

# **An Alternative Approach to Evaluating and Improving School Performance in New Mexico**

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## **Coalition for Excellence in Science and Math Education**

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# Background

- CESE, is a non-profit, non-partisan 501(c)3 corporation
- Members include National Laboratory retirees, industrial scientists, educators, Parents, college professors, etc.
- CESE has analyzed New Mexico public education data for over a decade
  - We have categorized school performance in terms of comparison to standards and with respect to demographically neutral expectations
- CESE's primary focus is to help improve schools using New Mexico data

# Our Goals

- To help every student achieve their potential
- To show school personnel HOW they can improve student performance
- To use research-based, mathematically-sound, New Mexico-specific data to create an easy to understand improvement method that does not use “silver bullets”

# Another CESE Goal

- To clarify how anyone can use traditional information, such as NMSBA (New Mexico Standards Based Assessment) test scores
  - to compare their school to standards
  - to compare school to school with respect to the overall achievement of their students

# The Current Situation

- The New Mexico ABCDF Schools Rating Act says that New Mexico schools will be graded and provides some guidelines
  - The Public Education Department (PED) has established a grading process for the Act

# CESE Observations of the PED Grading Process

- The PED results do not provide a method to show schools HOW to improve
- The PED process is complex
- The PED process apparently uses subjectively determined weights and attempts to combine some incompatible elements
- The PED method does not provide a path to improvement by accommodating for those factors schools have no control over that impact performance

# Complications

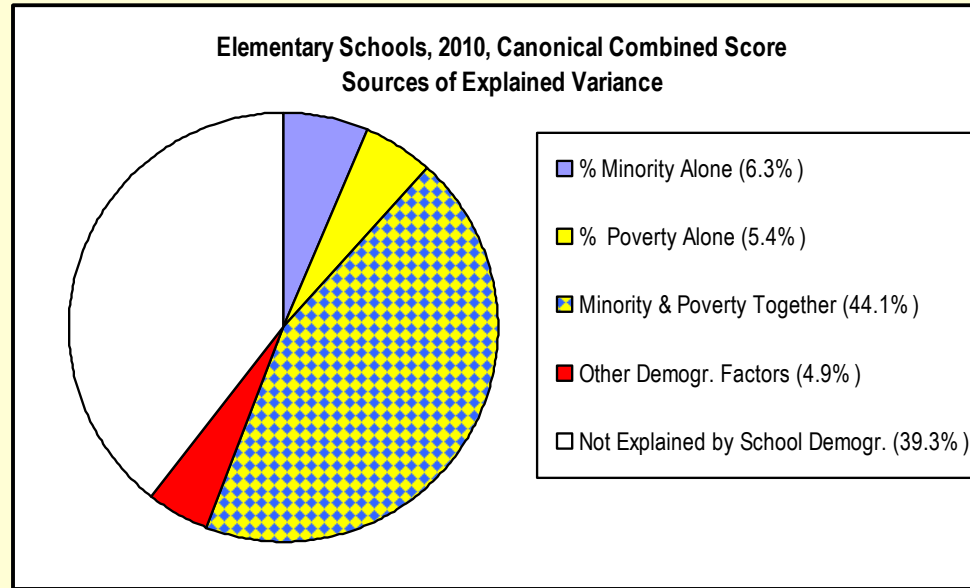
- Policy makers, business people and the general public want quick, simple solutions to improve education
  - The nation has used those techniques for three decades – since “Nation at Risk” – with little to no improvement
- The Federal Government does not use research-based, mathematically-sound methods to address long-range improvement of schools
  - This causes states to tell schools to “get better” without explaining HOW

# An Alternative Approach

- CESE has developed a method that uses New Mexico data to establish a “Measure of Merit” for schools
- The method avoids subjective guesswork and guarantees that known factors beyond schools’ control are completely removed
- The method accounts for demographic factors the school has no control over:
  - ✓ Minority population
  - ✓ Students learning English
  - ✓ Students with disabilities
  - ✓ Poverty levels
  - ✓ Student mobility

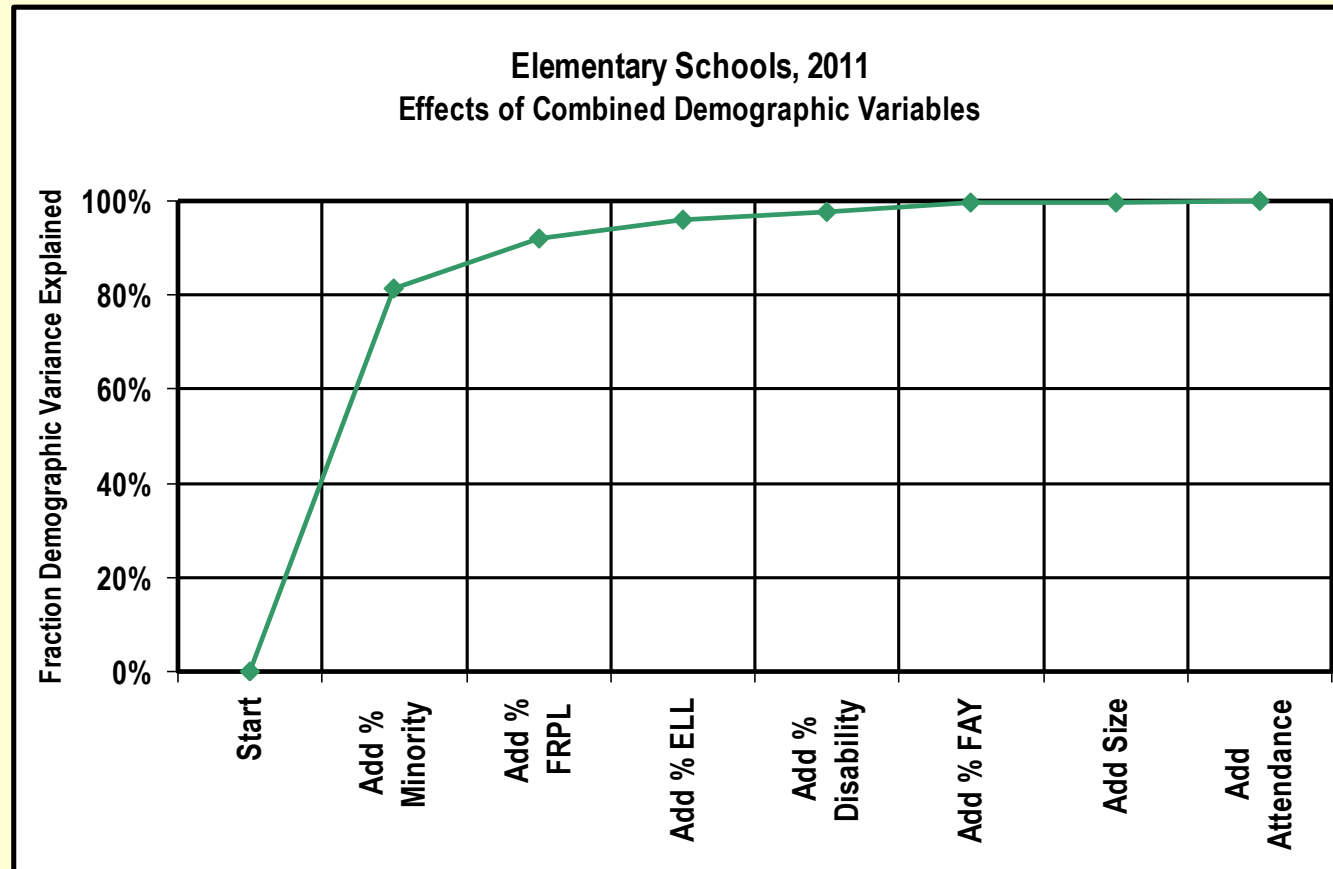


# Effects Of School Demographics On Performance



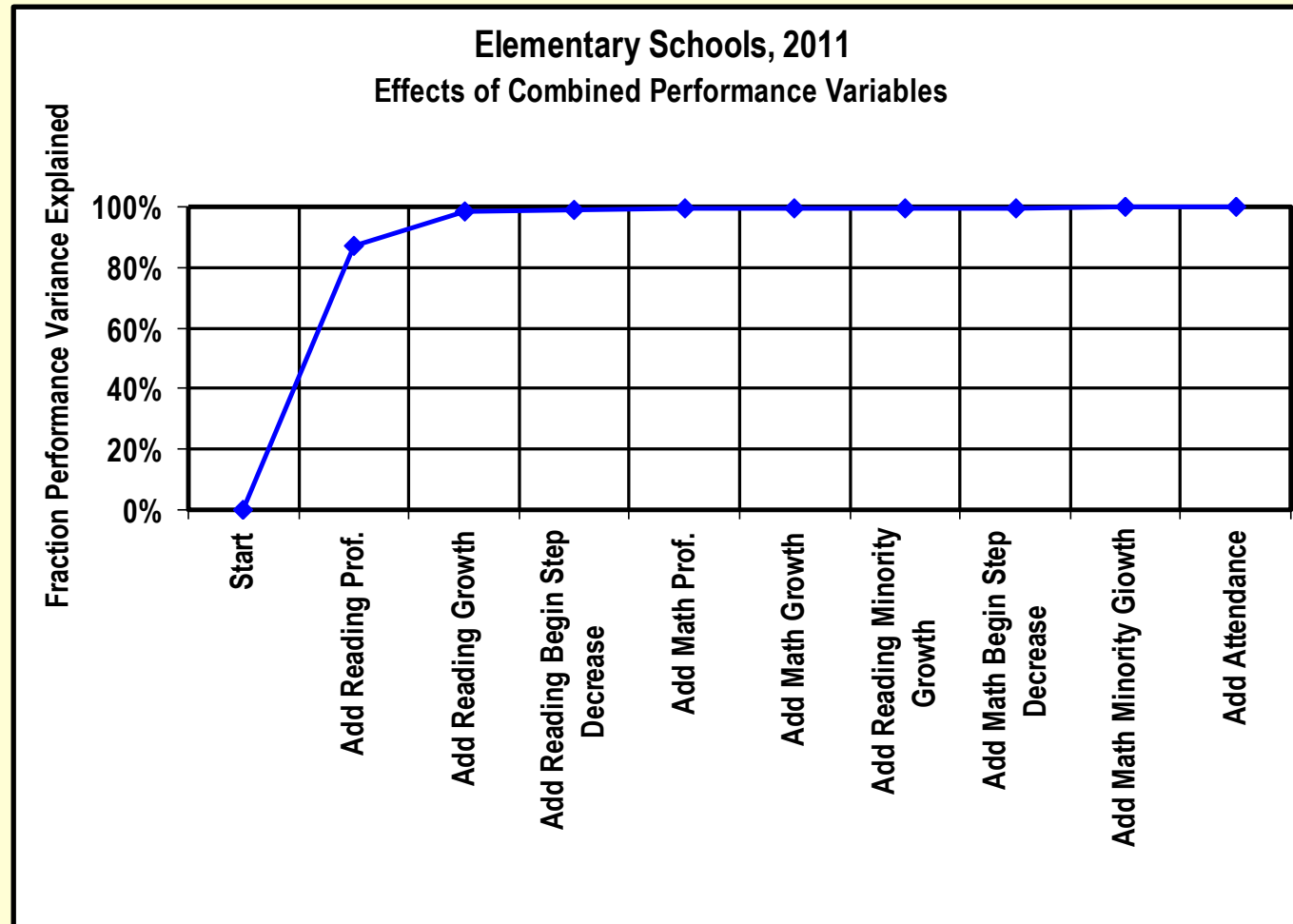
- Poverty by itself is not a major factor for performance in New Mexico schools
- Minority status by itself is not a large factor
- The combination of minority and poverty overwhelms all other factors
  - ✓ Minority students tend to be economically disadvantaged
  - ✓ Economically disadvantaged students tend to be minorities
- In this case, nearly 2/3 of performance variance is explained by school demographics

# Effects Of Combined Demographic Variables



Excess variables add no information and increase the chance of human or round-off error

# Effects Of Combining Performance Variables



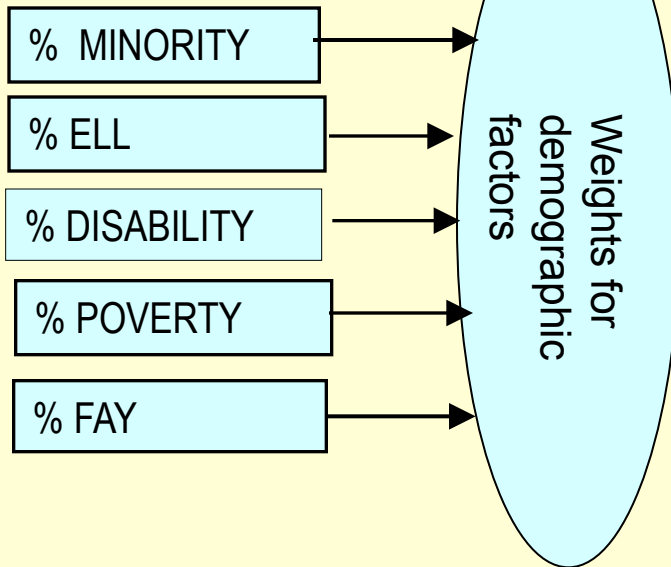
Performance factors do not add additional information after selecting About 4 or 5

# Features of the CESE Method's “Measure of Merit”

- CESE's method isolates and removes school performance correlated to demographics
- By “subtracting” out demographic effects, each school's actual performance is compared to its predicted performance
- The resultant “Measure of Merit” provides a true measure of how well a school performs at educating its students to achieve maximum potential
- The method uses a transparent, technically accepted process based on a defensible mathematical model as opposed to "feel good" judgment calls

# Canonical Correlation

## SCHOOL DEMOGRAPHICS



This is the "Demographic Index"

Weighted Sum<sub>IN</sub>

Calculated weights provide maximum correlation between inputs & outcomes

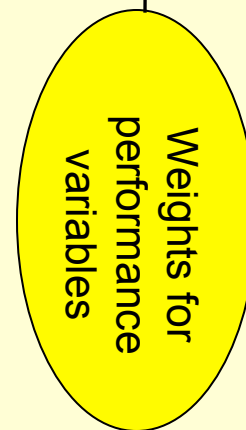
This is the "Canonical Outcome Score"

Weighted Sum<sub>OUT</sub>

## PERFORMANCE

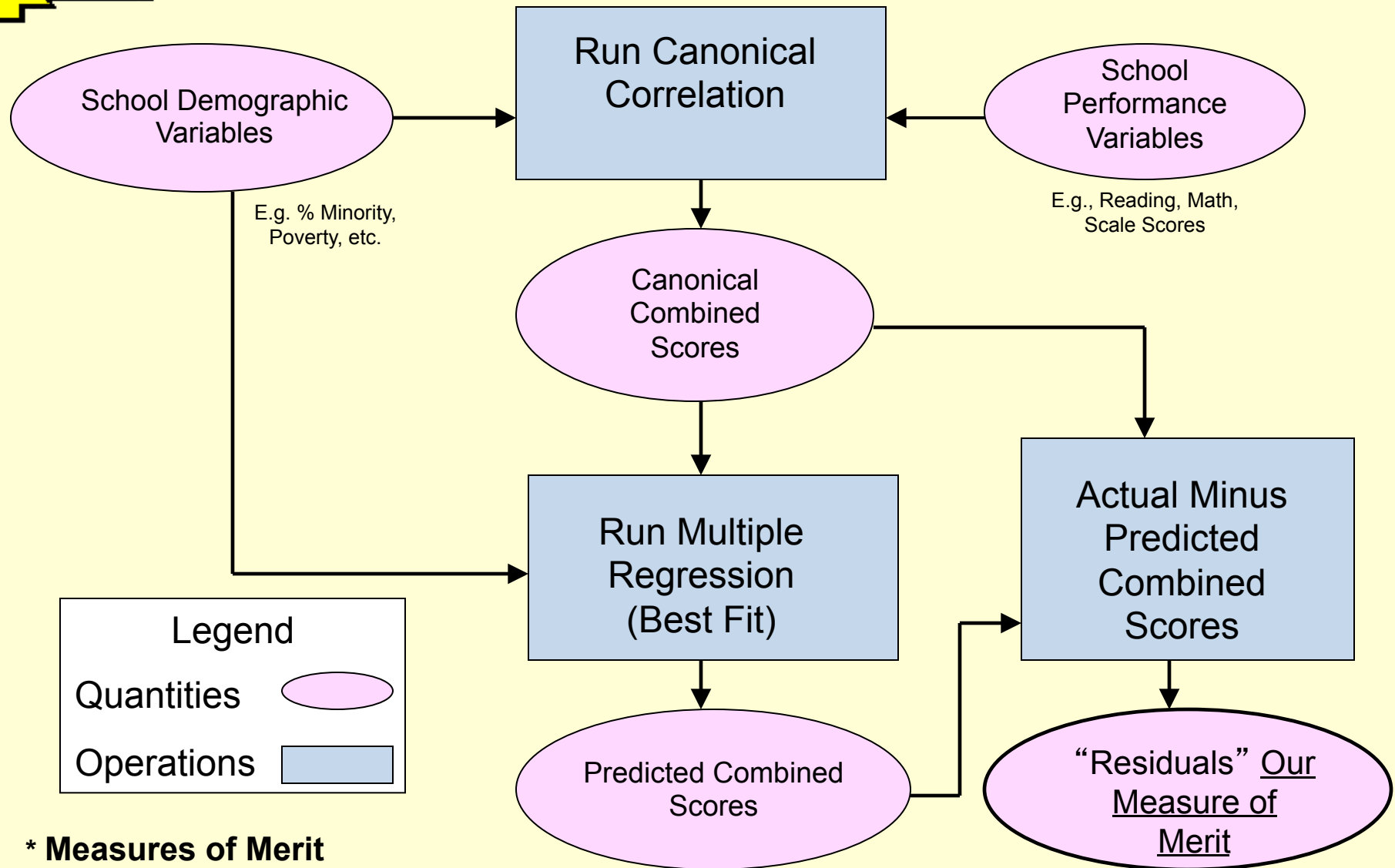
READING MEAN SCALE SCORE

MATH MEAN SCALE SCORE



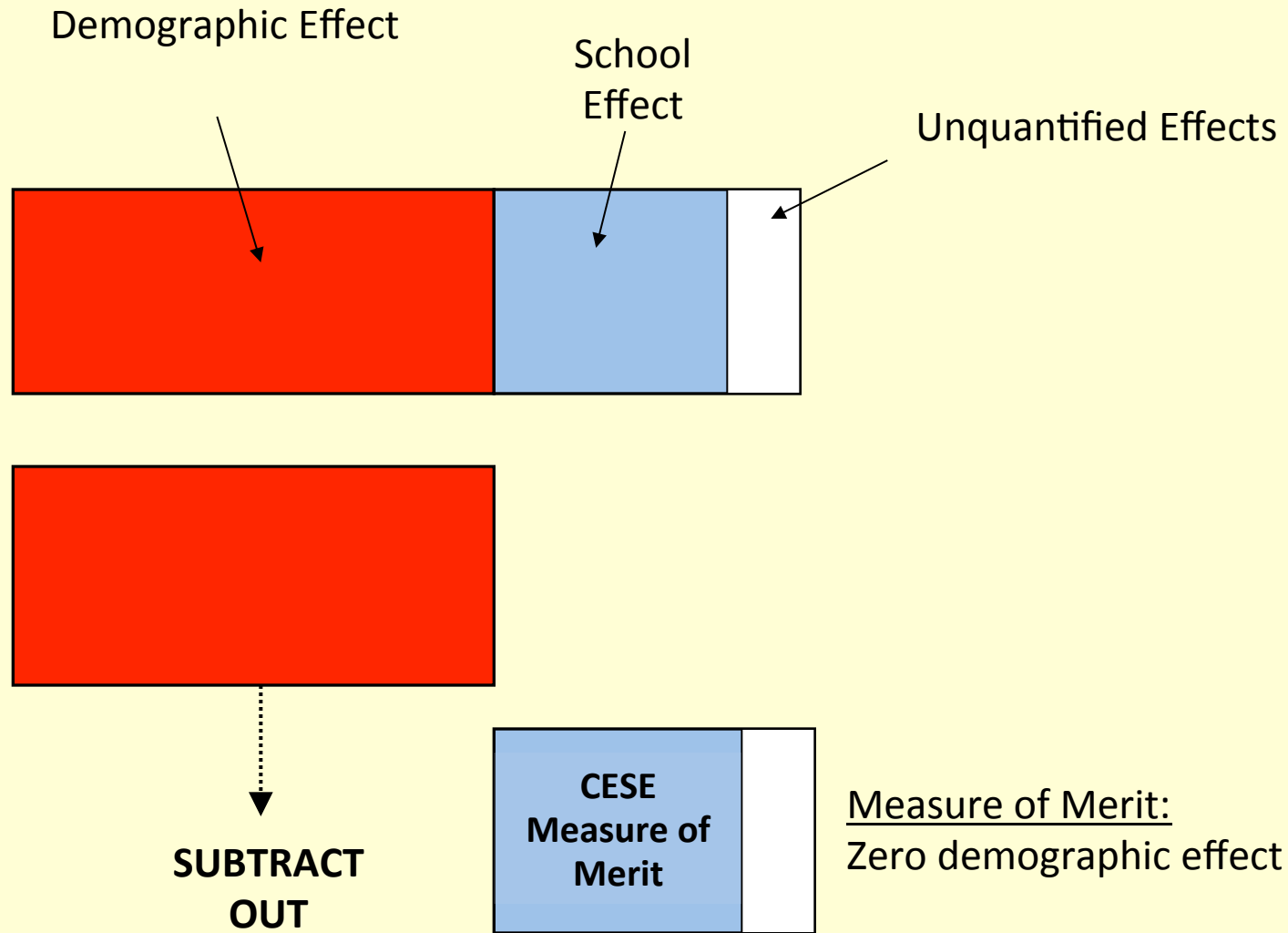
The weights for the demographic input factors and performance outcome factors are not arbitrarily chosen. They are determined by the data and calculated to provide maximum correlation.

# How We Find the “Residuals”\*



\* Measures of Merit

# Graphically – What Is Measure of Merit?

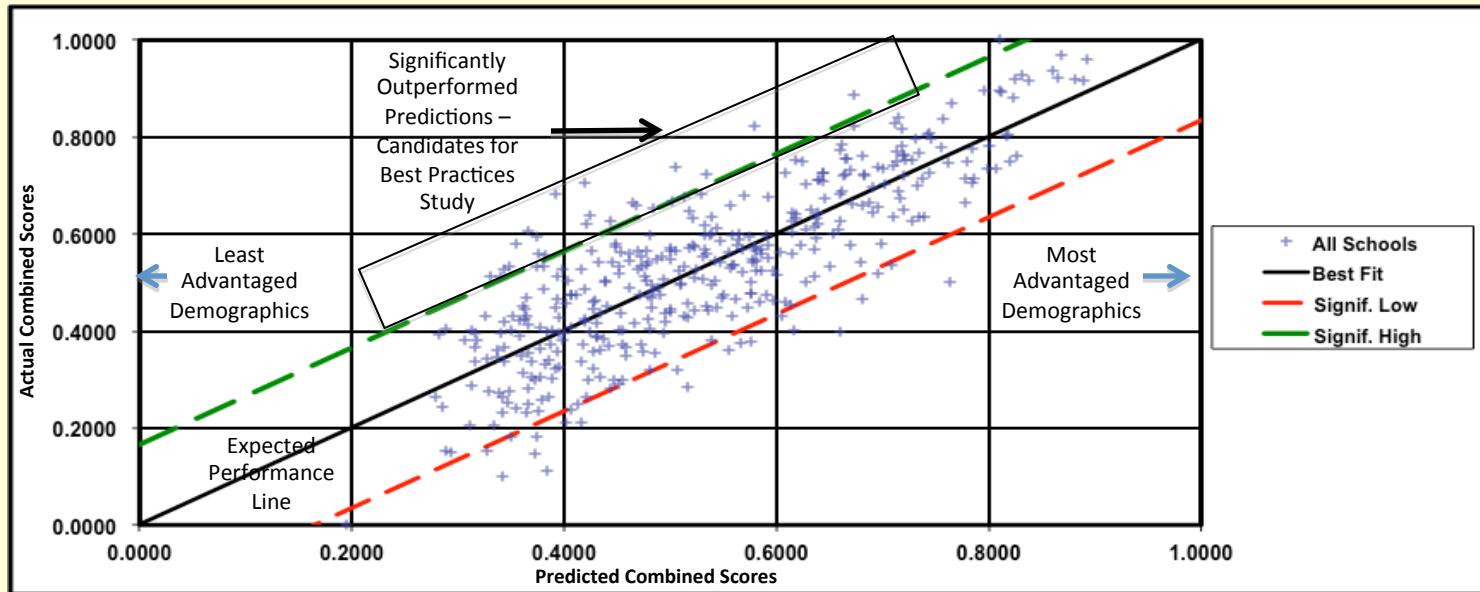


# How the CESE Method Can Inform School Improvement

- This approach allows schools with similar demographics to use the highest performing schools as models for improvement
  - Those that perform better than would be expected can be examined for best practices
  - Best practices can be shared with all similar schools performing at lower levels with similar demographics
  - This Method uses effective techniques that will work for New Mexico schools – not silver bullets

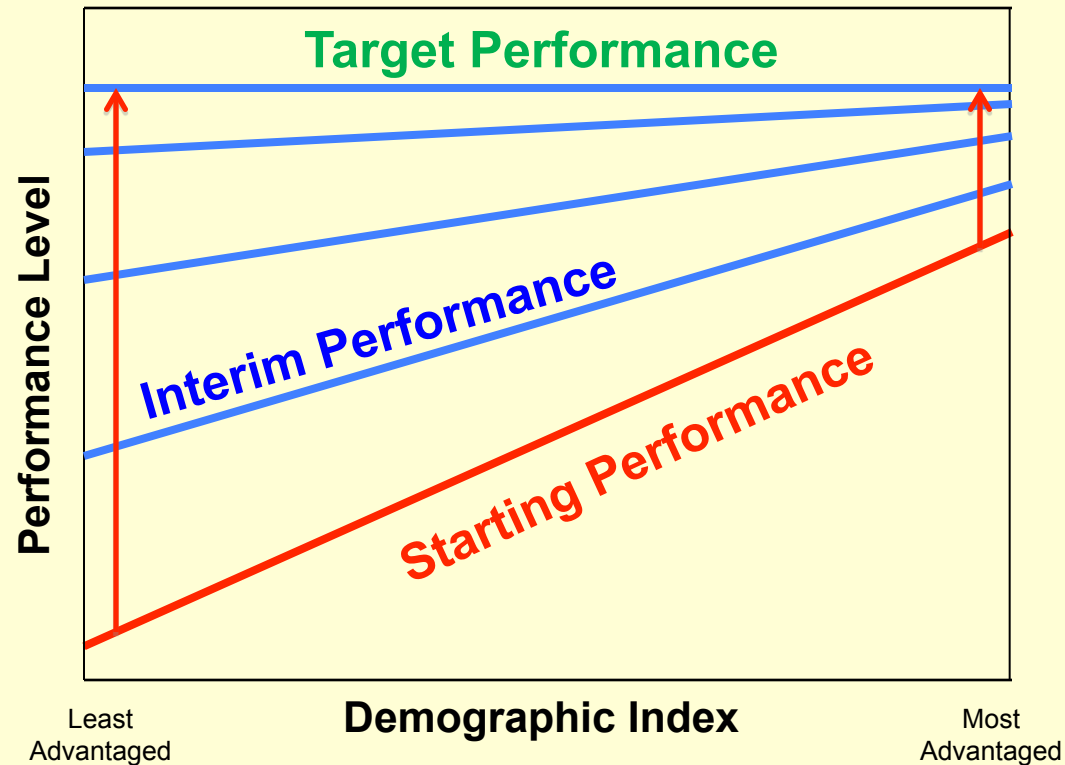


# How Data are Used to Identify Candidate Model Schools to Study



**Actual New Mexico data showing schools that significantly outperform predictions and are candidate models to show HOW to improve**

# What Are The Ultimate Goals?



- To increase actual performance to lift the disadvantaged demographic end so that performance is NO LONGER dependent on demographics
  - ✓ **This will close the Achievement Gap**
- To raise total performance so that all students perform to their potential

## **(And, A Bonus Use of the CESE Method)**

- Part of teacher evaluations could also be determined through our method
- Demographic factors, out of a teacher's control, could be removed for a teacher's "Measure of Merit"
- Teachers who excel could be studied for their successful techniques

# Summary

- The CESE method is fair
  - It eliminates effects that schools have no control over
- The CESE method is defensible
  - It is based on well established and accepted procedures
  - It does not depend on subjective and intuitive guesses
- The CESE method is flexible
  - It has the potential to cover teacher evaluations requiring performance output evaluation
  - It can be extended to individual economic and ethnic groups of students