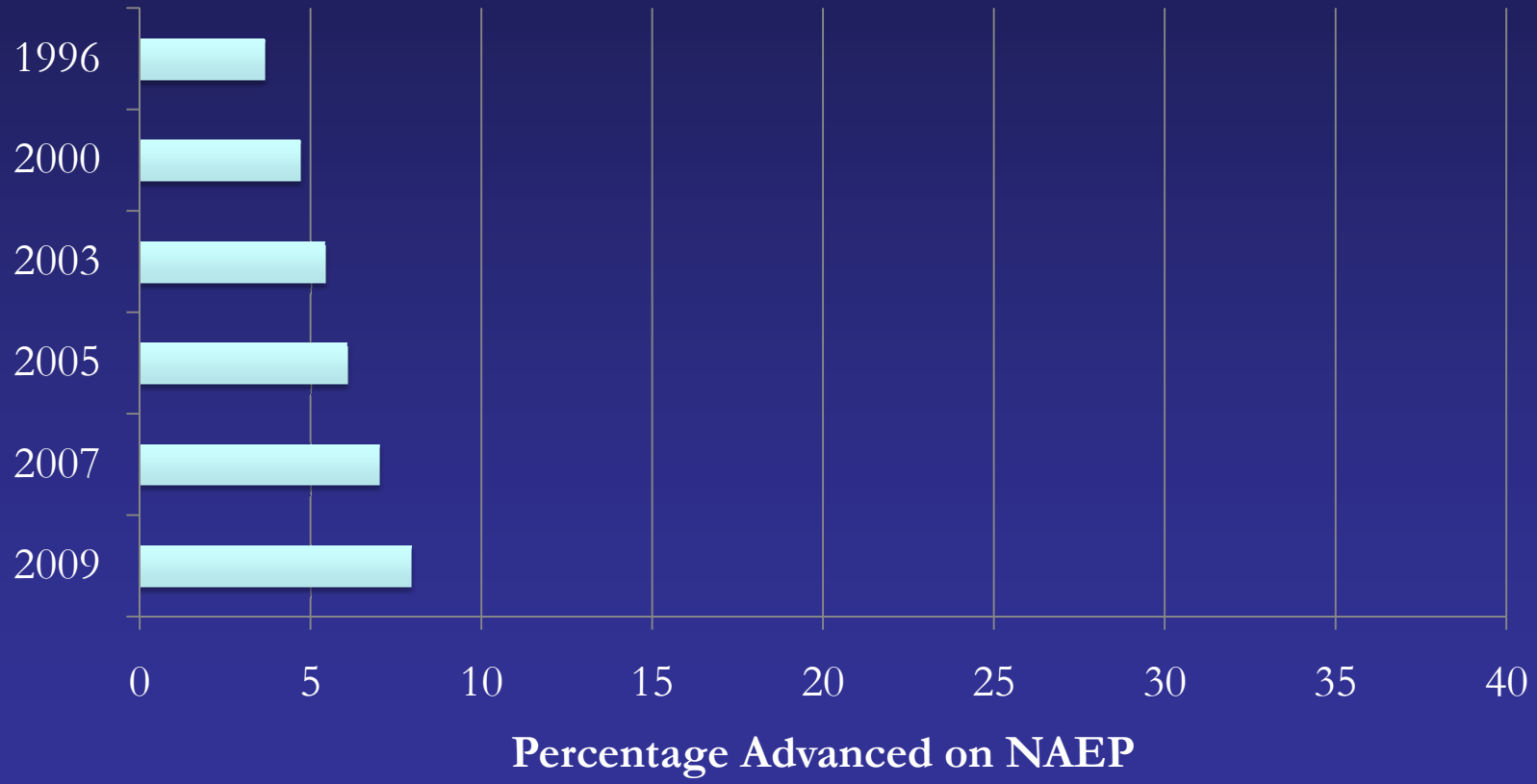
Rankings of Select States
(students with college educated parent)

State	Percent advanced	Significantly outperformed by
MA	17.1%	4
MN	15.7	5
VA	13.0	7
TX	11.7	14
NY	10.0	17
CA	9.5	17
FL	8.0	22
MS	2.2	38

Why did Phillips, 2009 (AIR) study find better results for U.S.?

Phillips compared student performance on TIMSS, not PISA. PISA has replaced TIMMS as study of choice in many advanced countries. 16 countries that outscored U.S. on PISA did not participate in TIMSS.

Is NCLB to Blame for Low Performance? Apparently not.



Importance of the Findings

"Unless the schools of the U.S. find the tools to bring students up to the highest level of accomplishment, it places the nation at risk in the international economy of the 21st Century."

—Bill Gates

Importance of the Findings

In 2006, the Science Technology Engineering and Math (STEM Education Coalition was formed to "raise awareness in Congress, the Administration, and other organizations about the critical role that STEM education plays in enabling the U.S. to remain the economic and technological leader of the global marketplace for the 21st Century."

What needs to be done?

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

The End

Percent Below Basic Level