

# ARIZONA: ECONOMIC FUTURE WITH EDUCATIONAL REFORM

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This file contains detailed projections and information from the article:

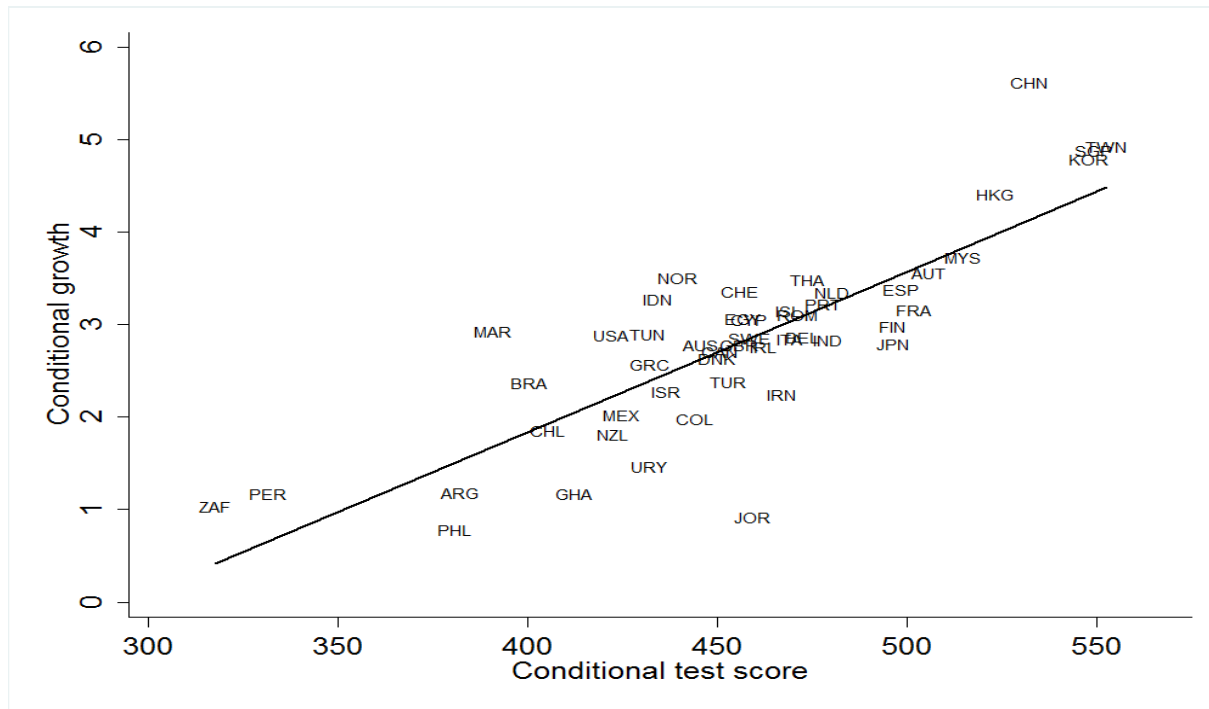
Eric A. Hanushek, Jens Ruhose, and Ludger Woessmann, “It pays to improve school quality: States that boost student achievement could reap large economic gains,” *Education Next*, Summer 2016

<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

# Cognitive Skills and Long Run Economic Growth: International Evidence



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



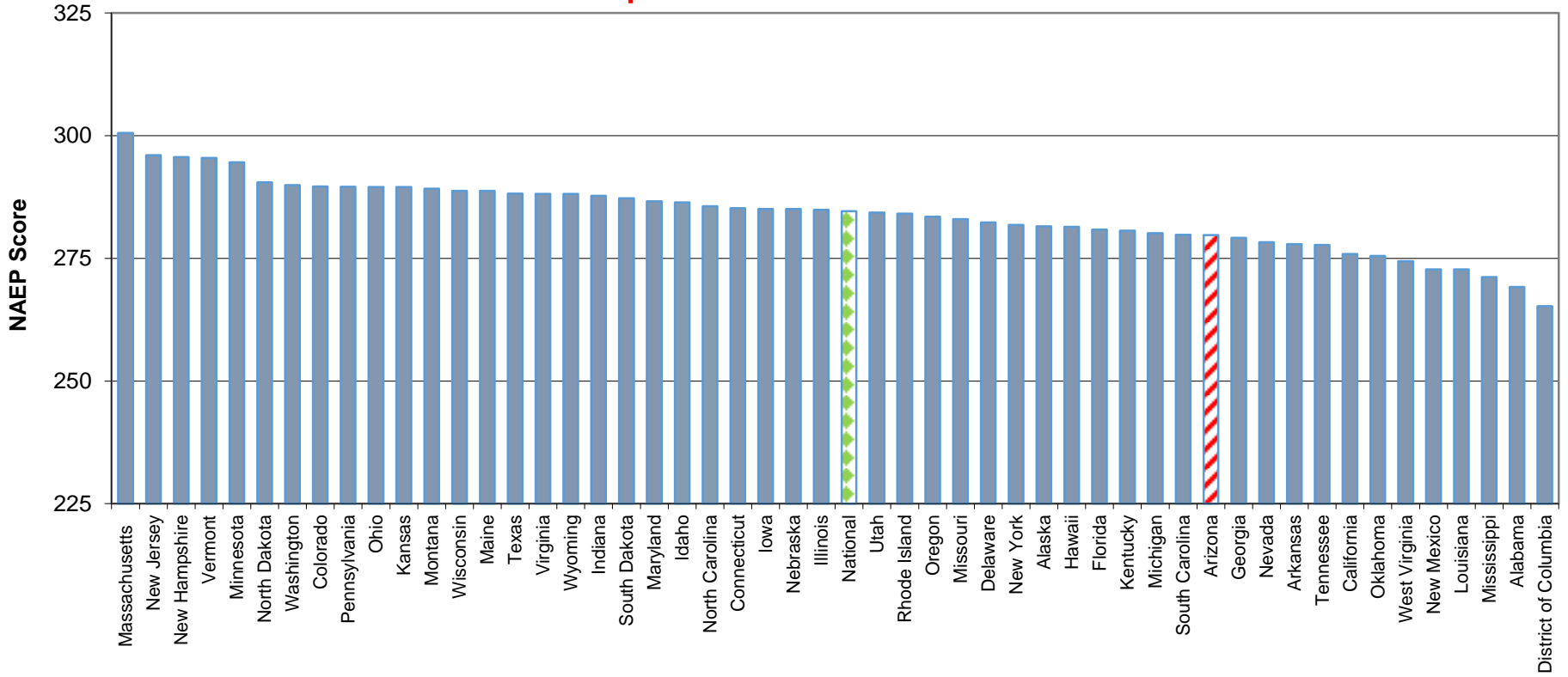
Growth in GDP/pop over 1970-2010 for states as related to math skills and conditional on income levels in 1970

# Arizona'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

# NAEP 8th Grade Mathematics, 2013

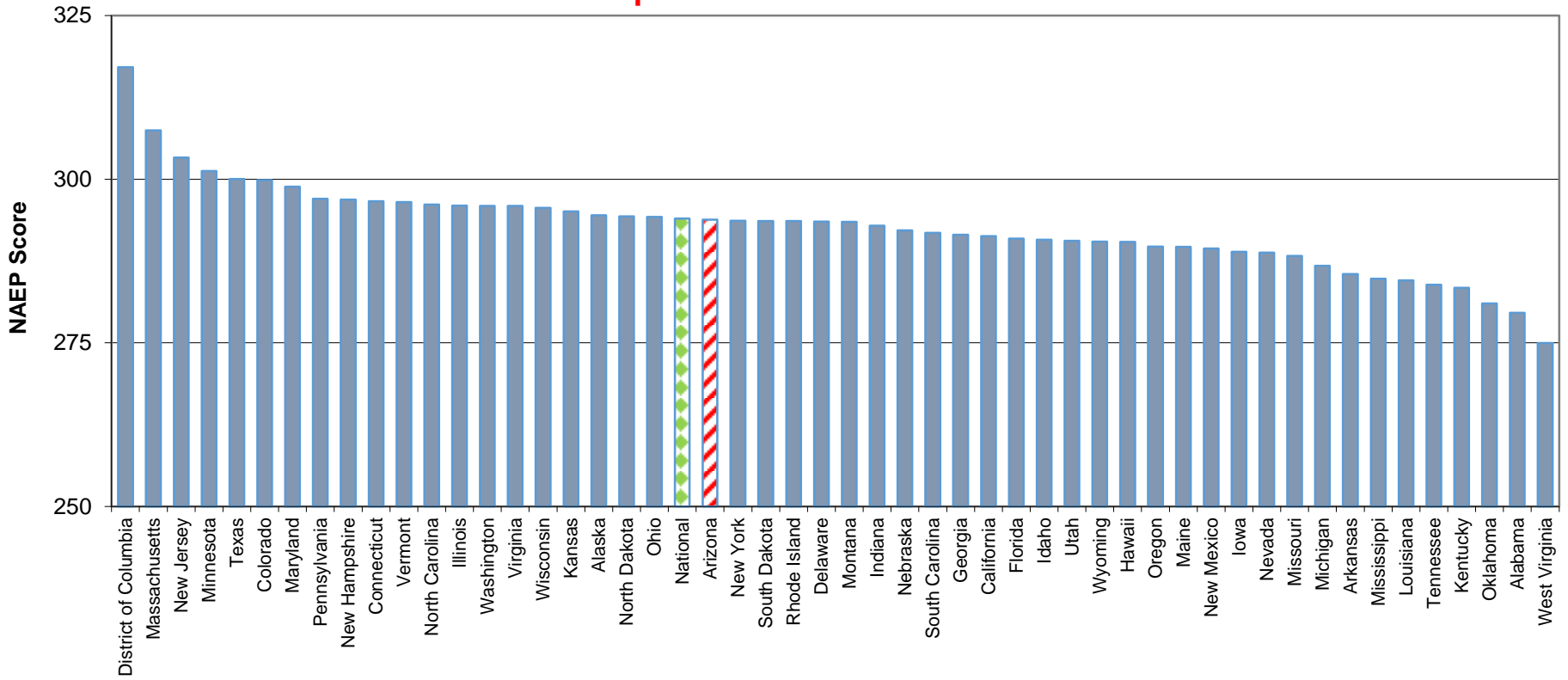
**Arizona is at 45th percentile of U.S. distribution**  
**Arizona is at 28th percentile of Massachusetts distribution**



# NAEP 8th Grade Mathematics, White Students, 2013

Arizona is at 50th percentile of U.S. distribution

Arizona is at 35th percentile of Massachusetts distribution



# Projection Methodology

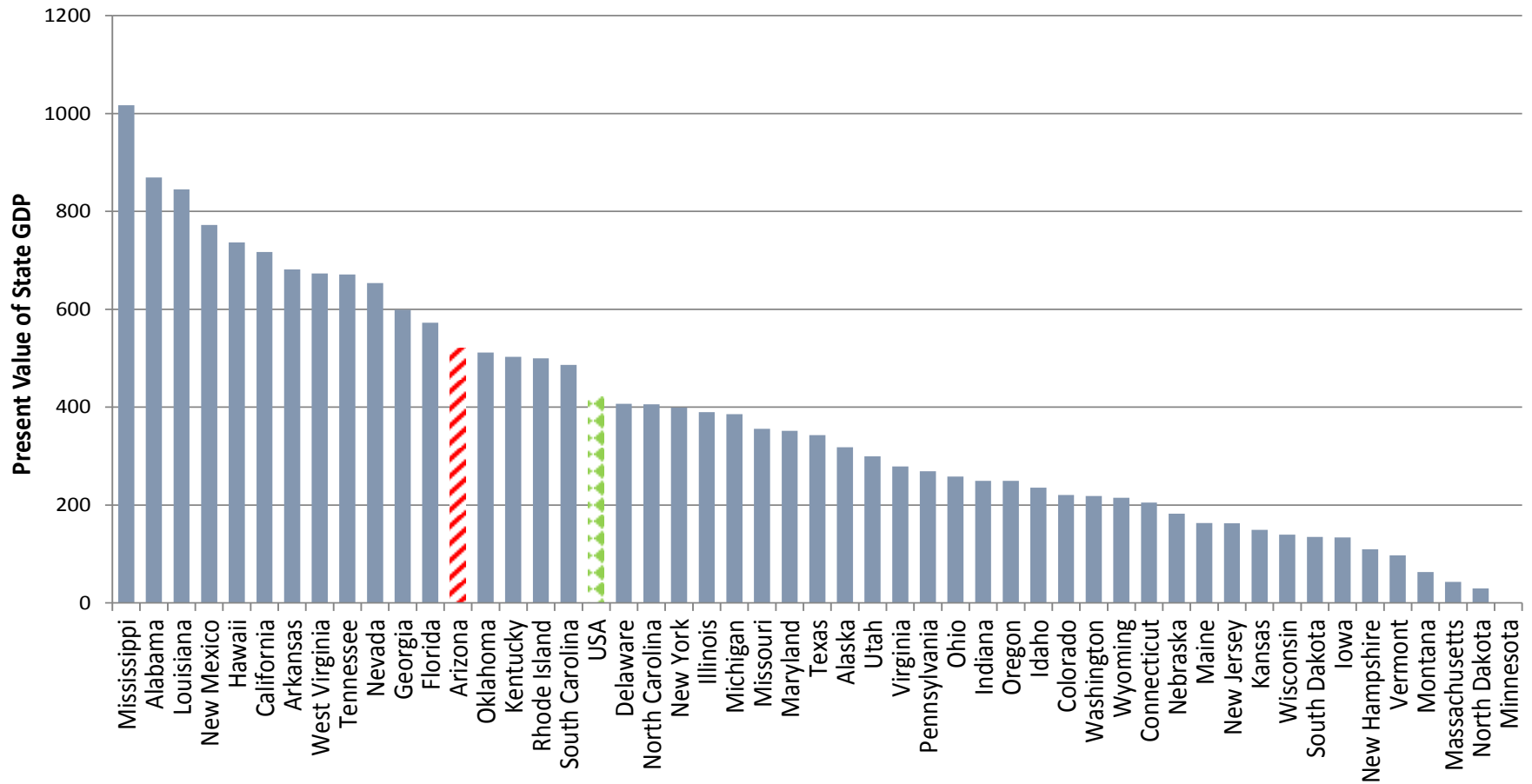
- Educational improvements steady until reaching the post-2015 goals in 2030
- Work life of 40 years
- Growth rate is based on the average skill of workers
- Consider horizon of somebody born today (80 years)
- Future gains in GDP are discounted to the present with a 3% discount rate
  - Implies the projections are directly comparable to current levels of GDP



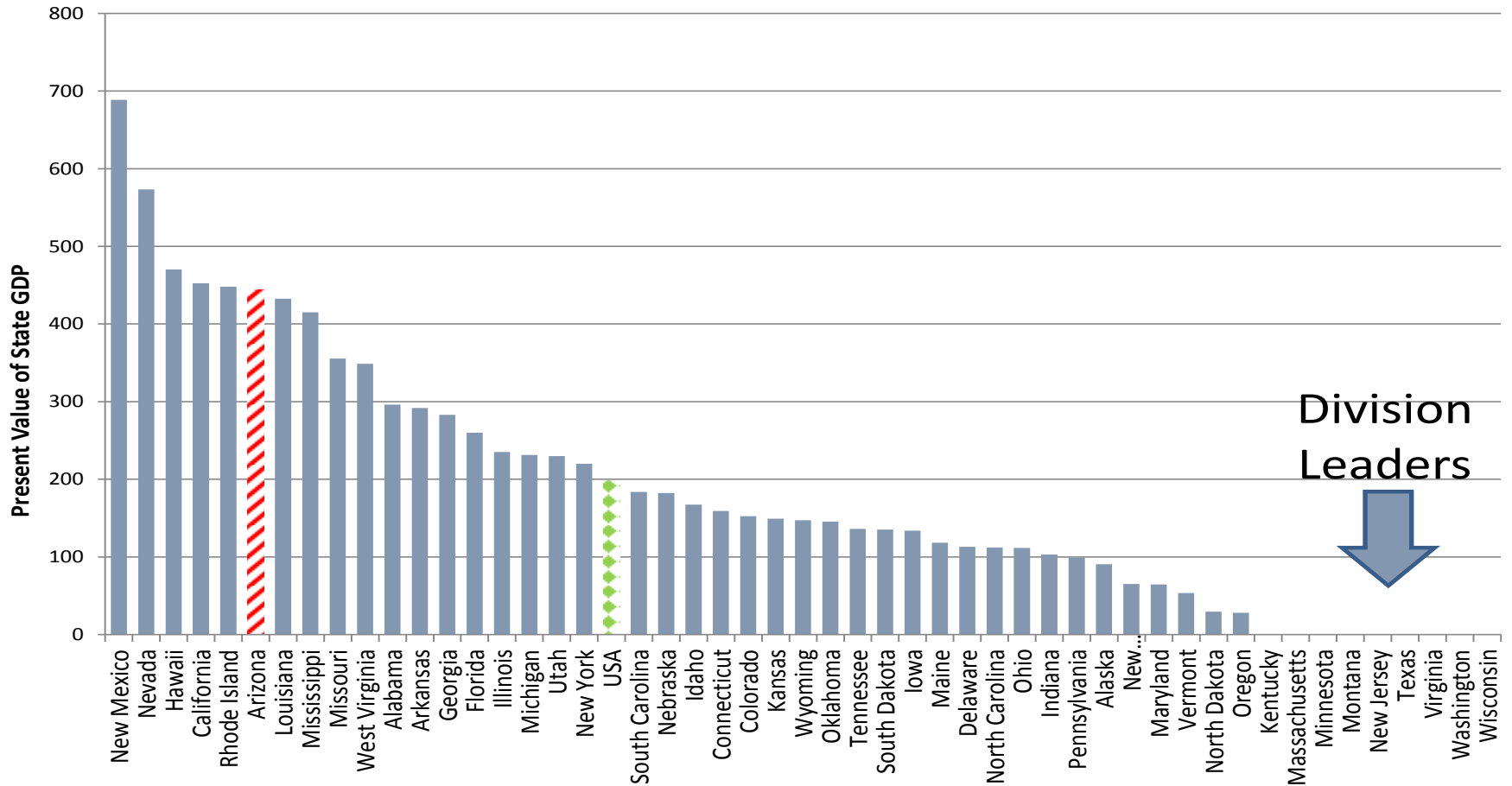
# Value of Improvement to Arizona

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 (Montana).
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

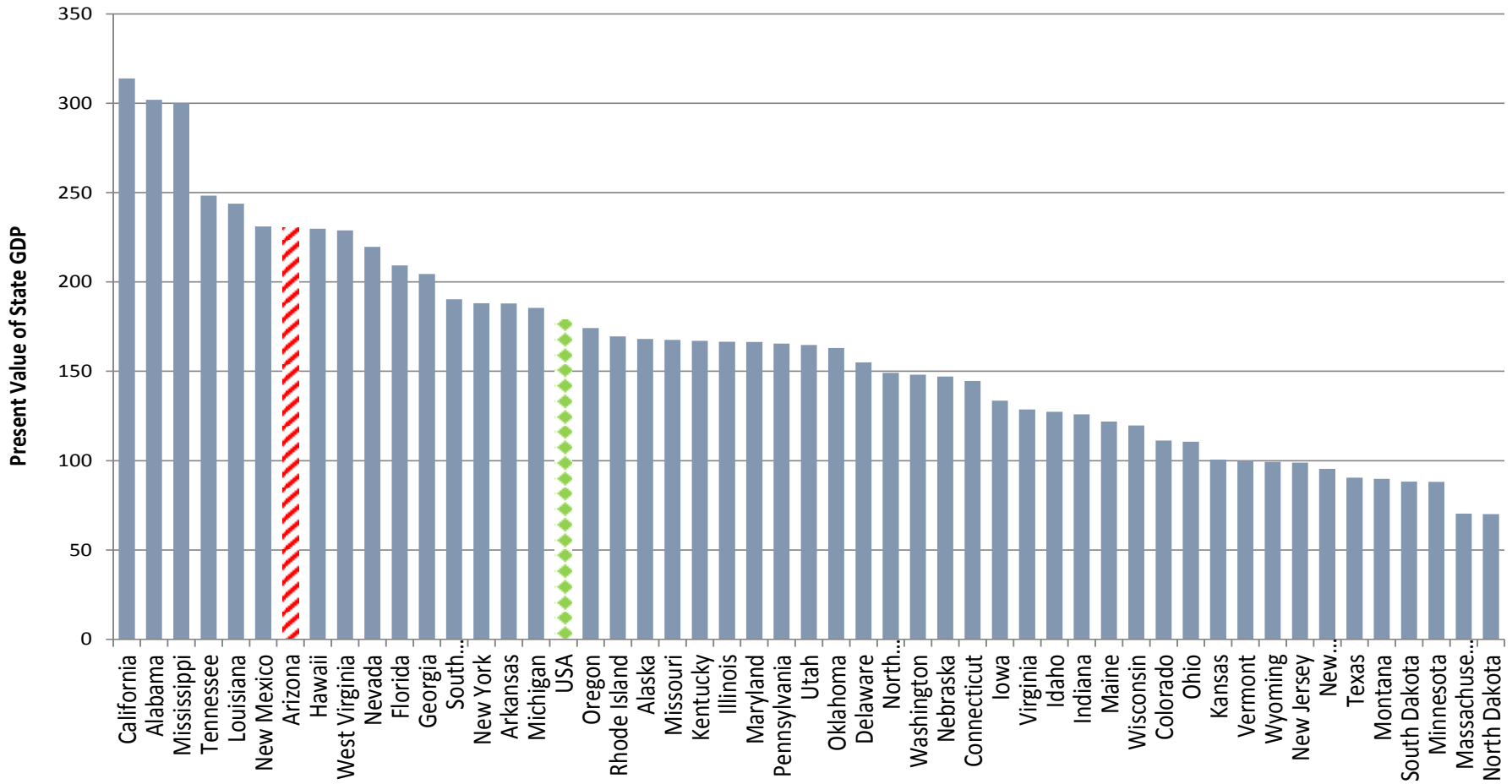
## 2. Equal Minnesota level: 521% of current GDP



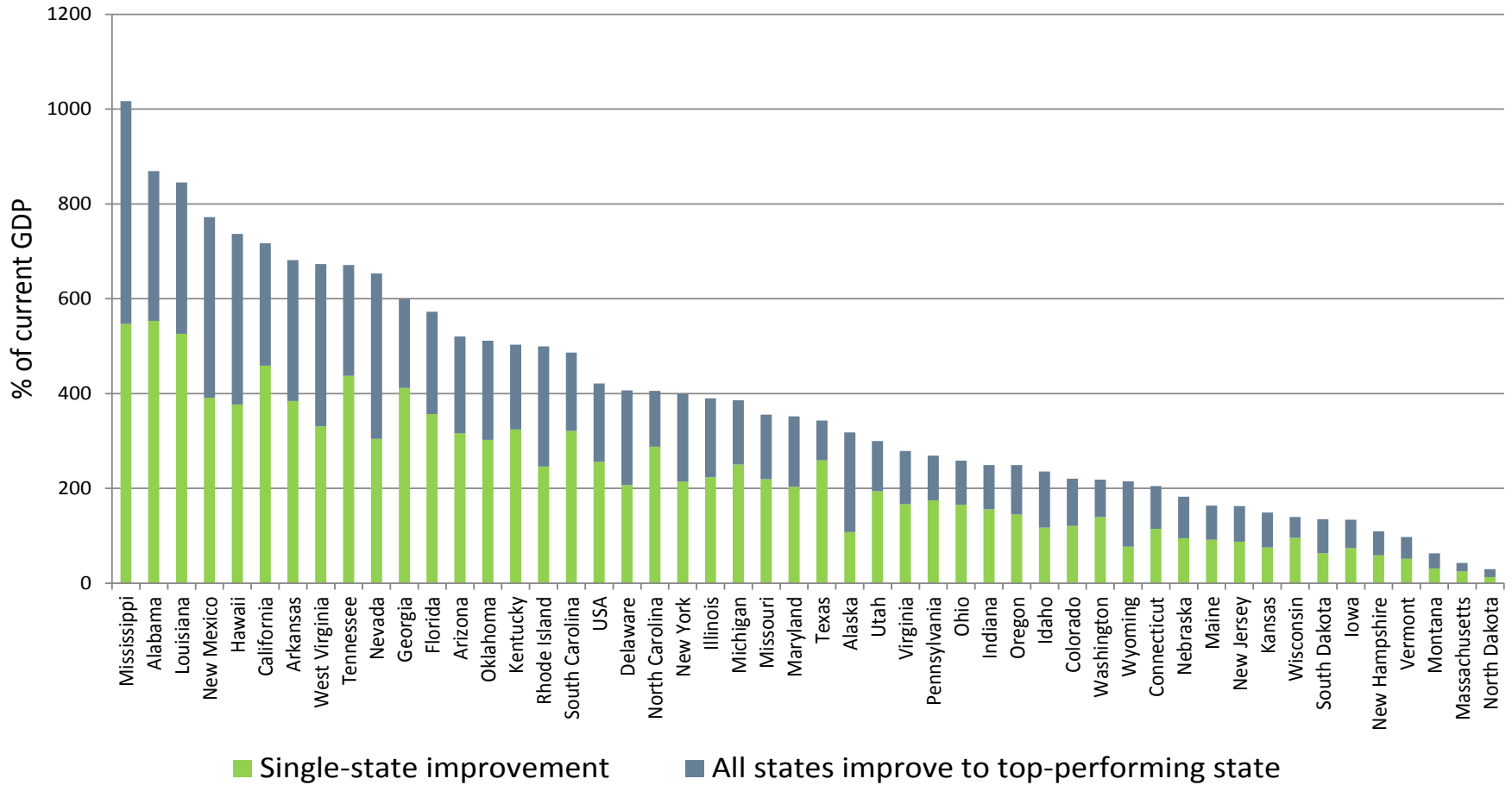
# 3. Equal Montana level: 444% of Current GDP



# 4. All students to basic: 230% of state GDP



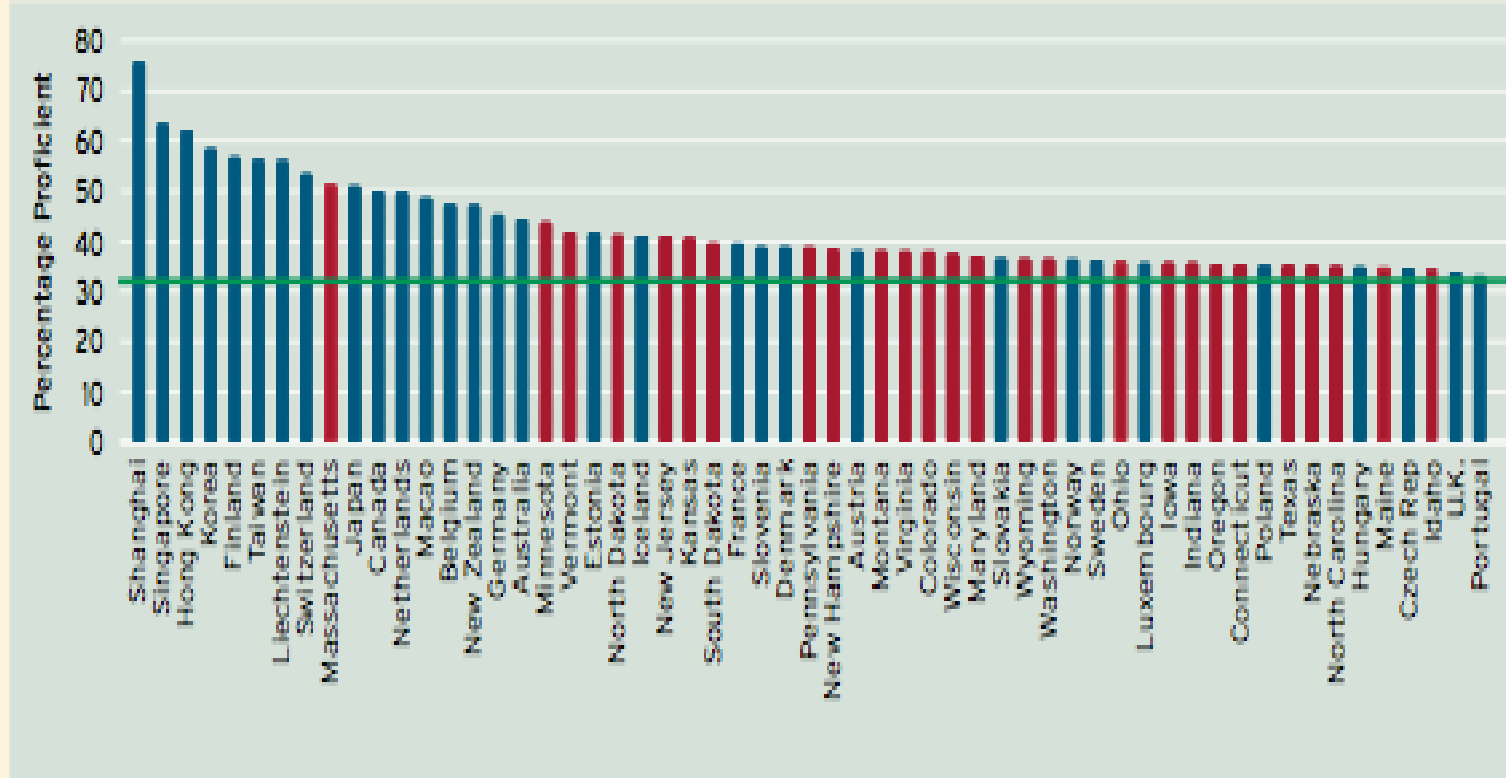
# 5. Single v. All States Improve to Best



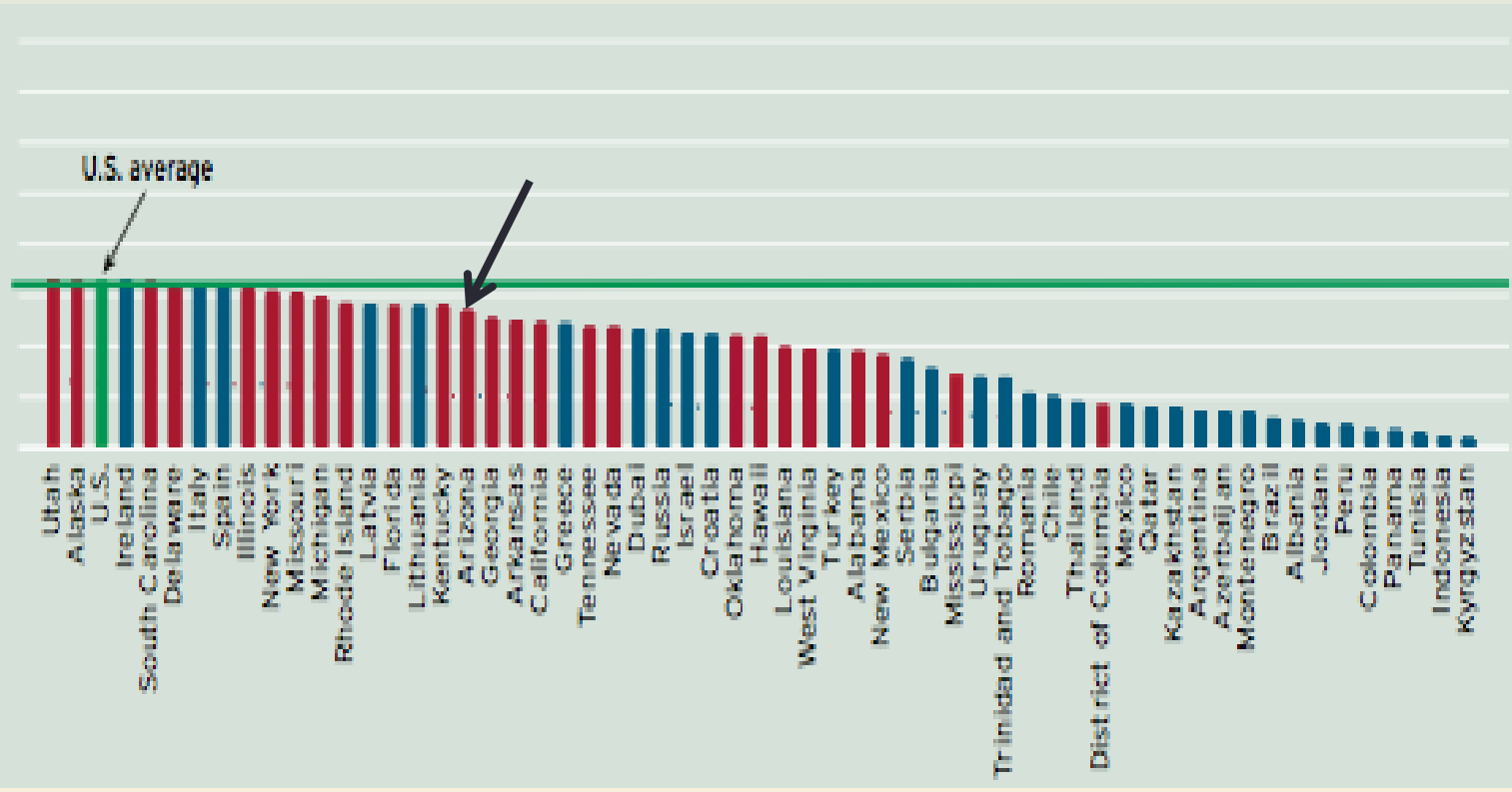
# International Challenge

- 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

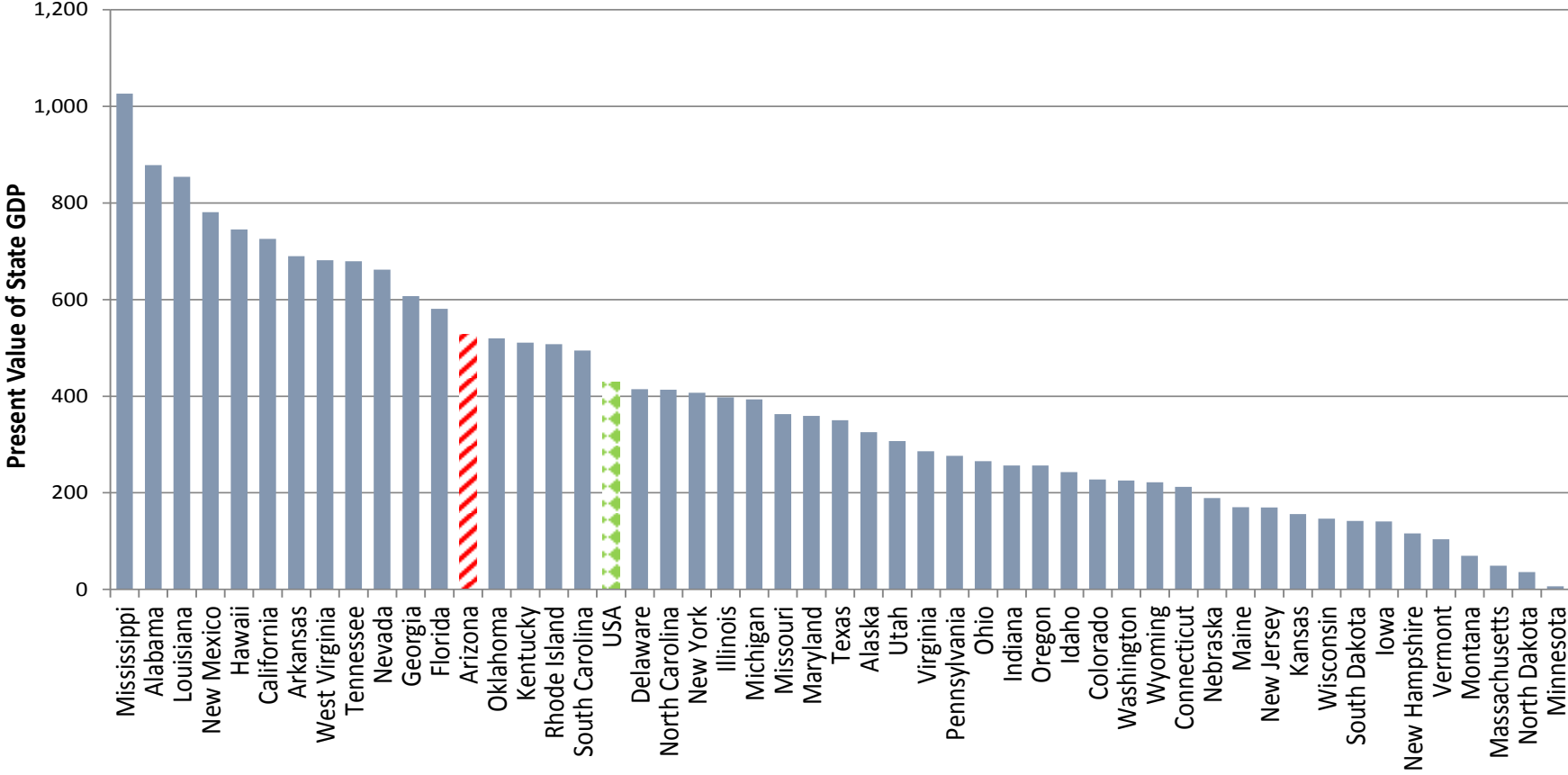


jurisdictions participating in PISA 2009. (Figure 1)

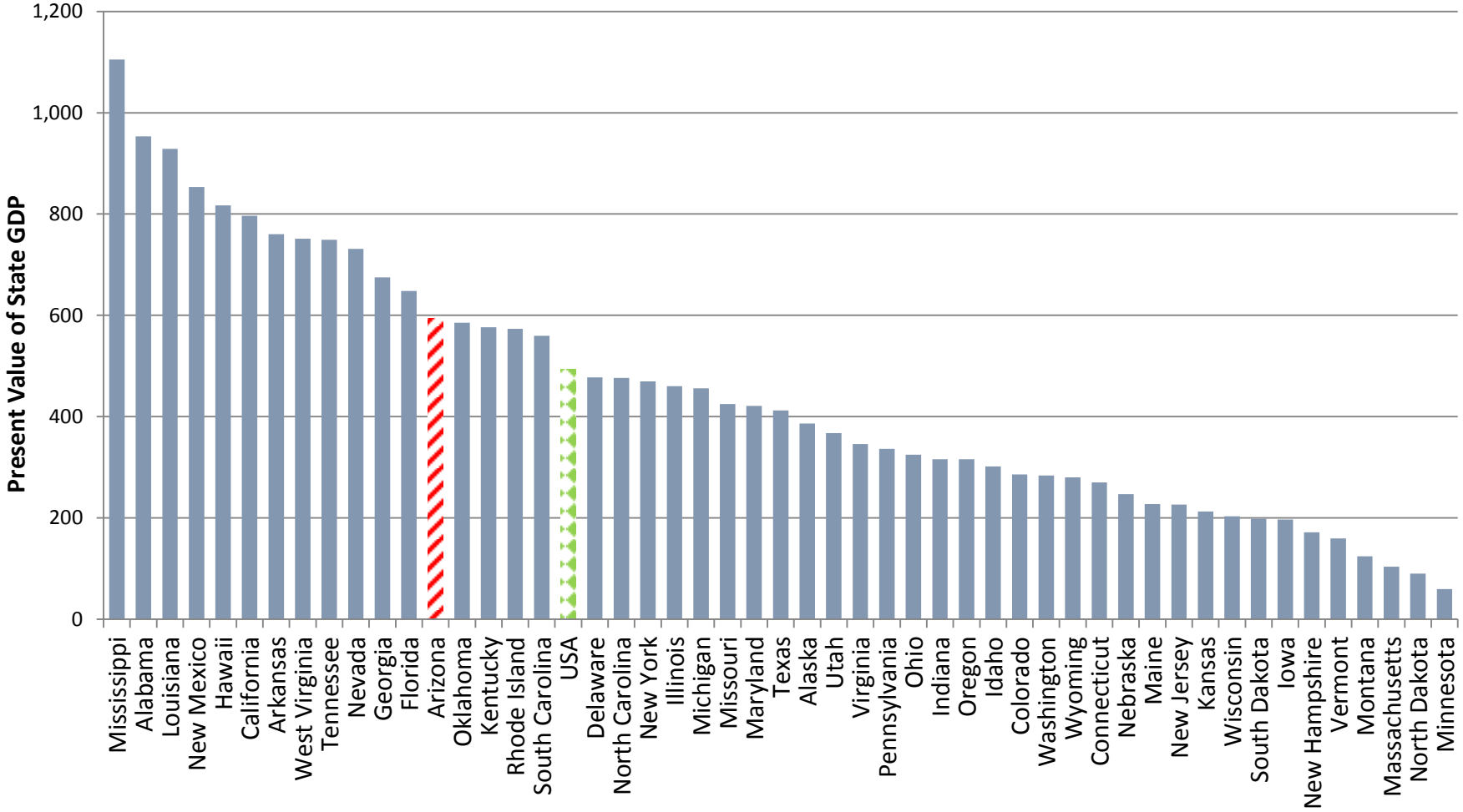




# 6. Equal Canadian level: 529% of current GDP



# 7. Equal Finnish level: 595% of current GDP



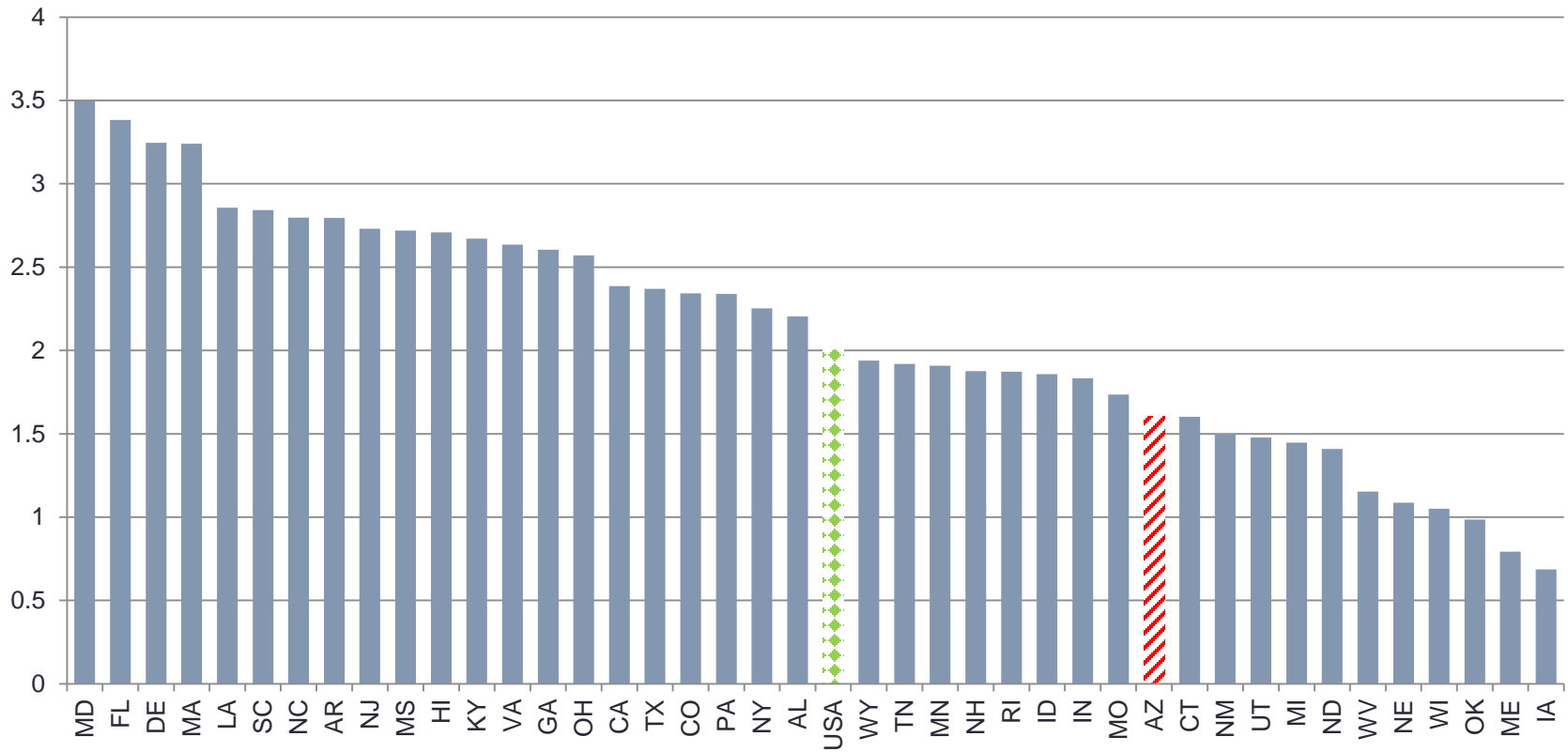
# Summary of Improvement: Arizona

Improvement	Discounted reform billion \$'s	% current GDP	% future GDP without reform
1. ¼ stnd deviation	656	262	5.61
2. Equal Minnesota	1,303	521	11.1
3. Equal division best (MT)	1,112	444	9.5
4. All at least basic	577	230	4.9
5. Single state to best (MN)	501	162	3.5
6. Equal Canada	1632	529	11.3
7. Equal Finland	1836	595	12.7

# THE CHALLENGE

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# Improvement is Possible: Gains on NAEP 1992-2009



# No Simple Answers

Improvement is possible but not easy

