This file contains detailed projections and information from the article:

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, Summer 2016

http://educationnext.org/pays-improve-school-quality-student-achievement-economic-gain/
U.S. and State Interests

- Future depends on skills of the population
- True for the nation and for individual states
- Improvements in student achievement return very large economic returns to states
  - Feasible gains would provide more incomes to state than total spending on K-12 education

Growth in GDP/pop over 1960-2000 as related to math and science skills and conditional on income levels in 1960
Test Scores and Growth: U.S. states

Growth in GDP/pop over 1970-2010 for states as related to math skills and conditional on income levels in 1970
Michigan’s Position in the U.S.

• The economic performance of states is dependent upon the skills of their populations.

• States compete with each other in terms of the skills of their population.

• National Assessment of Educational Progress (NAEP) for 2013 tracks current schools
Michigan is at 45th percentile of U.S. distribution
Michigan is at 29th percentile of Massachusetts distribution
Michigan is at 42nd percentile of U.S. distribution
Michigan is at 29th percentile of Massachusetts distribution
Projection Methodology

• Educational improvements steady until reaching the post-2015 goals in 2030

• Work life of 40 years

• Growth rate is based on the average skill of workers

• Consider horizon of somebody born today (80 years)

• Future gains in GDP are discounted to the present with a 3% discount rate
  • Implies the projections are directly comparable to current levels of GDP
Value of Improvement to Michigan

1. Increasing average achievement by $\frac{1}{4}$ standard deviation.
2. Bringing each state up to the best state (Minnesota).
3. Bringing each state up to the best in the geographic division (Wisconsin).
4. Bringing all students in a state up to the NAEP basic level.
5. Scenario 2 with single state improvement.
6. Equaling Canada
7. Equaling Finland
2. Equal Minnesota level: 386% of current GDP
3. Equal Wisconsin level: 231% of Current GDP
4. All students to basic: 185% of state GDP
5. Single v. All States Improve to Best

% of current GDP

Single-state improvement
All states improve to top-performing state
International Challenge

• Unfortunately the challenge extends beyond U.S. borders and includes countries around the world.

• Other countries are producing students with both more education and better education.
Percentage of students in the class of 2011 at the proficient level in math in U.S. states and foreign countries.
jurisdictions participating in PISA 2009. (Figure 1)
6. Equal Canadian level: 393% of current GDP
7. Equal Finnish level: 456% of current GDP
## Summary of Improvement: Michigan

<table>
<thead>
<tr>
<th>Improvement</th>
<th>Discounted reform billion $’s</th>
<th>% current GDP</th>
<th>% future GDP without reform</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ¼ stnd deviation</td>
<td>1,216</td>
<td>262</td>
<td>5.6</td>
</tr>
<tr>
<td>2. Equal Minnesota</td>
<td>1,789</td>
<td>386</td>
<td>8.3</td>
</tr>
<tr>
<td>3. Equal division best (WI)</td>
<td>1,072</td>
<td>231</td>
<td>5.0</td>
</tr>
<tr>
<td>4. All at least basic</td>
<td>860</td>
<td>185</td>
<td>4.0</td>
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<tr>
<td>5. Single state to best (MN)</td>
<td>796</td>
<td>172</td>
<td>3.7</td>
</tr>
<tr>
<td>6. Equal Canada</td>
<td>1,824</td>
<td>393</td>
<td>8.4</td>
</tr>
<tr>
<td>7. Equal Finland</td>
<td>2,114</td>
<td>456</td>
<td>9.8</td>
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</tbody>
</table>
THE CHALLENGE
Improvement is Possible: Gains on NAEP 1992-2009
No Simple Answers
Improvement is possible but not easy

Increments in Expenditures and Gains in Student Achievement

Test-score gains between 1992 and 2011

Increase in Expenditures, 1990-2009 (2009 Dollars)*

$1,000 $2,000 $3,000 $4,000 $5,000 $6,000