Texas Public Education Outcomes

TEXAS COMMISSION ON PUBLIC SCHOOL FINANCE

JANUARY 23, 2018

What do we want our education system to produce?

A split focus on Inputs vs Outcomes:

TEC §4.001: "The mission of the public education system of this state is to ensure that all Texas children have <u>access</u> to a quality education that enables them to <u>achieve</u> their potential and fully participate now and in the future in the social, economic, and educational opportunities of our state and nation."

Of 11 statutory objectives, the following reference outcomes:

- OBJECTIVE 2: Students will be encouraged and challenged to meet their full educational potential.
- OBJECTIVE 3: Through enhanced dropout prevention efforts, all students will remain in school until they obtain a high school diploma.
- OBJECTIVE 5: Educators will prepare students to be thoughtful, active citizens who have an appreciation for the basic values of our state and national heritage and who can understand and productively function in a free enterprise society.
- OBJECTIVE 7: The state's students will demonstrate exemplary performance in comparison to national and international standards.

What do we want our education system to produce?

TEC §4.002. PUBLIC EDUCATION ACADEMIC GOALS:

- ◦ GOAL 1: The students in the public education system will demonstrate exemplary performance in the reading and writing of the English language.
- ◦ GOAL 2: The students in the public education system will demonstrate exemplary performance in the understanding of mathematics.
- ◦ GOAL 3: The students in the public education system will demonstrate exemplary performance in the understanding of science.
- ◦ GOAL 4: The students in the public education system will demonstrate exemplary performance in the understanding of social studies.

What do we want our education system to produce?

Summary:

◦ We want graduates

◦ Who are prepared to be engaged citizens

◦ Who are prepared to be productive

How can we evaluate whether our system is doing this?

We have to find measurements that are proxies for these concepts.

For the outcomes of the K-12 system, we focus on:
- High School graduation
- College, Career, or Military Readiness (CCM-R) of those graduates
- And ultimately:
  - College (2-year, 4-year) completion
  - Employment

For "all Texas children"

Near term goal: 60x30TX

How do we measure CCM-Readiness? HB22 provides the path

College Ready

- Meet criteria on AP/IB exams
- Meet TSI criteria (SAT/ACT/TSIA) in reading and mathematics
- Complete a college prep course offered by a partnership between a district and higher education institution as required from HB5
- Complete a course for dual credit
- Complete an OnRamps course
- Earn an associate's degree
- Meet standards on a composite of indicators indicating college readiness

Career Ready

- Earn industry certification
- Be admitted to post-secondary industry certification program

Military Ready

Enlist in the United States Armed Forces

Certain Details: 74 Industry Certifications

Figure: 19 TAC §74.1003

2017-18 Final List of Industry-Based Certifications
A-F Accountability System
Student Achievement Domain

#	Certification	Industry Authorizing Certification	Career Cluster
1	API Welding	American Petroleum Institute	Manufacturing
2	ASE Air Conditioning	Automotive Service Excellence	Transportation, Distribution & Logistics
3	ASE Auto Transmission	Automotive Service Excellence	Transportation, Distribution & Logistics
4	ASE Automobile Service Technology	Automotive Service Excellence	Transportation, Distribution & Logistics
5	ASE Brakes	Automotive Service Excellence	Transportation, Distribution & Logistics
6	ASE Electronic Systems	Automotive Service Excellence	Transportation, Distribution & Logistics
7	ASE Engine Performance	Automotive Service Excellence	Transportation, Distribution & Logistics
8	ASE Engine Repair	Automotive Service Excellence	Transportation, Distribution & Logistics
9	ASE Heating	Automotive Service Excellence	Transportation, Distribution & Logistics
10	ASE Maintenance Light Repair	Automotive Service Excellence	Transportation, Distribution & Logistics
11	ASE Manual Drive Train	Automotive Service Excellence	Transportation, Distribution & Logistics
12	ASE Mech Elec Components	Automotive Service Excellence	Transportation, Distribution & Logistics
13	ASE Non-Structural Analysis Damage Repair	Automotive Service Excellence	Transportation, Distribution & Logistics
14	ASE Painting & Refinishing (B2)	Automotive Service Excellence	Transportation, Distribution & Logistics
15	ASE Refrigerant Recovery and Recycling	Automotive Service Excellence	Transportation, Distribution & Logistics
16	ASE Structural Analysis Damage Repair	Automotive Service Excellence	Transportation, Distribution & Logistics
17	ASE Suspension And Steering	Automotive Service Excellence	Transportation, Distribution & Logistics
18	ASE Truck Technician Brakes	Automotive Service Excellence	Transportation, Distribution & Logistics
19	ASE Truck Technician Diesel Engines	Automotive Service Excellence	Transportation, Distribution & Logistics
20	ASE Truck Technician Drive Trains	Automotive Service Excellence	Transportation, Distribution & Logistics
21	ASE Truck Technician Electronic Systems	Automotive Service Excellence	Transportation, Distribution & Logistics
22	ASE Truck Technician HVAC	Automotive Service Excellence	Transportation, Distribution & Logistics
23	ASE Truck Technician Suspension Steering	Automotive Service Excellence	Transportation, Distribution & Logistics
24	Associate of (ISC)²	International Information System Security Certification Consortium	Information Technology
25	AWS D1.1 Structural Steel	American Welding Society	Manufacturing
26	AWS D9.1 Sheet Metal Welding	American Welding Society	Manufacturing

Why do we think College, Career, and Military Readiness (CCM-R) measures are valid?

- There is a relationship between the performance of students on these measures and what they ultimately go on to do, in terms of longer term life outcomes (including employment and college completion)

- Specifically: The college readiness benchmarks on SAT (1110 or higher on Reading/Math) and ACT (24 or higher composite) have been shown to correlate with roughly a 75% chance of passing freshman level college courses

How do we evaluate the whole system?

- We want graduates who are prepared to be productive citizens, and we have a method to approximate how well we are doing that.
- But K-12 is 13 years of public schooling, starting with 5 year-olds.
- We don't think of 6 year-olds as prepared for college, career, or the military. So how do we evaluate outcomes before graduation?
- Texas has developed a set of standard expectations, describing what students should know and be able to do by grade level for English, math, science, and social studies: the Texas Essential Knowledge & Skills (TEKS)
- Each successive grade level is more advanced, leading to ultimate HS graduation standards that are intended to ensure all students are CCM-R

What is an Example of a Standard?

- Third Grade Math, Standard 4.F

$3 \times 7 = 21$

- **Strand:**   Number and operations.

- **Knowledge & Skill:** The student applies mathematical process standards to develop and use strategies and methods for *whole number computations* in order to solve problems with efficiency and accuracy.

- **The student is expected to:**
  - (F) recall facts to multiply up to 10 by 10 with automaticity and recall the corresponding division facts
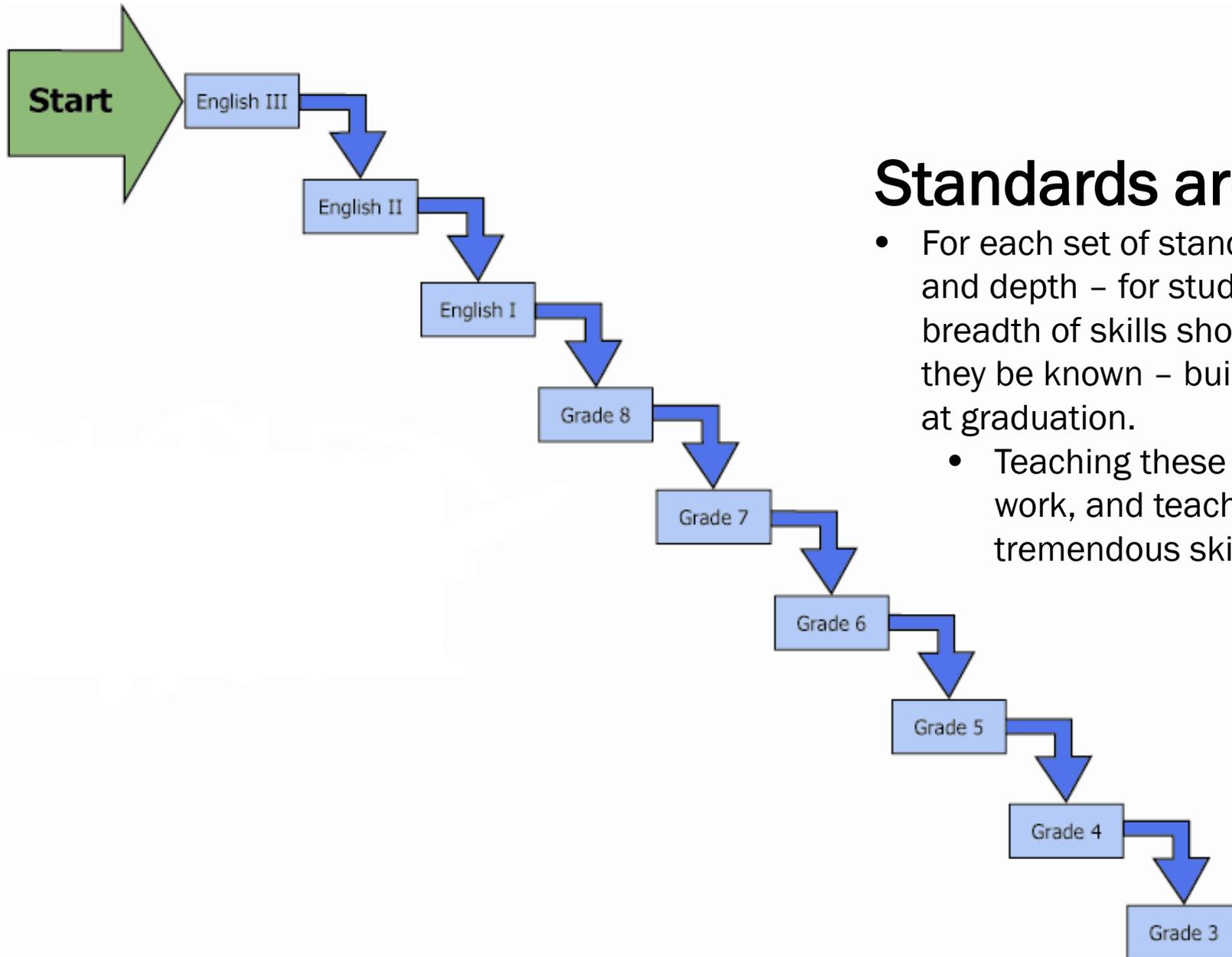
Standards are Vertically aligned:

- For each set of standards, there is an issue of scope and depth – for students of varying age levels, what breadth of skills should be known, and how well should they be known – building up to CCM-R for all students at graduation.
  - Teaching these standards is extremely technical work, and teachers have a job that requires tremendous skill and expertise.

Start → English III → English II → English I → Grade 8 → Grade 7 → Grade 6 → Grade 5 → Grade 4 → Grade 3

The State of Texas Assessments of Academic Readiness (STAAR) are designed to tell us how well our students know grade level knowledge & how well they can demonstrate grade level skills.

STAAR Performance Levels

Masters Grade Level

- Performance in this category indicates that students are expected to succeed in the next grade or course with little or no academic intervention. Students in this category demonstrate the ability to think critically and apply the assessed knowledge and skills in varied contexts, both familiar and unfamiliar.
- For students at the end of high school, this is associated with a 75% chance of passing freshman level college courses.

Meets Grade Level

- Performance in this category indicates that students have a high likelihood of success in the next grade or course but may still need some short-term, targeted academic intervention. Students in this category generally demonstrate the ability to think critically and apply the assessed knowledge and skills in familiar contexts.
- For students at the end of high school, this is associated with a 60% chance of passing freshman level college courses.

Approaches Grade Level

- Performance in this category indicates that students are likely to succeed in the next grade or course with targeted academic intervention. Students in this category generally demonstrate the ability to apply the assessed knowledge and skills in familiar contexts.
- This is the passing standard applied by the state to students who take the EOCs, and for students on the 5th and 8th grade in reading & math STAAR.
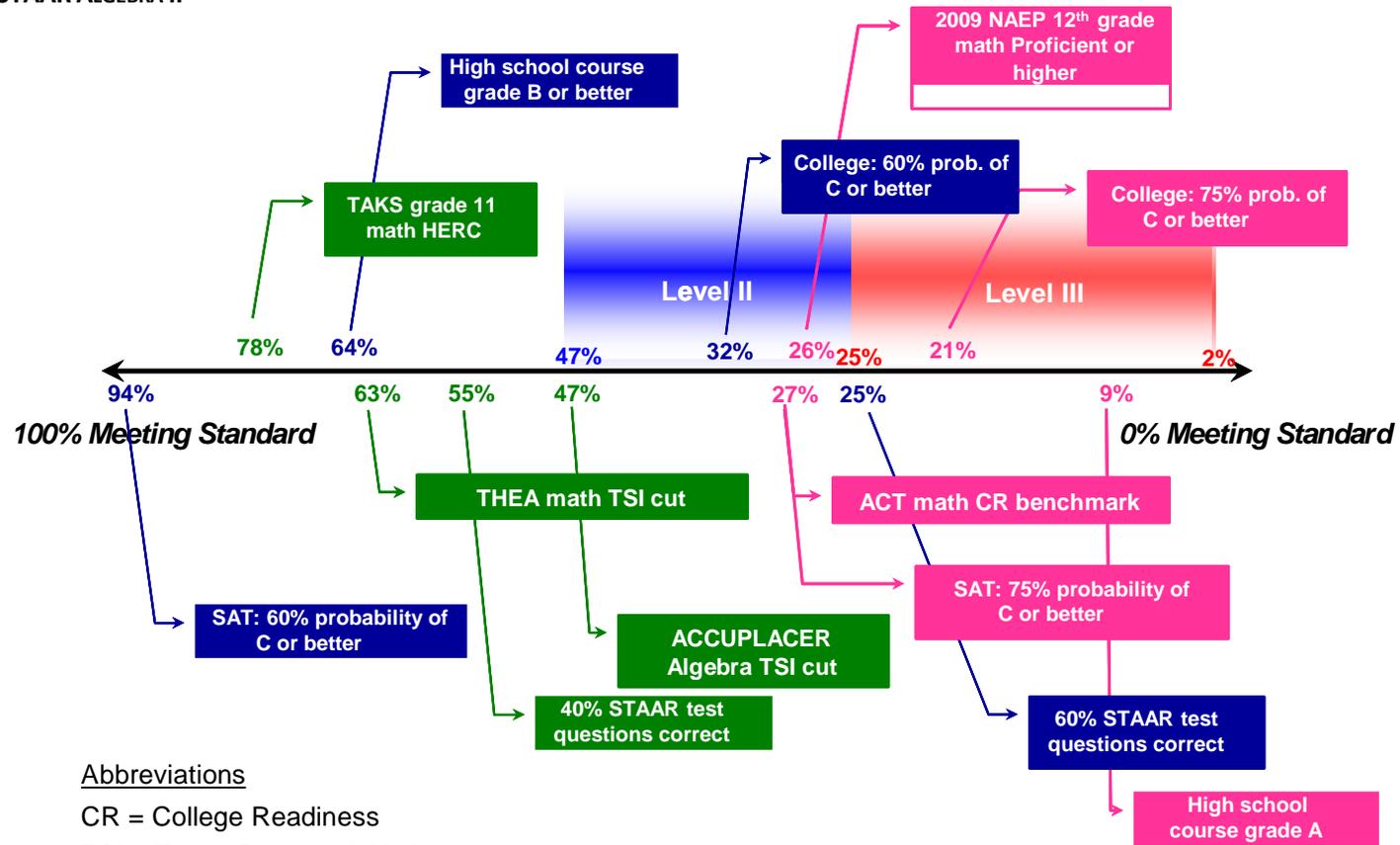
Student Achievement and Attainment Summary

Spring 2017 - "Meets" Standard

Category	Value
Kindergarten Readiness-Reading — Based on local district assessments	60
3rd Grade Reading — STAAR "Meets" Grade Level or Above	45
3rd Grade Math — STAAR "Meets" Grade Level or Above	48
8th Grade Reading — STAAR "Meets" Grade Level or Above	49
8th Grade Math — STAAR "Meets" Grade Level or Above	44
SAT/ACT Passing — 2016 Cohort Attaining College Ready Score	16
High School Completion — 2016 Cohort graduating within 4 years	89
College Enrollment — 2015 Cohort Enrolled within 1-yr at a Texas IHE	56
Postsecondary Completion — 2009 Cohort 2-or-4-year TX Postsecondary Completion within 6 years	24

3rd Grade Reading - STAAR

8th Grade Reading - STAAR

Approaches Grade Level*   Meets Grade Level   Masters Grade Level

* The Approaches Grade Level standard was raised (made more difficult) in 2016

16

3rd Grade Math - STAAR

Percentage of Students Meeting Standard

- Meets Grade Level: 34 (2013), 33 (2014), 40 (2015), 43 (2016*), 48 (2017)

* The Approaches Grade Level standard was raised (made more difficult) in 2016

8th Grade Math - STAAR

Percentage of Students Meeting Standard

- Meets Grade Level: 36 (2013), 37 (2014), 33 (2015), 39 (2016*), 44 (2017)

Approaches Grade Level* — Meets Grade Level — Masters Grade Level
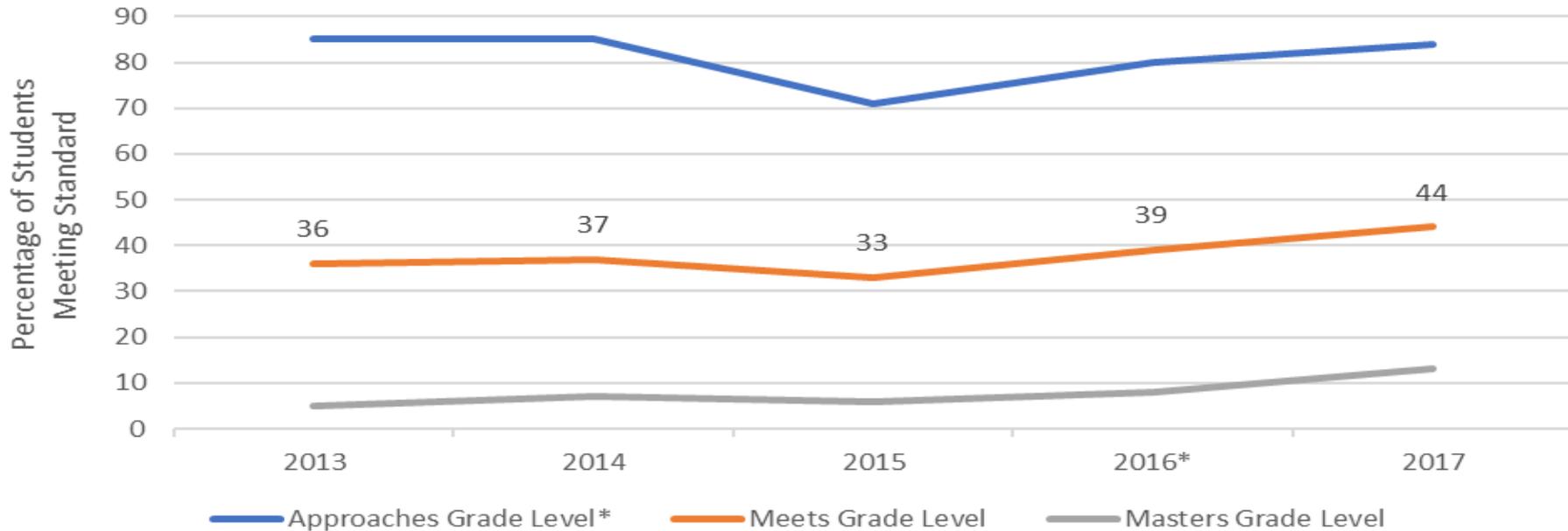
** These 8th Grade Math numbers include only 8th graders taking 8th grade math. The percentages do not include those students taking Algebra I in 8th grade, whose performance tends to be higher. Including those students, 8th grade students Meeting Grade Level is closer to 50%. That consolidated data will begin being published Fall 2018.

Texas Education Agency

3rd Grade Reading - STAAR

8th Grade Reading - STAAR

Economically Disadvantged — Non Economically Disadvantaged — All Students
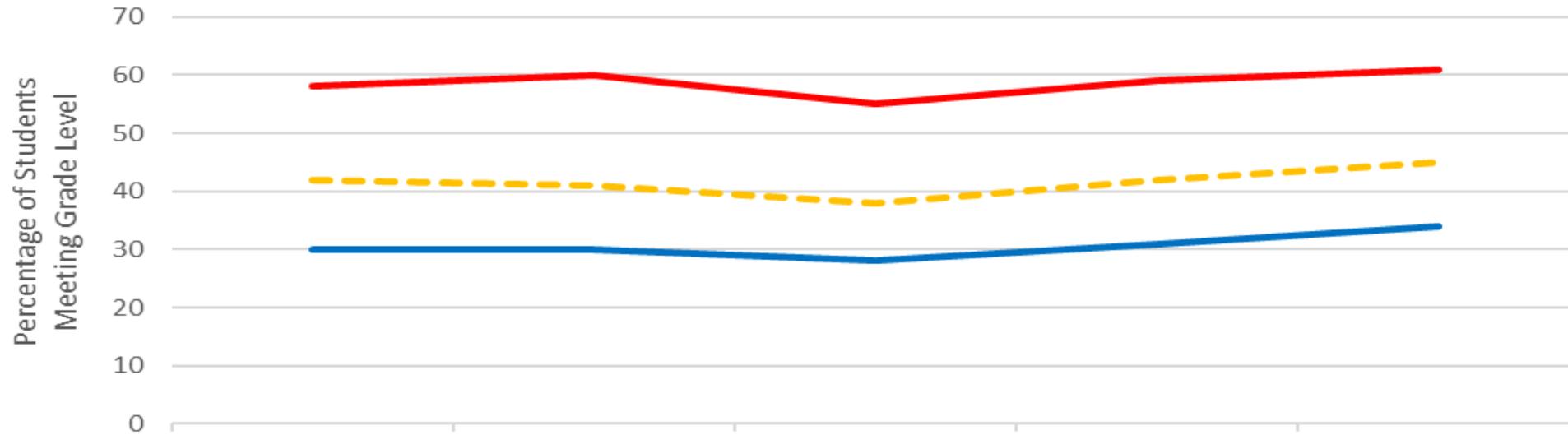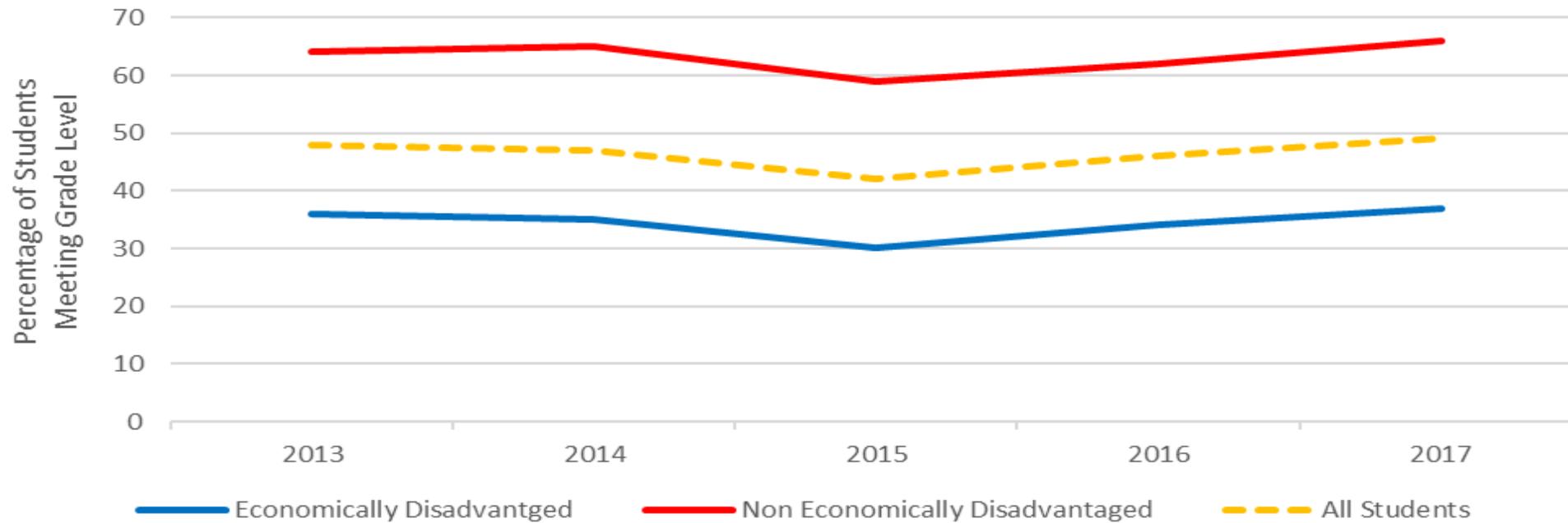
Four-Year Graduation Rates, by Race/Ethnicity, Texas Public Schools

4 Year Graduation Rates
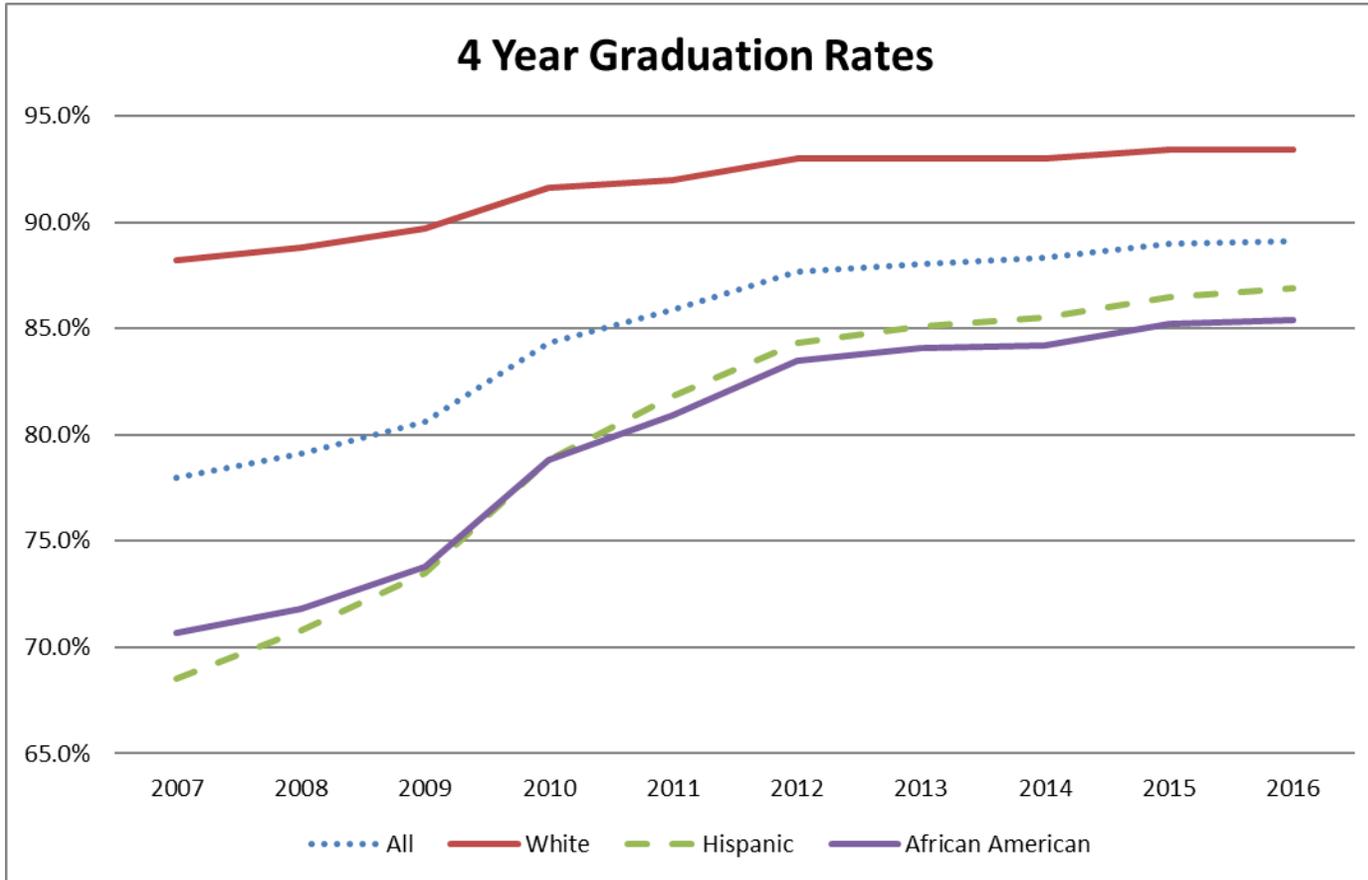
National Comparison

2014-15 Graduation Rates

Rank	State	Rate
1	Iowa	90.8%
2	New Jersey	89.7%
3	Alabama	89.3%
4	Texas	89.0%
5	Nebraska	88.9%

1996-2016: SAT/ACT Performance By Socioeconomic Status

% Above "Passing" on SAT/ACT

Non Economically Disadvantaged

6.1 point rise
31% increase

All Students In Texas

Economically Disadvantaged

1.8 point rise
45% increase

Economically disadvantaged — Not economically disadvantaged — All
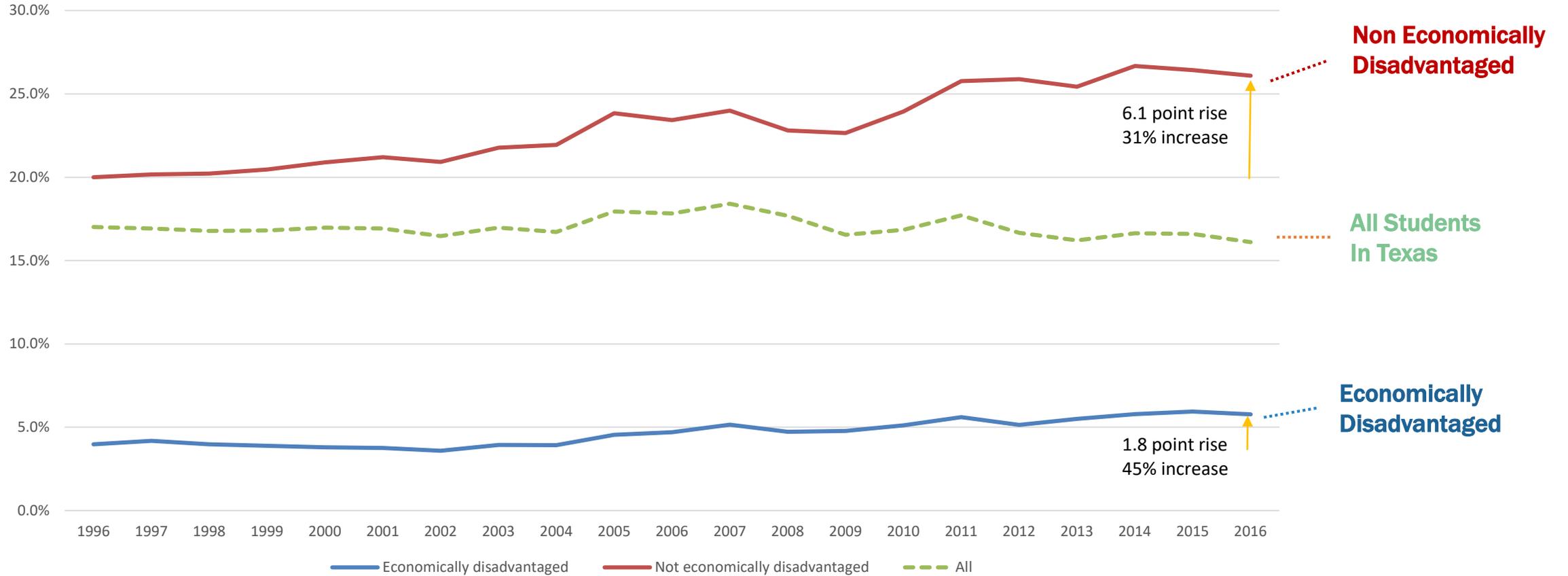
1996-2017: Rise In Student Poverty Rates in Texas

Selected Student Demographics over Time

1996 Econ Dis. %

% Economically Disadvantaged
% English Language Learner
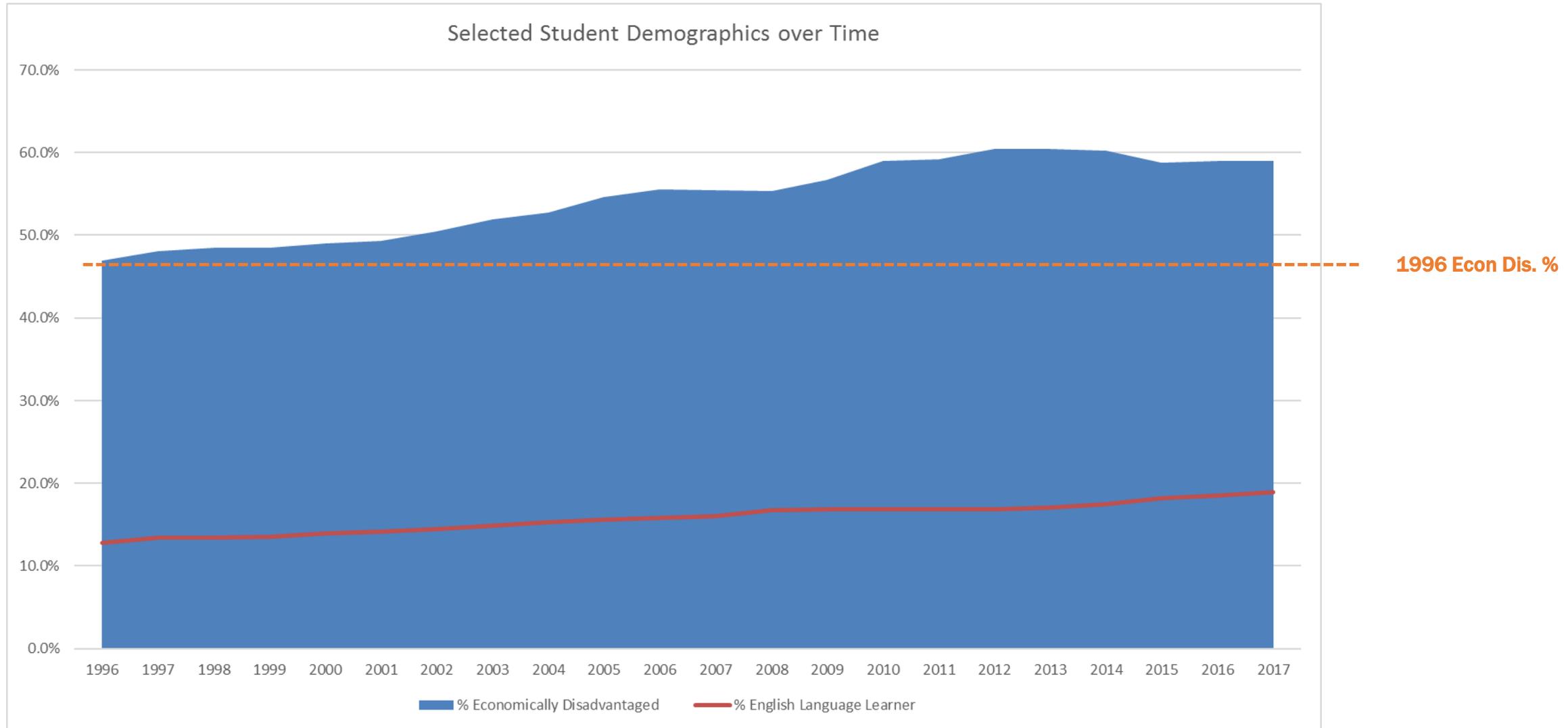
SAT/ACT Performance Among Certain Student-Populations
1996 - 2016

% Above "Passing" on SAT/ACT

White Students

All Students In Texas

Hispanic Students

African American Students

All · · · · · White —— Hispanic ----- African American ——

College Enrollment Rates

Enrollment in Public & Private TX Institutions of Higher Education by Year of HS Graduation

High School Graduates in College: 53.3% (2007), 53.6% (2008), 54.4% (2009), 53.1% (2010), 51.9% (2011), 50.8% (2012), 50.2% (2013), 50.6% (2014)

High School Graduates in Two-Year College: 31.0% (2007), 31.9% (2008), 33.3% (2009), 32.1% (2010), 30.9% (2011), 30.3% (2012), 30.0% (2013), 29.4% (2014)

High School Graduates in Four-Year College: 22.3% (2007), 21.8% (2008), 21.1% (2009), 21.0% (2010), 21.1% (2011), 20.5% (2012), 20.2% (2013), 21.2% (2014)

How Does Texas Compare to Other States?

4th Grade Math NAEP

- Texas rank vs other states (right)
- Average of all students over time (below)
- Texas student-groups over time (below right)

	2000	2003	2005	2007	2009	2011	2013	2015
Texas-White-Rank*	3	5	2	4	7	7	6	4
Texas-Hispanic-Rank*	2	7	2	3	8	11	13	3
Texas-Black-Rank*	1	1	2	3	3	4	4	1
Texas-Overall-Rank*	7	17	11	20	27	24	26	10

* Rank of states only, excludes DC, Dept of Def, and territories

Math Grade 4 - Average Score

Math Grade 4 - Average Score
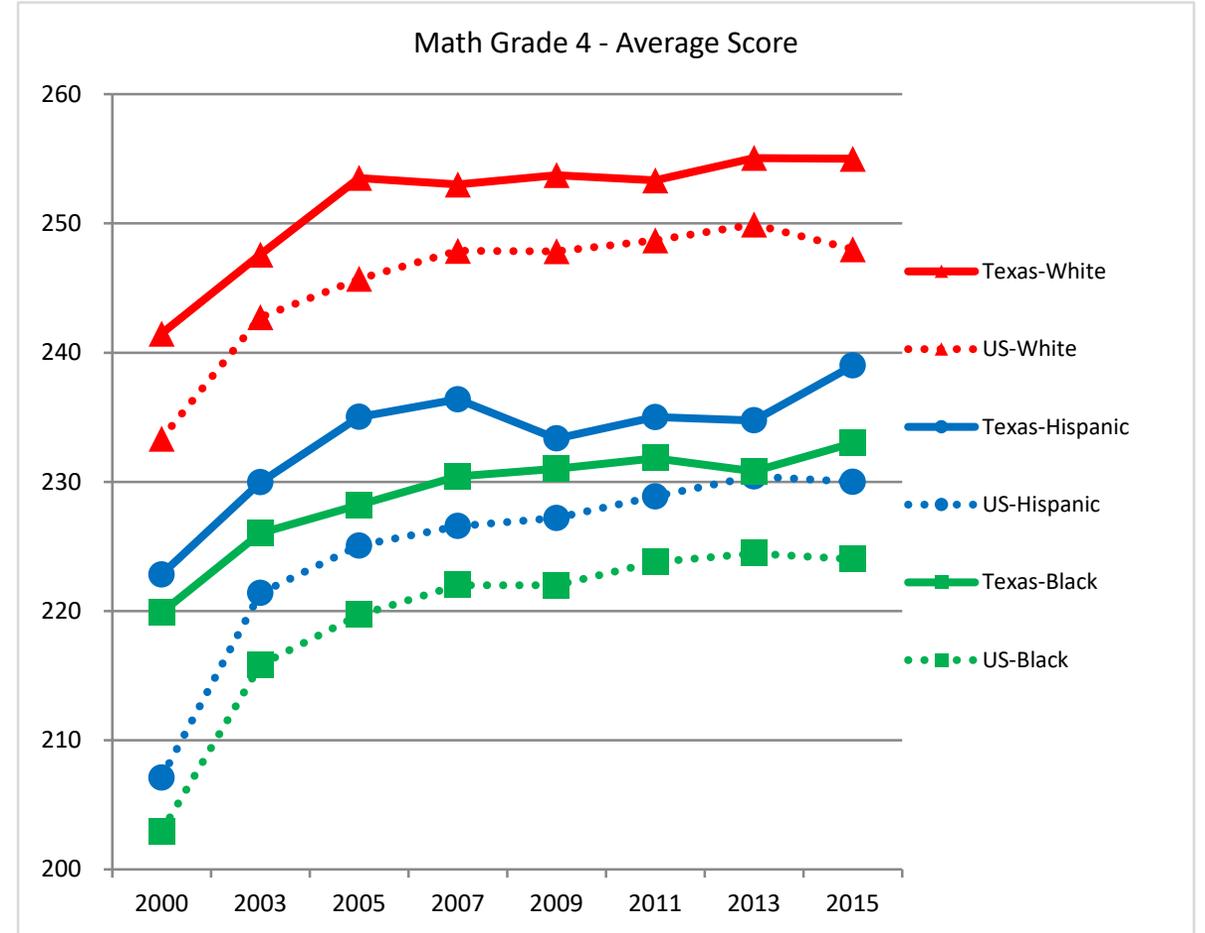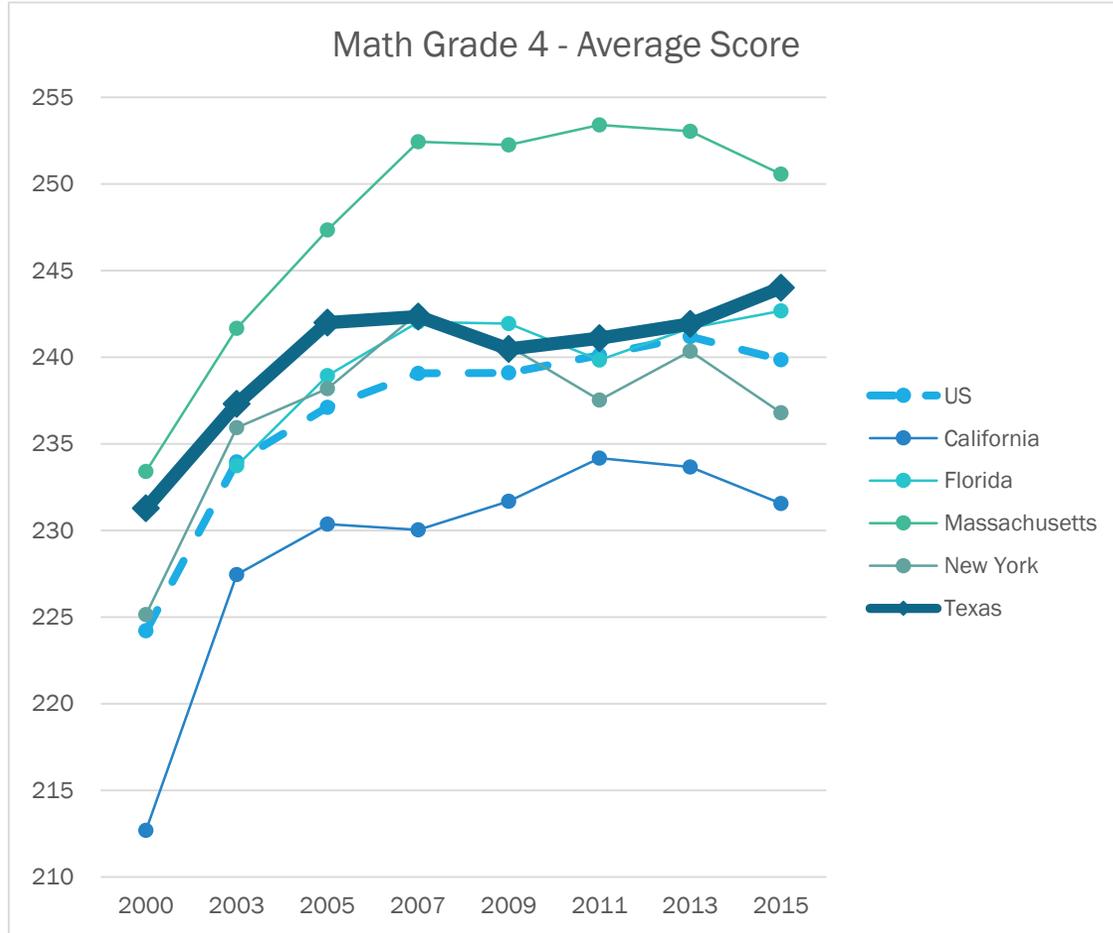
8th Grade Math NAEP

- Texas rank vs other states (right)
- Average of all students over time (below)
- Texas student-groups over time (below right)

	2000	2003	2005	2007	2009	2011	2013	2015
Texas-White-Rank*	7	10	4	3	4	4	5	4
Texas-Hispanic-Rank*	4	3	2	1	4	2	3	3
Texas-Black-Rank*	9	7	4	4	1	2	3	5
Texas-Overall-Rank*	20	33	21	15	18	10	15	22

Math Grade 8 - Average Score

Math Grade 8 - Average Score
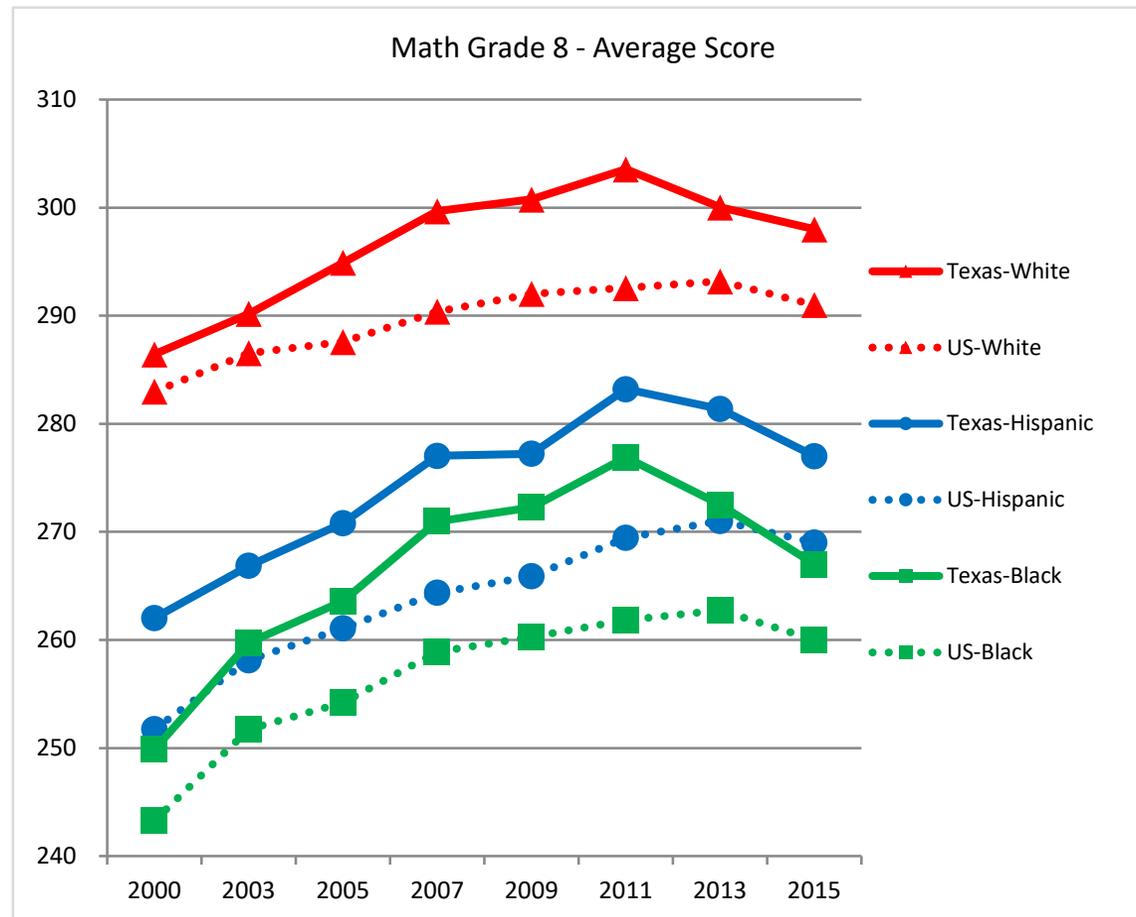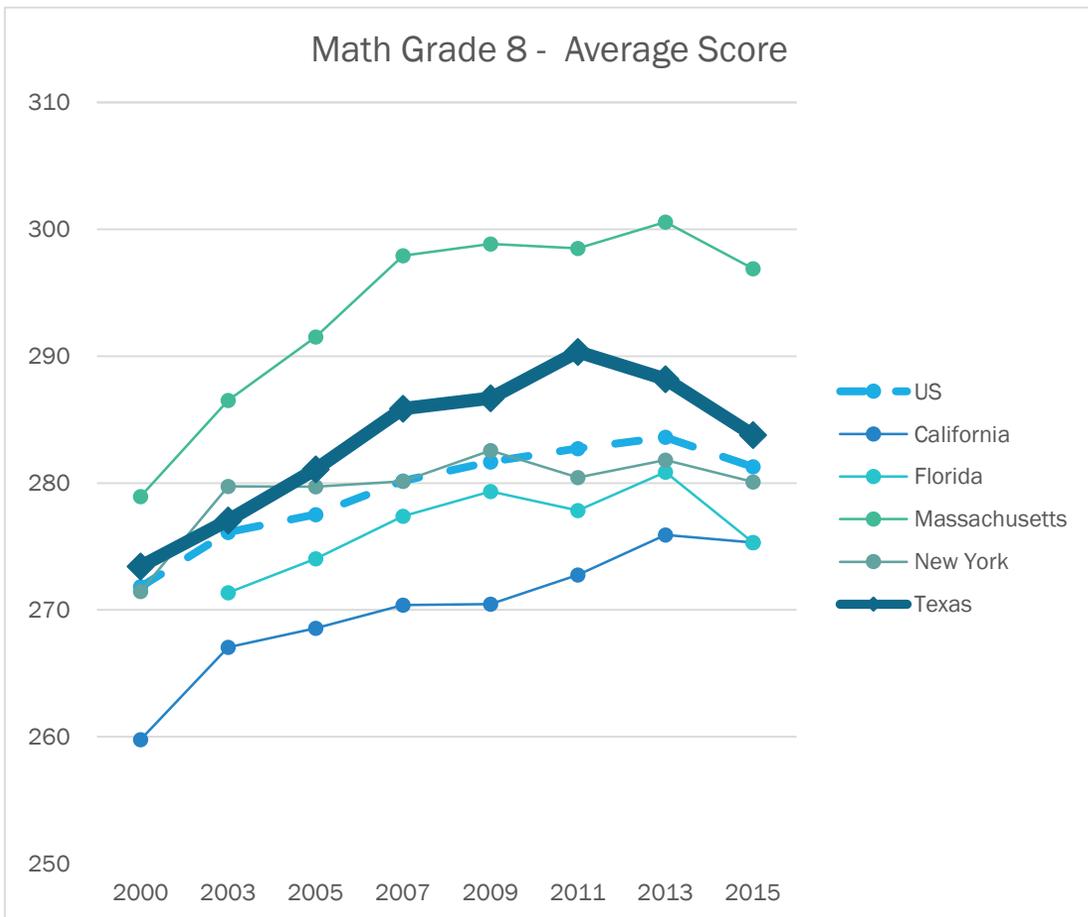
4th Grade Reading NAEP

- Texas rank vs other states (right)
- Average of all students over time (below)
- Texas student-groups over time (below right)

	1998	2002	2003	2005	2007	2009	2011	2013	2015
Texas-White-Rank*	3	7	16	11	11	11	11	11	11
Texas-Hispanic-Rank*	9	5	18	11	11	18	14	34	22
Texas-Black-Rank*	21	16	13	9	13	5	7	13	22
Texas-Overall-Rank*	22	29	36	29	31	33	36	40	39

Reading Grade 4 - Average Score
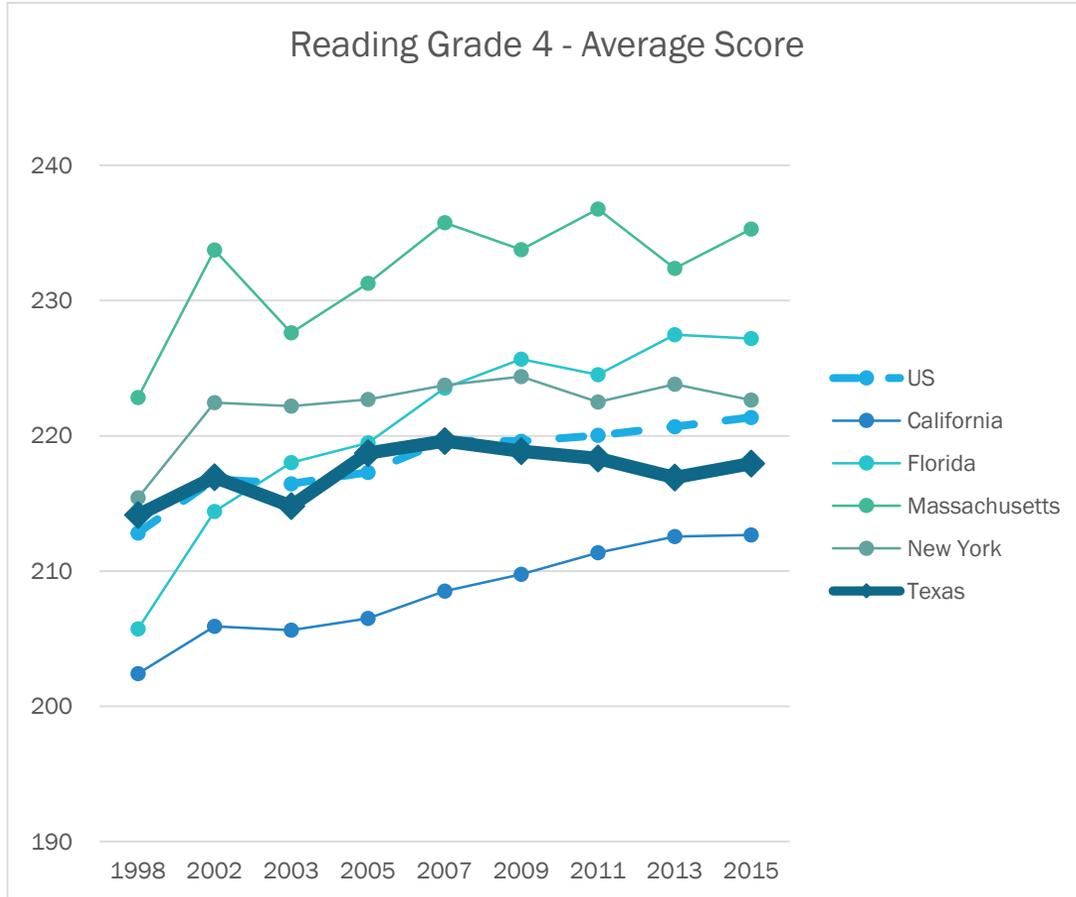
Reading Grade 4 - Average Score
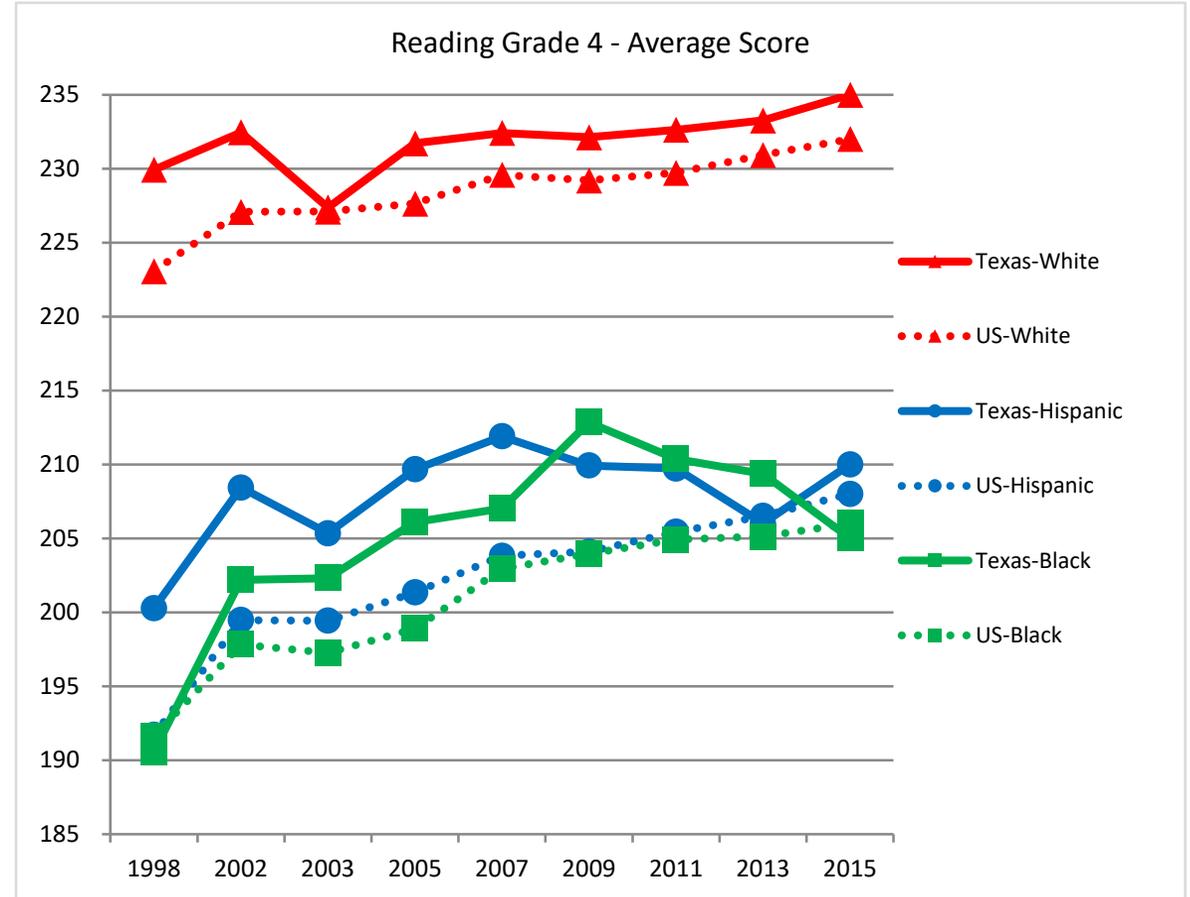
8th Grade Reading NAEP

- Texas rank vs other states (right)
- Average of all students over time (below)
- Texas student-groups over time (below right)

	1998	2000/02	2003	2005	2007	2009	2011	2013	2015
Texas-White-Rank*	9	4	13	21	5	10	14	8	20
Texas-Hispanic-Rank*	7	9	15	15	12	19	23	28	34
Texas-Black-Rank*	10	9	13	10	10	17	10	13	8
Texas-Overall-Rank*	21	26	36	36	31	34	36	37	38

Reading Grade 8 - Average Score
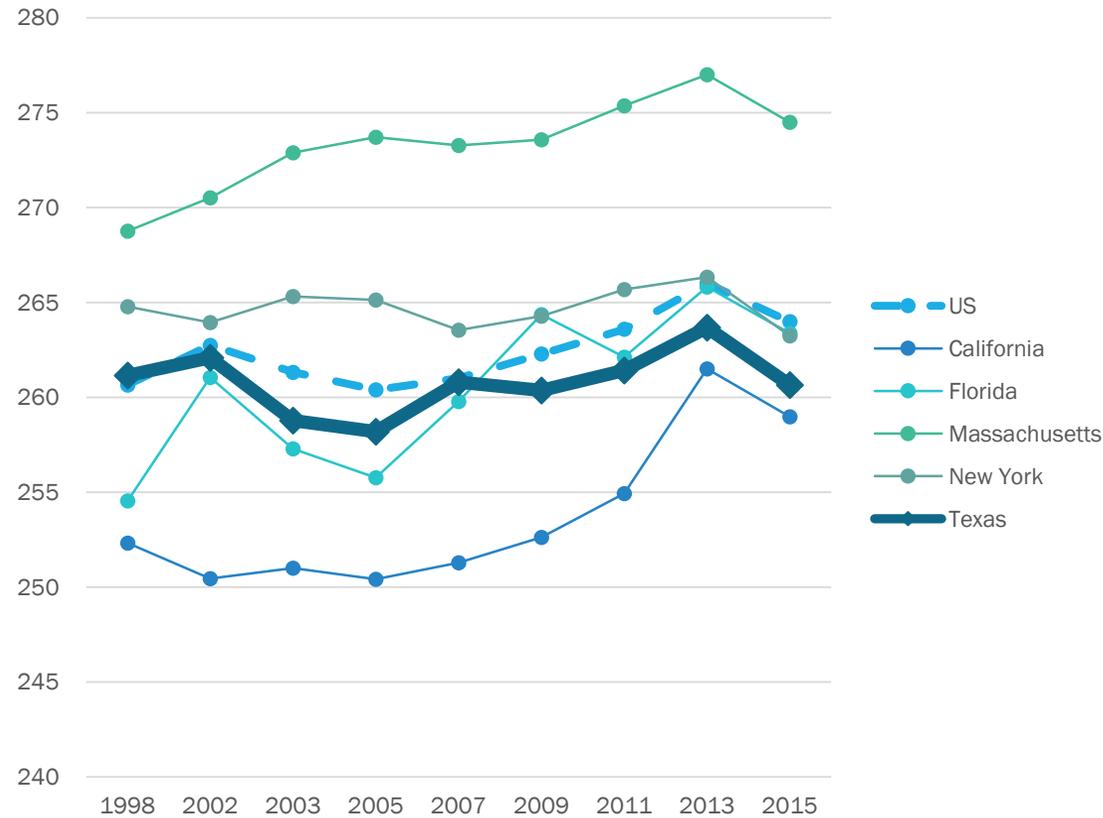
Reading Grade 8 - Average Score
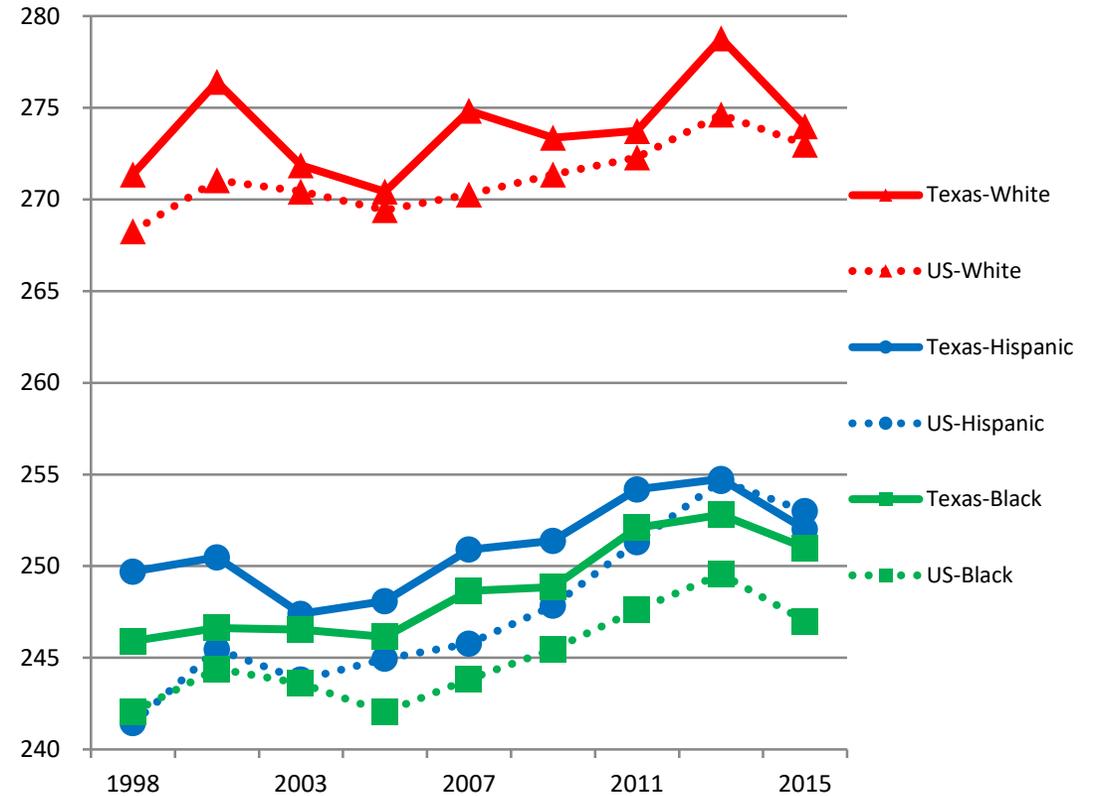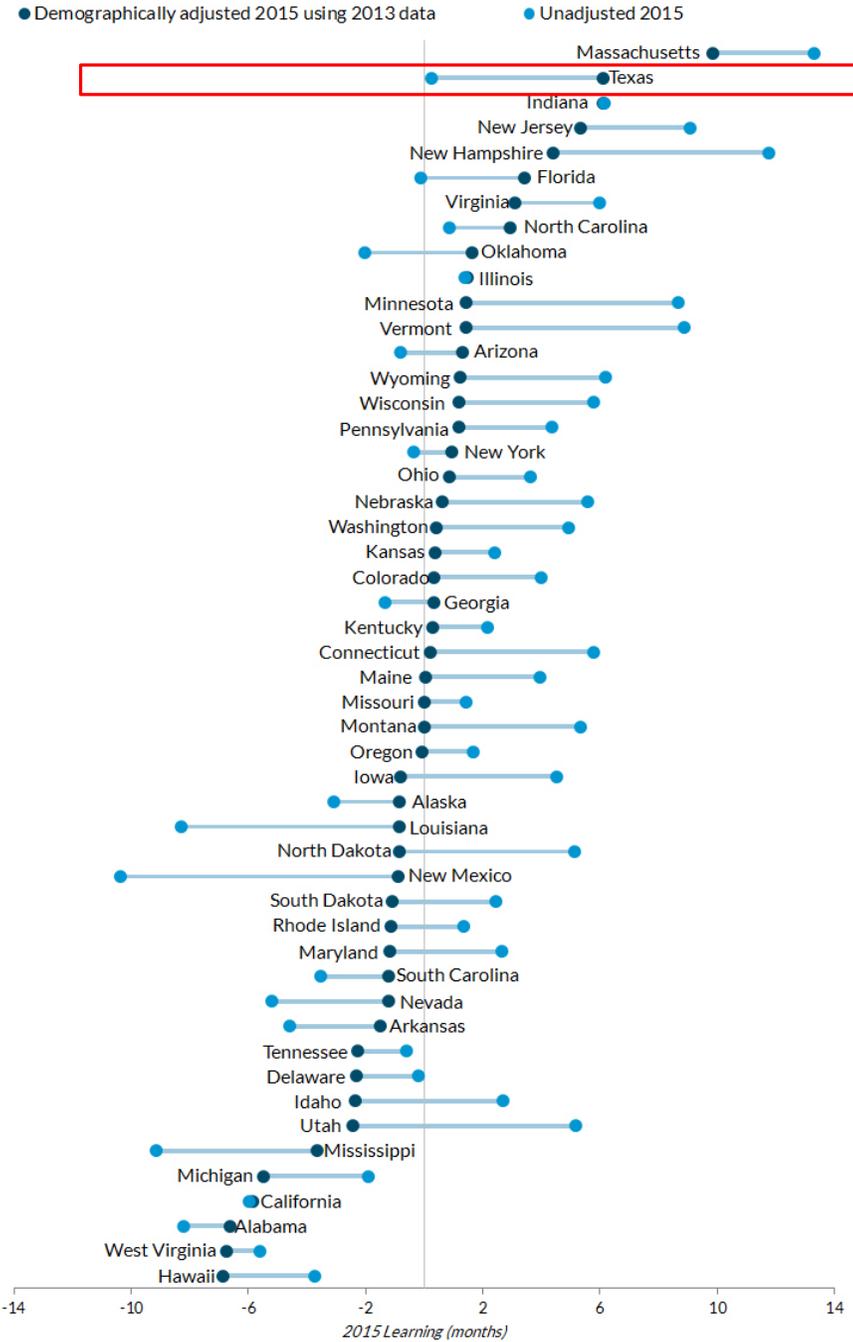
NAEP State Rankings - 2015

Absolute vs Demographically Adjusted

See:

http://educationnext.org/how-do-states-really-stack-up-on-the-2015-naep/

State Performance on 2015 NAEP

● Demographically adjusted 2015 using 2013 data   ● Unadjusted 2015

Source: Urban Institute analysis of NAEP data

URBAN INSTITUTE

NAEP State Rankings - 2013

Absolute vs Demographically Adjusted

See:

http://www.urban.org/research/publication/breaking-curve-promises-and-pitfalls-using-naep-data-assess-state-role-student-achievement/view/full_report

2013 Per Pupil Spending

Per US Census

United States	$ 10,700
California	$ 9,220
Florida	$ 8,433
Massachusets	$ 14,515
New York	$ 19,818
Texas	$ 8,299

State Performance on 2013 NAEP
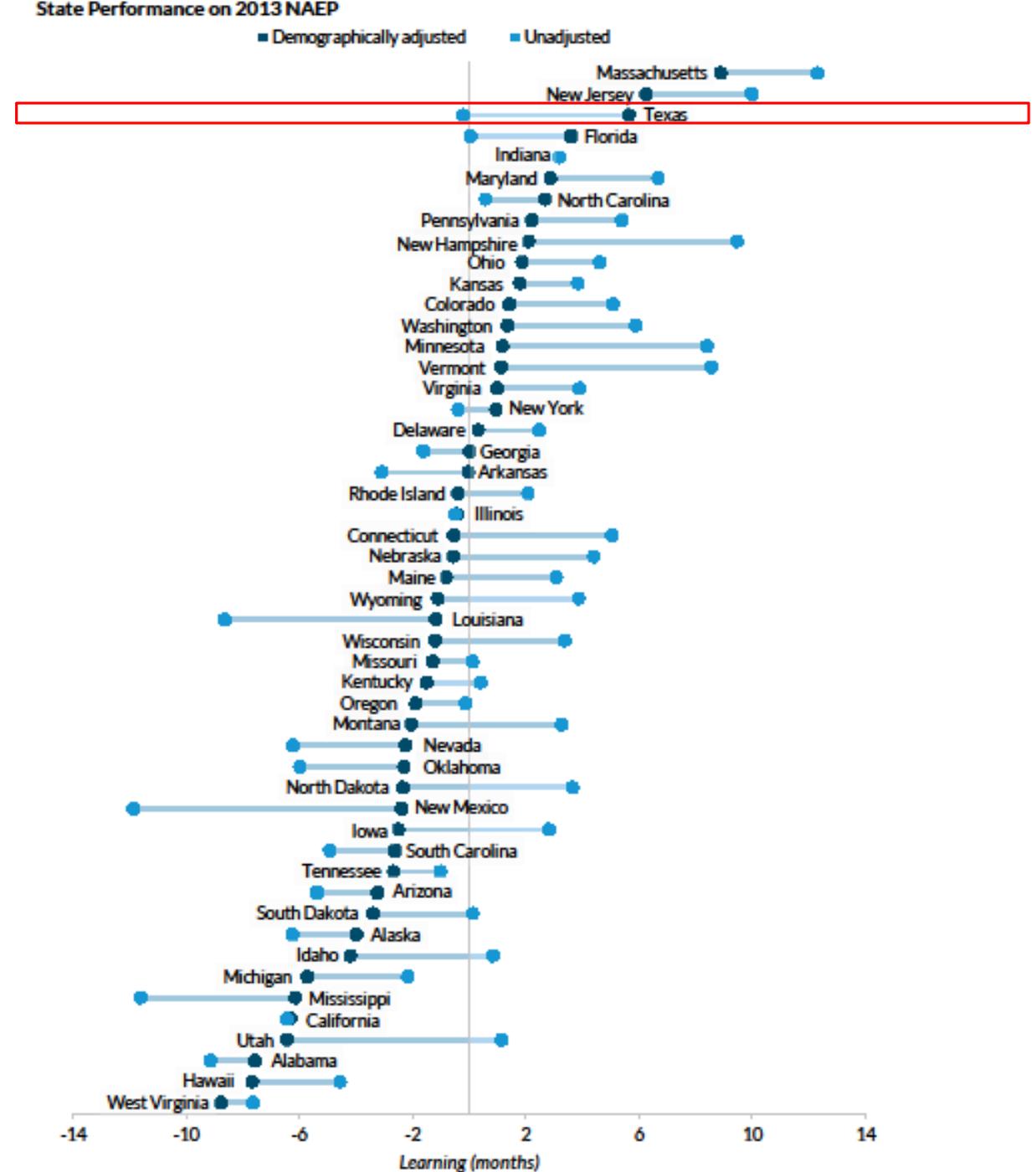
How do we differentiate performance within Texas?

- HB22 will allow for clear differentiation, but won't be initially available for campuses until August 2018
- In the meantime, it is possible to analyze Student Achievement relative to Poverty to see performance outliers

Elementary Campus "Performance"

% of Students Meeting Grade Level on the STAAR

% of Students Eligible for Free/Reduce Lunch
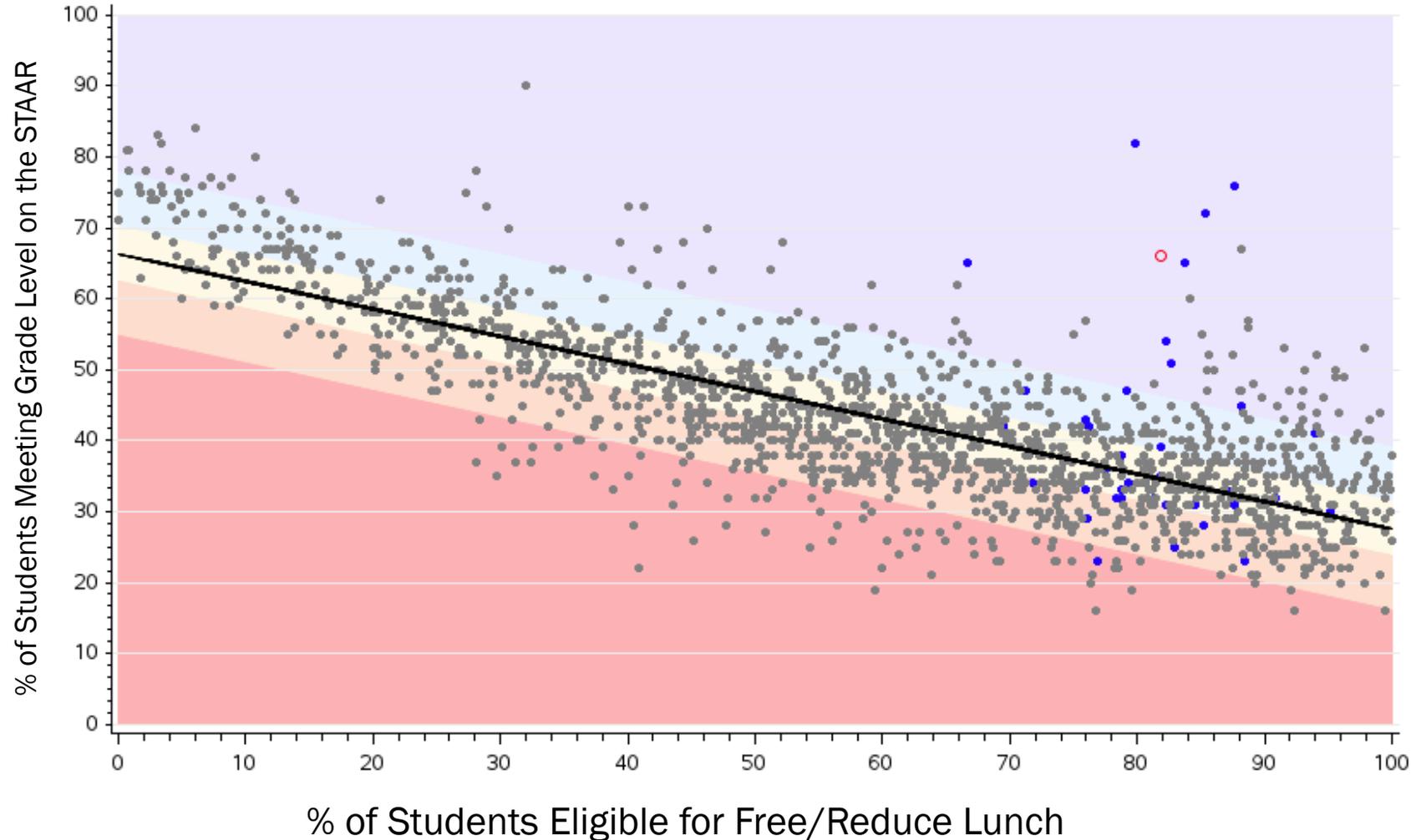
2015-2016 School Year

District "Performance"
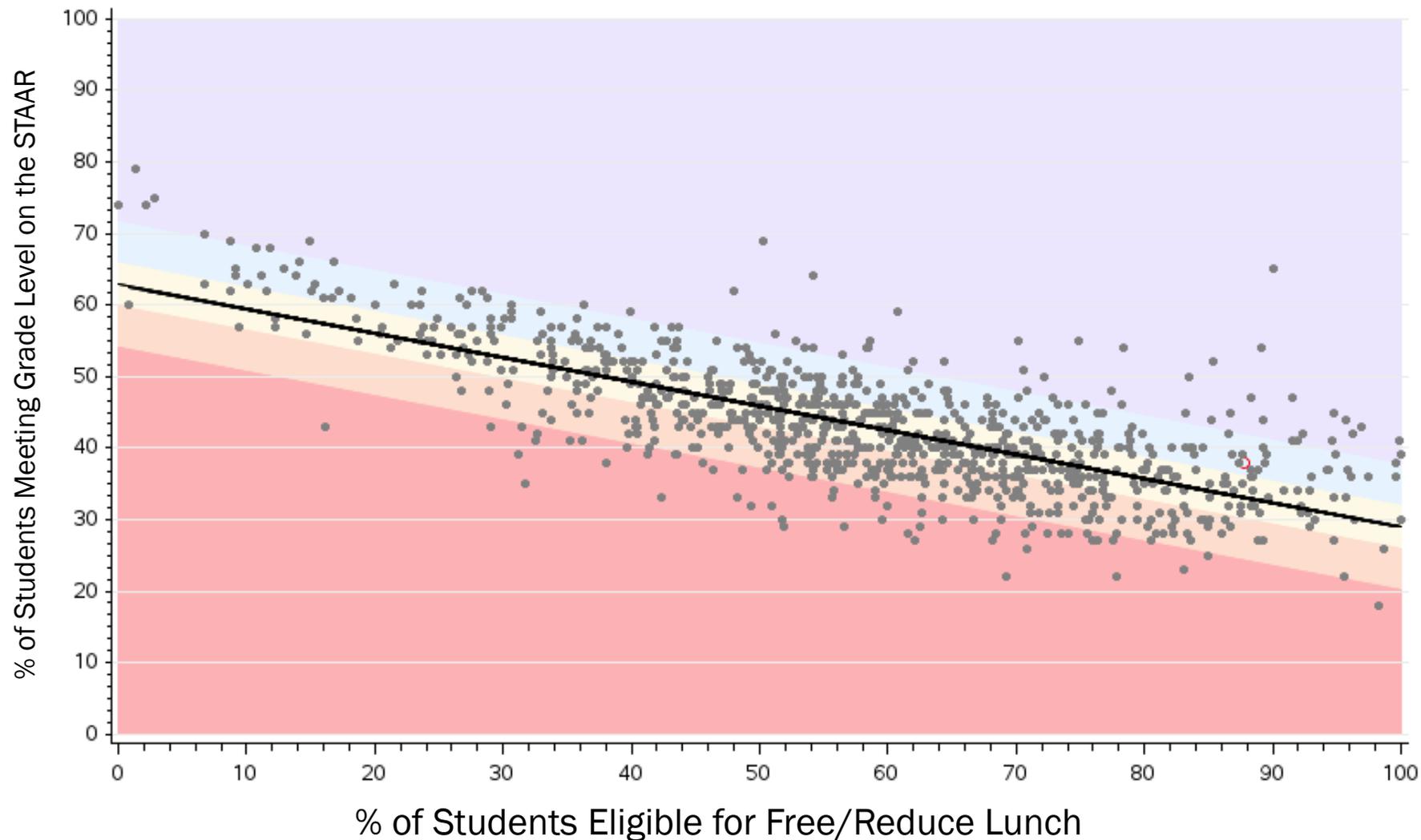
2015-2016 School Year

The relationship between funding and performance: limitations

- Campus level funding information is imprecise in Texas because of different approaches to time & effort allocations in managerial accounting.
  - Example to Consider: IT Services
- District level financial information is highly accurate, and allows for comparisons.

District "Performance" Relative to Per Student Funding for
Below Average Taxation Districts & Above Average Student Poverty Districts*

Academic Performance for only those districts and charters with:
1) maintenance and operations (M&O) local property tax rates at or below the state average of $1.0812 per $100 of taxable property valuation (which includes all charters, funded at that average), and
2) population of economically disadvantaged students higher than state average of 59%
382 districts & charters featured

"What If" Domain III Score: STAAR Achievement Relative to Student Poverty 2015-2016
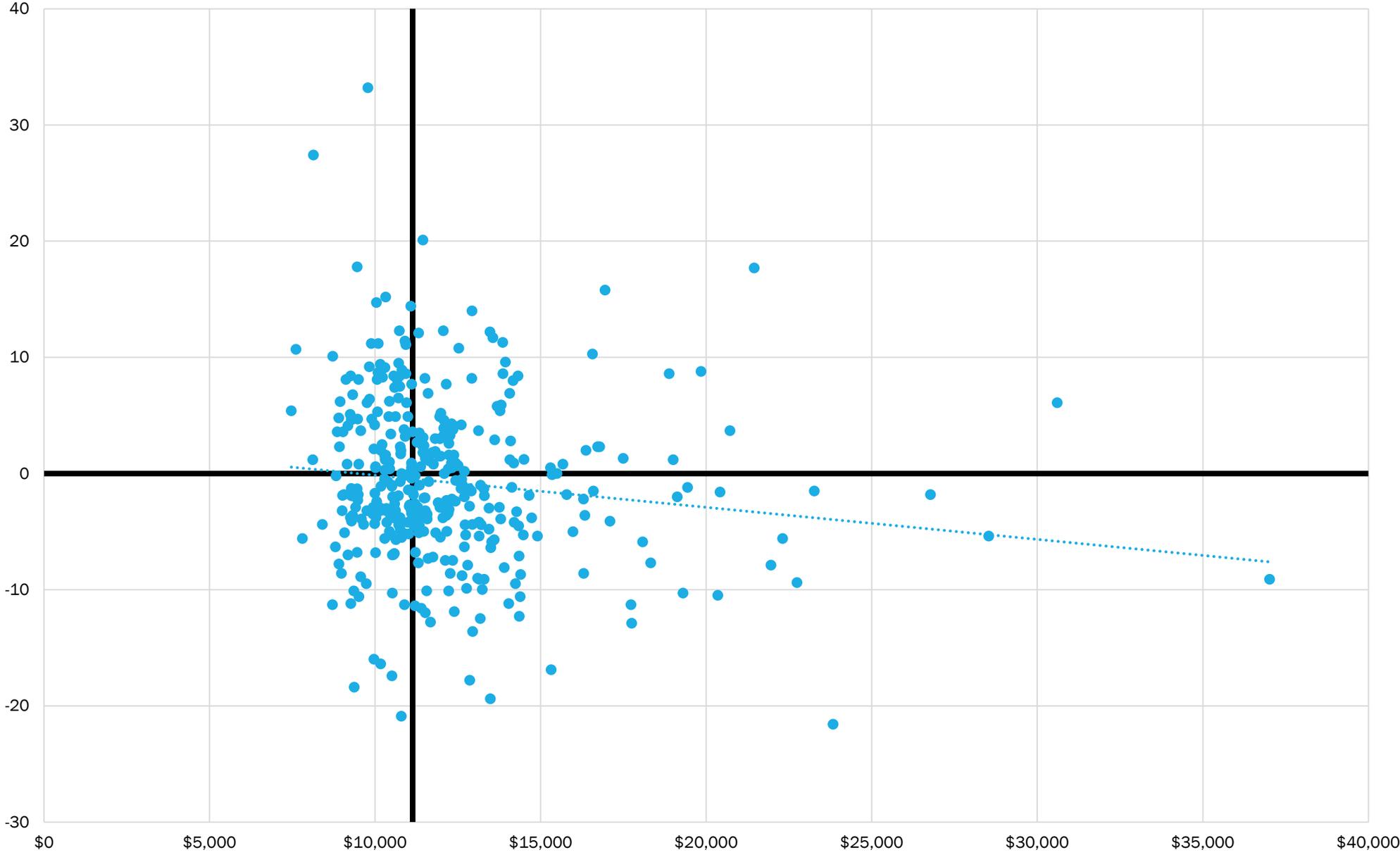
State, Local and Federal Revenue per Student (All Funds) for the 2015-2016 School Year

What do district budgets tell us?

Texas financial accounting system tracks spending by functional area. Examples:

- Instruction
- Curriculum/Staff Development
- School Administration
- General Administration
- Plant Maintenance/Operations
- Data Processing Services

Despite much study, no clear relationship seems to exist between total dollars spent in these functional budget categories and student outcomes

What do district budgets tell us?

It's not as simple as total dollars in a budget functional area.

Instead, it's <u>programmatic choices</u> & <u>execution quality</u> of that spending that matter the most

- It appears that the programmatic choices made by districts and the quality of execution of those choices at the campus level – with a special focus on quality instruction – drive outcomes far more than macro-level budgetary decisions.
- Consider: The difference between total spent on staff development vs the content & approach of the staff development pursued.

What are some promising practices worth exploring?

- Comprehensive Teacher Quality & Placement Initiatives
- Focused Instructional Leadership Initiatives
- Quality Early Learning Programs
- Certain Integrated, Coherent Instructional Materials (Blended & Traditional)
- Increased Summer Learning Opportunities
- School Systems transforming into Systems of Great Schools:
  - Certain School Models (Primarily High School)
  - Intentional School Launch Practices
  - Proven Operator Replications

Teacher Quality

- Teachers are the most important in-school factor impacting student outcomes. Teachers are also the biggest budget driver in Texas.
- Teaching represents $28B per year of spending in Texas, roughly 48% of all K12 spending.
- Increases in funding that are applied to teaching can do some combination of:
  - Increase the number of teachers
  - Increase pay for all
  - Increase pay for some
- Districts respond to funding changes differently given local context
  - But those responses are built around certain default system behaviors. Can finance system components change those behaviors?

District Funding Responses:
Teacher Quality

- **Increasing the number of teachers:**

class size reduction

- Consider effect-size research*: 0.21
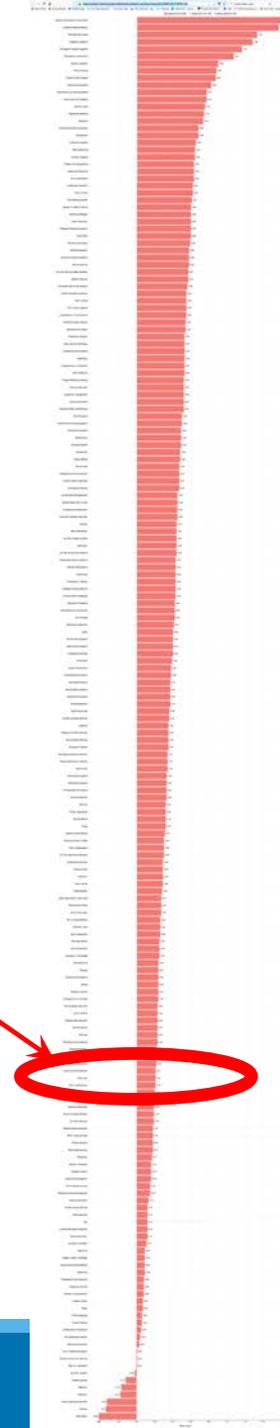
- See: https://visible-learning.org/hattie-ranking-influences-effect-sizes-learning-achievement/
Note these effect sizes are not typically based on random control trials, and subject to some caution on interpretation

District Funding Responses: Teacher Quality

- **Increasing pay for all**
  - Consider the default salary schedule:

Sample District Salary Schedule:

17-18 TEACHER PLACEMENT TABLE
All Months

Step	YRS EXP	10M STEP RATE	10.5M STEP RATE	11M STEP RATE	11.5M STEP RATE	12M STEP RATE
1	0-3	$52,530	$55,157	$57,783	$60,410	$63,036
2	4-5	$53,040	$55,692	$58,344	$60,996	$63,648
3	6	$54,590	$57,320	$60,049	$62,779	$65,508
4	7	$54,848	$57,590	$60,333	$63,075	$65,818
5	8	$55,105	$57,860	$60,616	$63,371	$66,126
6	9	$55,363	$58,131	$60,899	$63,667	$66,436
7	10	$55,620	$58,401	$61,182	$63,963	$66,744
8	11	$56,149	$58,956	$61,764	$64,571	$67,379
9	12	$56,408	$59,228	$62,049	$64,869	$67,690
10	13	$56,666	$59,499	$62,333	$65,166	$67,999
11	14	$56,925	$59,771	$62,618	$65,464	$68,310
12	15	$57,184	$60,043	$62,902	$65,762	$68,621
13	16	$57,720	$60,606	$63,492	$66,378	$69,264
14	17	$58,240	$61,152	$64,064	$66,976	$69,888
15	18	$58,760	$61,698	$64,636	$67,574	$70,512
16	19	$59,540	$62,517	$65,494	$68,471	$71,448
17	20	$59,956	$62,954	$65,952	$68,949	$71,947
18	21	$62,166	$65,274	$68,383	$71,491	$74,599
19	22	$62,296	$65,411	$68,526	$71,640	$74,755
20	23	$62,712	$65,848	$68,983	$72,119	$75,254
21	24	$63,544	$66,721	$69,898	$73,076	$76,253
22	25	$64,064	$67,267	$70,470	$73,674	$76,877
23	26	$65,000	$68,250	$71,500	$74,750	$78,000
24	27	$65,884	$69,178	$72,472	$75,767	$79,061
25	28	$66,144	$69,451	$72,758	$76,066	$79,373
26	29	$66,768	$70,106	$73,445	$76,783	$80,122
27	30	$67,704	$71,089	$74,474	$77,860	$81,245
28	31	$68,120	$71,526	$74,932	$78,338	$81,744
29	32	$68,744	$72,181	$75,618	$79,056	$82,493
30	33	$69,576	$73,055	$76,534	$80,012	$83,491
31	34	$70,460	$73,983	$77,506	$81,029	$84,552
32	35	$72,280	$75,894	$79,508	$83,122	$86,736
33	36+	$74,360	$78,078	$81,796	$85,514	$89,232

District Funding Responses: Teacher Quality

- **Increasing pay for some**
  - Connecting school funding changes to teacher quality would require compensation systems based on something beyond just years of experience

Figure 1. Improvements in Math Student Achievement Attributable to Additional Teacher Experience
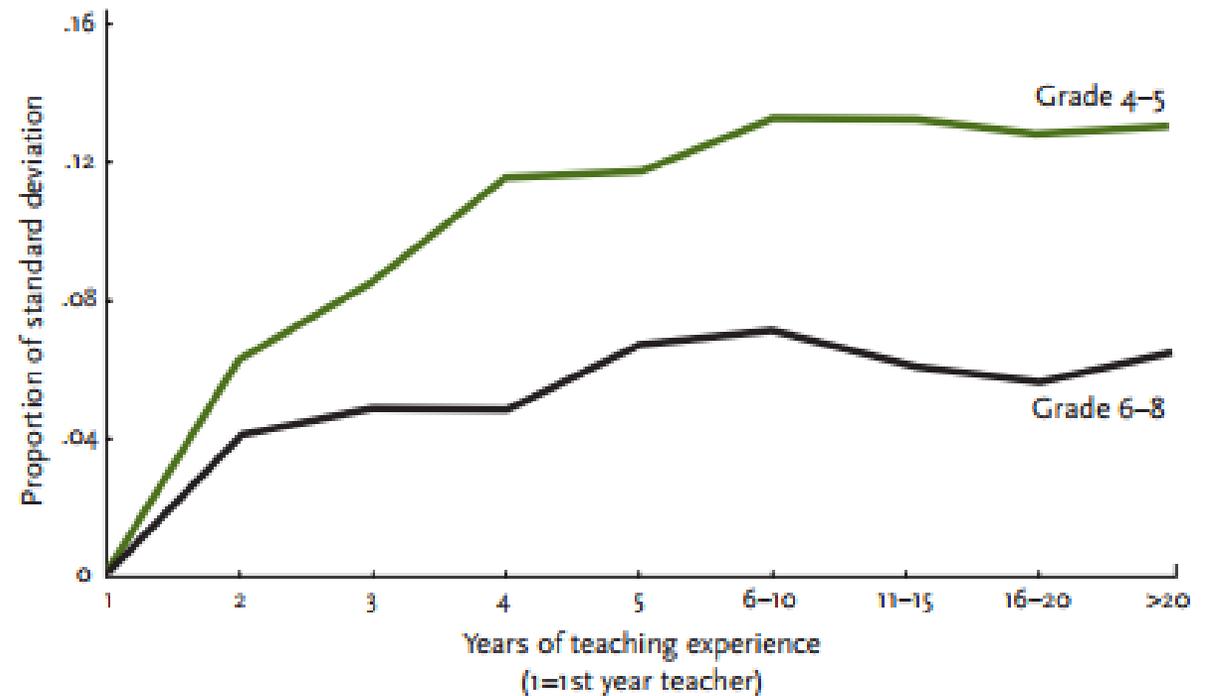
Early Learning

- 90% of brain development occurs before age 5
- TEA data shows that of students eligible for Pre-K in Texas, those who participated in Pre-K in 1999 are persisting in college at 6.8% higher rates that those who were eligible and did not
- Districts respond to funding changes differently given local context
  - But those responses are built around certain default system behaviors.
  - Current funding formulas include a high school allotment on top of full ADA funding for high school students. By comparison, PreK has only a half ADA allocation, and no extra allotment.

Coherent Curriculum

- Quality instructional materials & approaches are incredibly impactful
- Random control trial results:

Curriculum comparisons	RCT Effect size
More effective math curricula	0.30 mathematics
Most effective preschool curricula	0.48 vocabulary
Most effective dropout preventions	1.00 progressing in school
Most effective early reading programs	0.80 alphabetics

- Districts are provided IMA for materials, but the content/quality of those materials is unlinked to any systemic incentives.
- A new state law sets up an Instructional Materials Portal, to list materials and information about their quality. It should go live in 2019.

Summer Learning

- Typical days of instruction in Texas is roughly 180. Most Asian nations have 220+ days of instruction.
  - Consider effect-size research: Summer Vacation -0.02
- State law recently changed instructional requirements to be based upon minutes, but funding is still based on daily attendance that is effectively capped at that instructional minute floor.
- Districts respond to funding changes differently given local context
  - But those responses are built around certain default system behaviors
  - Adding (or reducing) instructional days is not linked to any differences in funding formulas, but those changes are linked to differences in local costs.
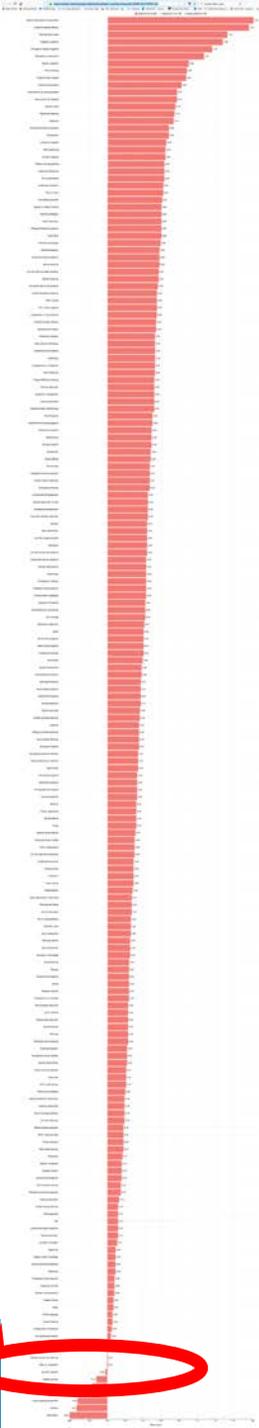
A System of Great Schools

- Given the necessity to focus on execution quality as opposed to broad programs, it is very useful to think of a "whole school approach" as the unit of change:
  - An individual school (or network of like-schools) can control (among many other factors):
    - Instructional Materials
    - Instructional Leadership & Teacher Quality
    - Summer Learning Opportunities
  - and can influence other important factors -- like peer effects from students – through a comprehensive approach to school culture
- Tiered accountability (A-F) is a precondition to identifying, and then replicating, high performers
- Districts could respond to funding incentives based around schools as the unit of change:
  - Consider recently adopted SB1882 that encourages whole school-level partnerships. Does this or something similar create finance system incentives to replicate "A" campuses?

| A 10% | B 16% | C 31% | D 24% | F 19% |

Hypothetical Current Distribution of Schools in a District

| A 22% | B 28% | C 23% | D 17% | F 10% |

Hypothetical Future when Focused on Schools as the Unit of Change