

Return on Investment & Student Achievement

Prepared for the House Education Committee, Chairman Harry Brooks

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SELECTION OF STATES

A summary of the criteria used to identify states for consideration:

Return on Investment (States receive 1 point.)

1. States with largest return on investment based on OREA's internal analysis (2003-07)
2. States with largest return on investment based on U.S. Chamber of Commerce analysis (2003-04)

Student Achievement (States receive 1 point.)

1. States performing above expected levels of NAEP performance given student population (2003, 2005)
2. States with largest percentage point gains in NAEP over time based on RAND's 1990-2003 analysis.
3. States with largest percentage point gains in NAEP over time based on OREA's 2003-2007 analysis.
4. States with highest NAEP scores over time based on OREA's 2003-2007 analysis.

Comparison States

1. States with per pupil expenditures similar to Tennessee (2003-07)
2. States with family characteristics similar to Tennessee (1990-2003)

See page 6 for highest and lowest scoring states.

Indicators

Return on Investment

- 1) OREA Analysis – OREA calculated return on investment for 2003-2007 Per Pupil Expenditures and 2003, 2005, and 2007 NAEP Math and Reading scores. This calculation does not control for cost of living or student demographics.

OREA measured the gap between actual per pupil expenditures and expected per pupil expenditures needed to achieve each state's NAEP scores. OREA identified 10 states with the largest return on investment – states where expenditures were notably less than would be expected.

Based on national average scores and expenditures, each NAEP point “costs” an average of \$35.68. At this price per point level, Utah would have been expected to pay \$8,930 for their score of 250, but they spent \$5,243 – 41.29% less than expected.

| | Avg. NAEP Score (03,05,07) | Avg. Expenditure (2003-07) | Expected \$ | % Below Expected \$ |
|-----------------------|---------------------------------------|---------------------------------------|--------------------|----------------------------|
| Utah | 250.25 | 5,243 | 8,930 | 41.29% |
| Idaho | 251.58 | 6,337 | 8,977 | 29.41% |
| Arizona | 241.92 | 6,488 | 8,633 | 24.84% |
| Oklahoma | 245.42 | 6,645 | 8,757 | 24.12% |
| Tennessee | 243.67 | 6,713 | 8,695 | 22.79% |
| Mississippi | 236.58 | 6,634 | 8,442 | 21.42% |
| North Carolina | 250.58 | 7,109 | 8,942 | 20.49% |
| Nevada | 240.08 | 6,858 | 8,567 | 19.95% |
| South Dakota | 254.67 | 7,384 | 9,088 | 18.75% |
| Kentucky | 247.92 | 7,253 | 8,847 | 18.01% |

- 2) Leaders and Laggards: A State-by-State Report Card on Educational Effectiveness (U.S. Chamber of Commerce, February 2007) – The U.S. Chamber of Commerce divided the percentage of students scoring at or above the proficient level on the 4th and 8th grade NAEP reading and math tests in 2003 by 2004 state expenditures. The expenditures were adjusted for cost of living and student demographics. 10 states received an “A” in Return on Investment. (Tennessee’s grade = C.)

| State | Grade |
|----------------|-------|
| Utah | A |
| North Carolina | A |
| Washington | A |
| Minnesota | A |
| Virginia | A |
| Colorado | A |
| Massachusetts | A |
| Kansas | A |
| Idaho | A |
| Florida | A |

Student Achievement

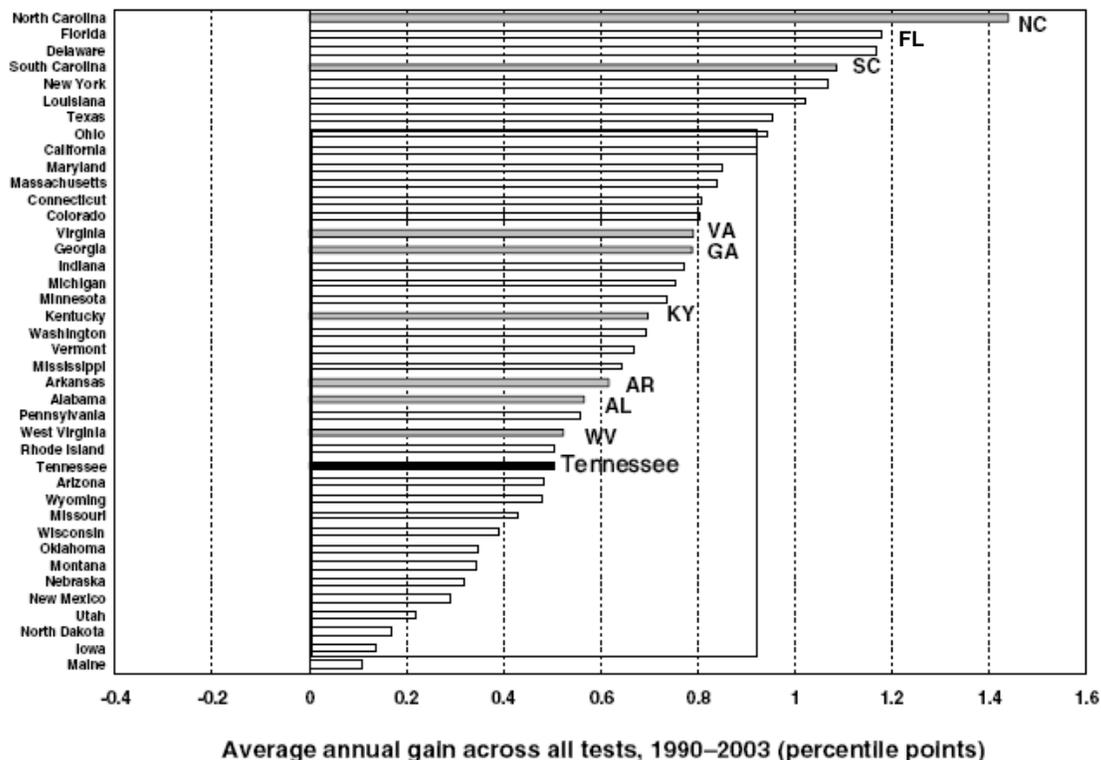
- 1) Leveling the Playing Field 2005: Identifying Outperforming and Underperforming States on the NAEP in Demographic Context (Standard and Poor's) – Standard and Poor's identified states that performed consistently above statistical expectations on 2003 and 2005 NAEP math and reading tests. 9 states exceeded statistical expectations on 1 or more tests both years with exclusion rates of students with disabilities or limited English proficiency of less than 5%.

| | Tests |
|----------------|----------------------------|
| Florida | Grade 4 Math |
| Kansas | Grade 4 Math, Grade 8 Math |
| Minnesota | Grade 4 Math, Grade 8 Math |
| Montana | Grade 8 Math |
| New York | Grade 8 Math |
| North Carolina | Grade 4 Math |
| Oregon | Grade 8 Math |
| South Carolina | Grade 4 Math |
| South Dakota | Grade 8 Reading |

Kentucky, Massachusetts, Texas, Delaware, and Oklahoma also exceeded statistical expectations but had exclusion rates of 5% or greater.

Tennessee was the only state not included in Standard and Poor's analysis. Tennessee did not report data on how many students receive free or reduced-price lunch to the National Center for Education Statistics (NCES) for 2002-03 or 2003-04.

- 2) Improving the Achievement of Tennessee Students: Analysis of the National Assessment of Educational Progress (RAND) – RAND calculated annual NAEP gains from 1990-2003. 7 states had annual gains that were statistically significantly larger than Tennessee's. (North Carolina gained over 1.4 percentage points per year, while Tennessee gained 0.5 percentage points per year.)



NOTE: Score gains within the box are not statistically different from Tennessee's at the 90% level of confidence.

- 3) OREA Analysis – NAEP gains, 2003-2007
 OREA compared state NAEP gains (in 4th math, 4th reading, 8th math, and 8th reading from 2003 to 2005 and 2005 to 2007) to national average gains. OREA identified the 10 states with the consistently largest gains. (Massachusetts consistently gained more than 1 standard deviation units above the mean national gains.) (Tennessee – ranked 13th – consistently gained 0.277 standard deviation units above the mean national gains.)

| | Average Standard Gains |
|-----------------------------|-------------------------------|
| Massachusetts | 1.114 |
| Pennsylvania | 0.960 |
| New Jersey | 0.930 |
| District of Columbia | 0.859 |
| Maryland | 0.827 |
| Florida | 0.746 |
| Texas | 0.618 |
| Arkansas | 0.550 |
| Kansas | 0.409 |
| New Mexico | 0.374 |

- 4) OREA Analysis – NAEP scores, 2003-2007
 OREA compared state NAEP scores (in 4th math, 4th reading, 8th math, and 8th reading in 2003, 2005, and 2007) to the national average scores. OREA identified the 10 states with the consistently highest scores. (Massachusetts consistently scored more than 1½ standard deviation units above the mean national scores.) (Tennessee – ranked 42nd – consistently scored 0.7 standard deviation units below the mean national scores.)

| | Average Standard Scores |
|----------------------|--------------------------------|
| Massachusetts | 1.632 |
| New Hampshire | 1.187 |
| Vermont | 1.152 |
| Minnesota | 1.075 |
| New Jersey | 0.963 |
| North Dakota | 0.946 |
| Montana | 0.865 |
| Kansas | 0.807 |
| Virginia | 0.768 |
| South Dakota | 0.759 |

As evidenced by their appearance in the top 10 states on OREA analysis of both NAEP gains and NAEP scores (2003-2007), Kansas, Massachusetts, and New Jersey have consistently improved on already high NAEP scores.

Tennessee's rank of 13th in gains and 42nd in scores, indicates that Tennessee is consistently making annual gains that are larger than the national average gains, but the state is building on scores that are consistently lower than the national average.

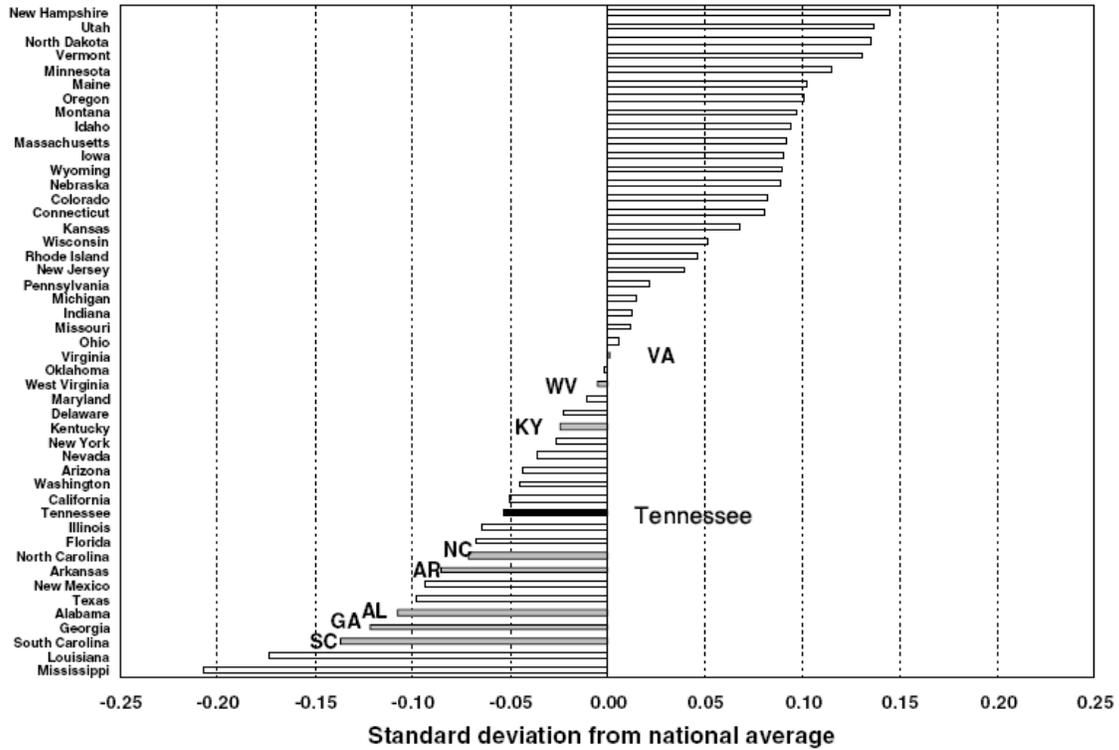
Comparison States

- 1) OREA analysis of 2002-2007 per pupil expenditures – OREA identified states within 10% of Tennessee's per-pupil expenditures.

| | AVERAGE 2002-2007 | |
|-----------------------|------------------------------|------------------------|
| Utah | 5,082 | |
| Arizona | 6,191 | 10% Lower Limit: 5,829 |
| Idaho | 6,210 | |
| Mississippi | 6,213 | |
| Oklahoma | 6,405 | |
| Tennessee | 6,477 | |
| Nevada | 6,512 | |
| Alabama | 6,733 | |
| North Carolina | 6,833 | |
| Florida | 6,894 | |
| Kentucky | 6,970 | |
| South Dakota | 7,056 | |
| Arkansas | 7,058 | 10% Upper Limit: 7,125 |
| Texas | 7,157 | |

- 2) Family Characteristics – OREA identified a cluster of states surrounding Tennessee in RAND's ranking of family characteristics predicting achievement.

Tennessee Ranks 36th Out of 47 on a Weighted Measure of Family Characteristics Predicting Achievement



Results

High Return on Investment / High Achieving States

| | Return on Investment | | Student Achievement | | | | Comparability | | Total |
|----------------|----------------------|----------------------|---------------------|------|------------|-------------|------------------------|------------------------|--------|
| | OREA | Leaders and Laggards | Standard and Poor's | RAND | OREA Gains | OREA Scores | Per Pupil Expenditures | Family Characteristics | |
| Florida | | 1 | 1 | 1 | 1 | | \$ | # | 4 \$ # |
| North Carolina | 1 | 1 | 1 | 1 | | | \$ | # | 4 \$ # |
| Kansas | | 1 | 1 | | 1 | 1 | | | 4 |
| South Dakota | 1 | | 1 | | | 1 | \$ | | 3 \$ |
| Massachusetts | | 1 | | | 1 | 1 | | | 3 |
| Minnesota | | 1 | 1 | | | 1 | | | 3 |
| Utah | 1 | 1 | | | | | | | 2 |

Low Return on Investment / Low Achieving States

(Based on the lowest ranking states in the sources discussed in previous pages.)

| | Return on Investment | | Student Achievement | | | | Comparability | | Total |
|----------------------|----------------------|----------------------|---------------------|------|------------|-------------|------------------------|------------------------|-------|
| | OREA | Leaders and Laggards | Standard and Poor's | RAND | OREA Gains | OREA Scores | Per Pupil Expenditures | Family Characteristics | |
| Alaska | 1 | 1 | 1 | | | 1 | | | 4 |
| Alabama | | 1 | 1 | | | 1 | \$ | | 3 \$ |
| Mississippi | | 1 | | | 1 | 1 | \$ | | 3 \$ |
| New Mexico | | 1 | | 1 | | 1 | | # | 3# |
| District of Columbia | 1 | 1 | | | | 1 | | | 3 |
| Hawaii | | 1 | 1 | | | 1 | | | 3 |
| Rhode Island | 1 | 1 | 1 | | | | | | 3 |
| Utah | | | | 1 | 1 | | | | 2 |

Utah ranked in the top 10 on both Return on Investment indicators. However, the state was not in the top on any Student Achievement indicators. In fact, Utah ranked in the bottom 10 on 2 Student Achievement indicators.

Utah's top Return on Investment rankings are the result of average state NAEP scores that are slightly higher (0.81%) than the national average NAEP scores and average per pupil expenditures that are the lowest in the nation – 41.6% lower than the national average per pupil expenditure.

Limitations

NAEP data collected prior to 2003 is not consistent with regard to state and grade level participation, subjects tested, or accommodations permitted. Therefore, the NAEP data set does not allow for valid longitudinal comparisons with start dates before 2003.

The first NAEP assessment was given in 1969. However, through 1988, NAEP reported only on the academic achievement of the nation as a whole and subgroups within the national population. Trial state assessments were conducted in 1990, 1992, and 1994. Beginning in 1996, the state assessments were no longer considered "trial."

Prior to 1996 NAEP did not allow accommodations for students with disabilities or English language learners. In 1996 and 2000 math, NAEP had 2 samples – 1 with accommodations permitted and 1 without accommodations permitted. In 1998 reading, NAEP used the same split-sample design. In 2002 NAEP began to offer accommodations to all students who need them, and thus there are no longer non-accommodated NAEP samples.

Prior to 2003, NAEP tests were not given in all subjects in a given year and not all states participated. The "No Child Left Behind" Act of 2001 made a significant change to NAEP. Beginning with the 2003 NAEP, every state was required to participate in state NAEP assessments in reading and mathematics at grades 4 and 8 every two years. Districts that receive federal Title I money are required to participate if they are selected as part of the NAEP sample. State participation in science and writing assessments remains voluntary.

(<http://nces.ed.gov/nationsreportcard/about/state.asp>,
<http://www.edweek.org/ew/articles/2002/03/13/26naeptide.h21.html>,
<http://nces.ed.gov/nationsreportcard/about/inclusion.asp>)

Number of States¹ Participating in NAEP Assessments by Year and Subject

| | 4th Math | 4th Reading | 8th Math | 8th Reading |
|---------------|-----------------|--------------------|-----------------|--------------------|
| 1990 * | - | - | 38 | - |
| 1992 * | 42 | 42 | 42 | - |
| 1994 * | - | 39 | - | - |
| 1996 * | 44 | - | 41 | - |
| 1998 * | - | 40 | - | 37 |
| 1998 | - | 40 | - | 37 |
| 2000 * | 41 | - | 40 | - |
| 2000 | 41 | - | 40 | - |
| 2002 | - | 44 | - | 42 |
| 2003 | 51 | 51 | 51 | 51 |
| 2005 | 51 | 51 | 51 | 51 |
| 2007 | 51 | 51 | 51 | 51 |

¹: Includes District of Columbia

*: Accommodations not permitted.