



*Illinois Education Research Council*

# **Teacher Academic Capital in Illinois, 2001-2006: Closing the Gap?**

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# Context

- Teachers matter a lot and there are large differences in teacher effectiveness (as measured by VA)
- There are links between (some) teacher qualifications and student performance at both the classroom level and the school level
- Teacher qualifications are not distributed equally across schools
  - Schools with high proportions of poor and minority student are particularly disadvantaged



# Research Questions

- How have teacher qualifications changed over time in Illinois in recent years?
- Do all Illinois students have equal access to teacher qualifications?
- If there are gaps in students' access, are they widening or closing?
- How were teacher qualifications related to student achievement in Illinois during this time period?



# Data

- All Illinois public schools and public school teachers over six years (2001-2006)
  - **Approximately 4,200 schools and 125,000 teachers per year**
- School Data (from school report cards and CCD)
  - **Concentrations of poor (FRL) and minority (non-white) students**
  - **Grade level served (elem/mid or HS)**
  - **Locale**
  - **Region of state**
  - **Student achievement (% passing state tests)**
- Teacher Data (from state administrative records and ACT)
  - **Years of experience**
  - **Certifications**
  - **Undergraduate college (selectivity via Barron's)**
  - **Basic Skills Test results**
  - **ACT scores**



# The Index of Teacher Academic Capital (ITAC)

- The ITAC statistically combines five **school-level** measures of teacher academic qualifications into a single indicator to capture the average collective level of academic preparation of teachers in each school each year.
- ITAC components (*and loadings*):
  1. Average teacher ACT Composite scores (0.91)
  2. Average teacher ACT English scores (0.90)
  3. % of teachers failing Basic Skills Test (-0.36)
  4. % of emergency certified teachers (-0.50)
  5. Teachers' mean undergraduate college competitiveness (0.45)
- *[We also investigate each school's proportion of inexperienced teachers (defined as 3 years or less) – but separate from ITAC]*



# A Closer Look at ITAC

- ITAC has a mean of zero and a standard deviation of one in 2003

## Average School-Level Teacher Qualifications by ITAC (2003)

Teacher Qualifications	ITAC Score (+/- 0.1)				
	-2.0	-1.0	0.0	1.0	2.0
Average ACT Composite	17.8	19.2	20.9	22.9	24.8
Average ACT English	17.5	19.4	21.5	23.6	25.6
Average undergrad Barron's Ranking*	2.8	2.9	3.0	3.2	3.6
% Failed Basic Skills on first attempt	0.8	0.6	0.2	0.1	0.0
% Emergency/Provisionally Certified	18.2	9.3	2.9	2.0	1.9
<i>N</i>	42	133	412	231	24

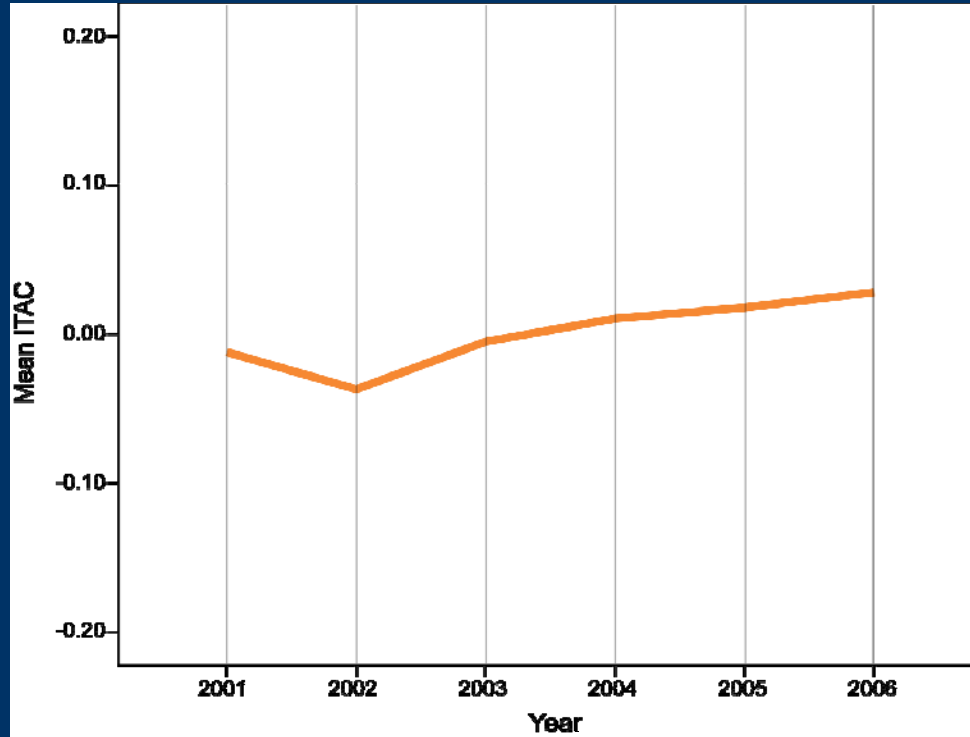
\* Barron's college rankings range from a low of 1 (Non-Competitive) to a high of 6 (Most Competitive)



**How have teacher  
qualifications changed in  
Illinois in recent years?**



# Slight ITAC improvement from 2001 to 2006



ITAC Component	2001	2002	2003	2004	2005	2006	Change
Emergency Certified	5.12%	5.33%	5.26%	4.79%	4.77%	4.50%	-0.62
Failed Basic Skills Test	0.27%	0.44%	0.42%	0.44%	0.44%	0.51%	+0.24
ACT Composite	20.98	20.99	21.06	21.10	21.13	21.16	+0.18
ACT English	21.59	21.54	21.59	21.59	21.59	21.58	-0.01
College Competitiveness	3.04	3.03	3.04	3.03	3.03	3.04	0.00



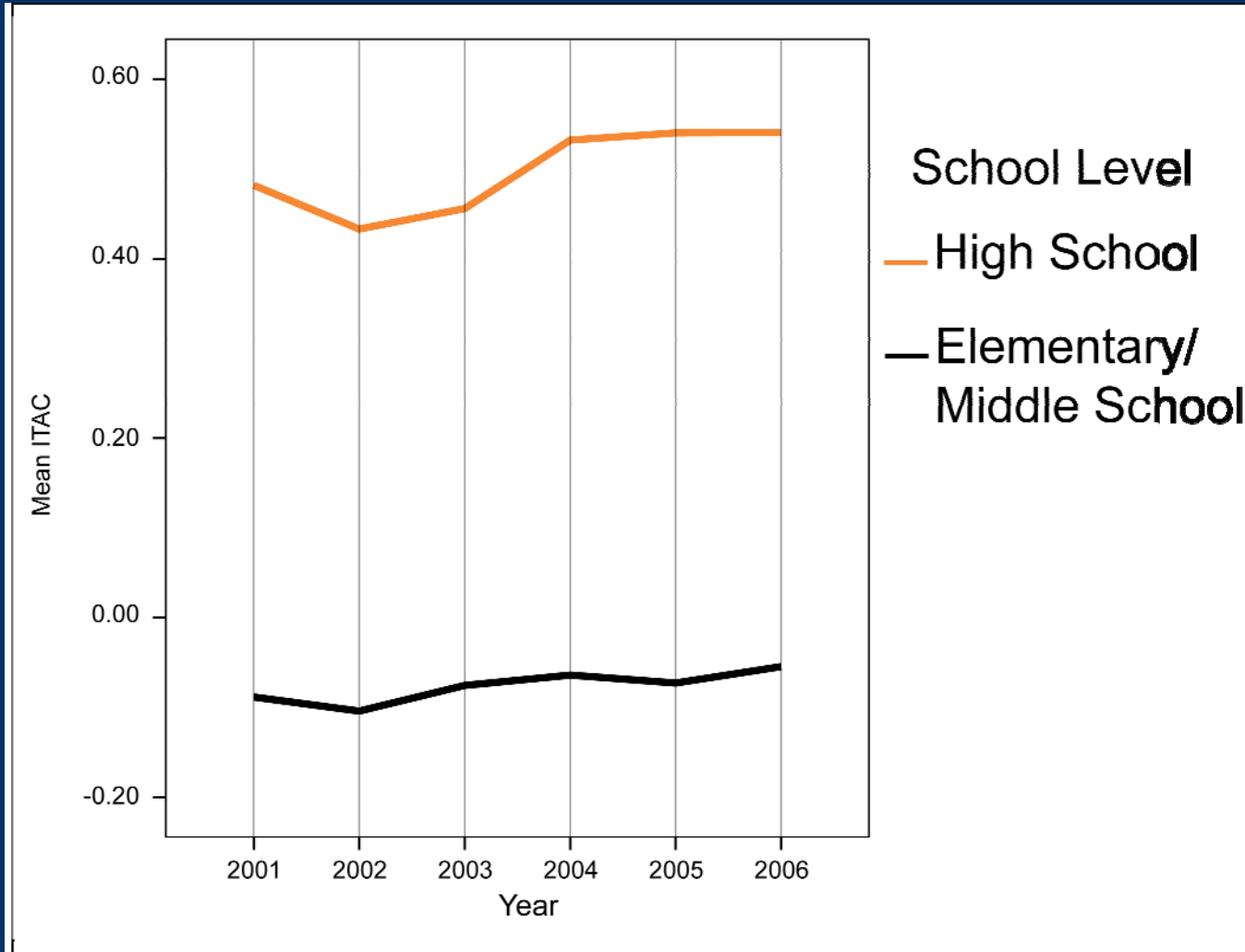


**Do all Illinois students  
have equal access to  
teacher qualifications?**

**If there are gaps in  
students' access, are they  
widening or closing?**

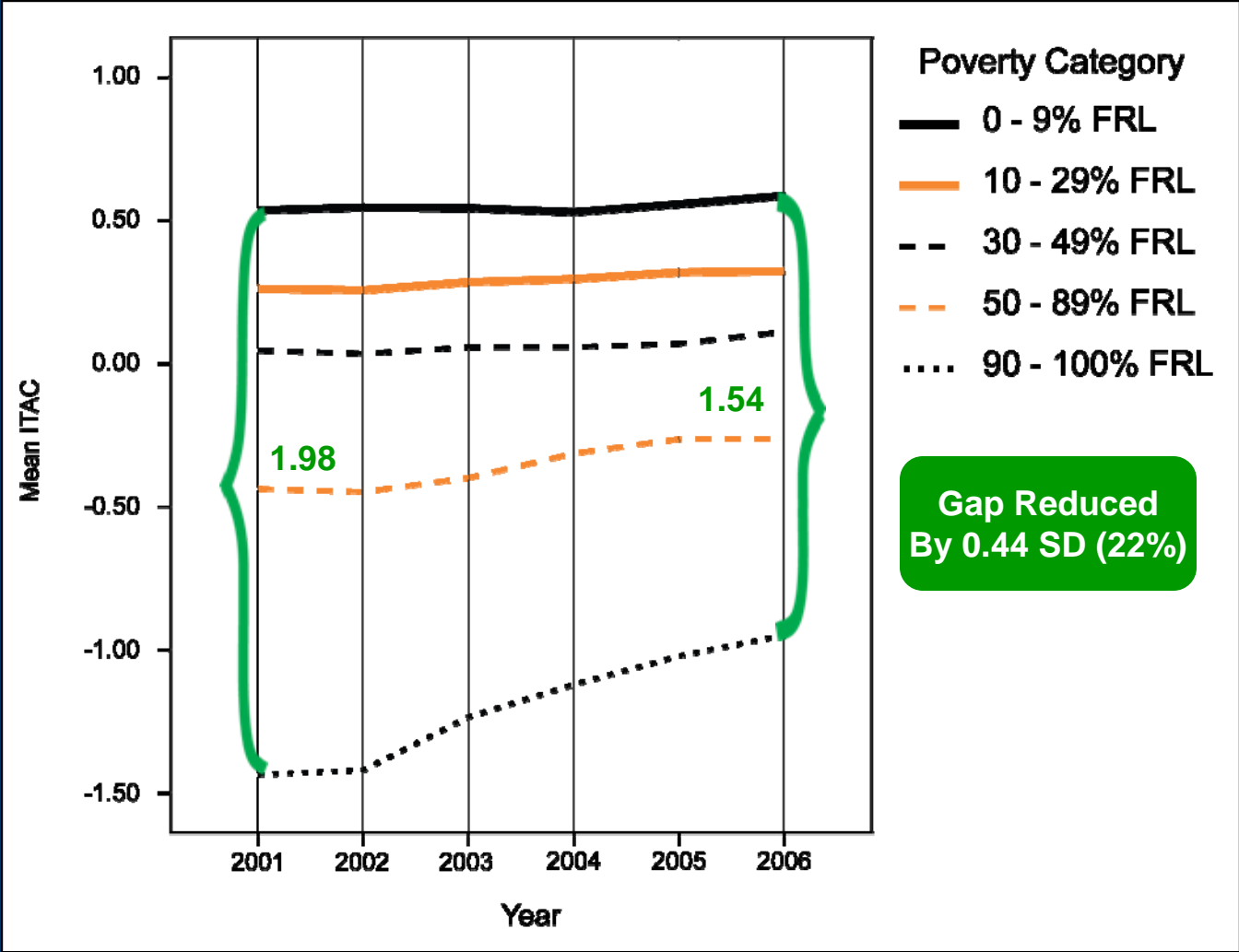


# Large ITAC differences by school level





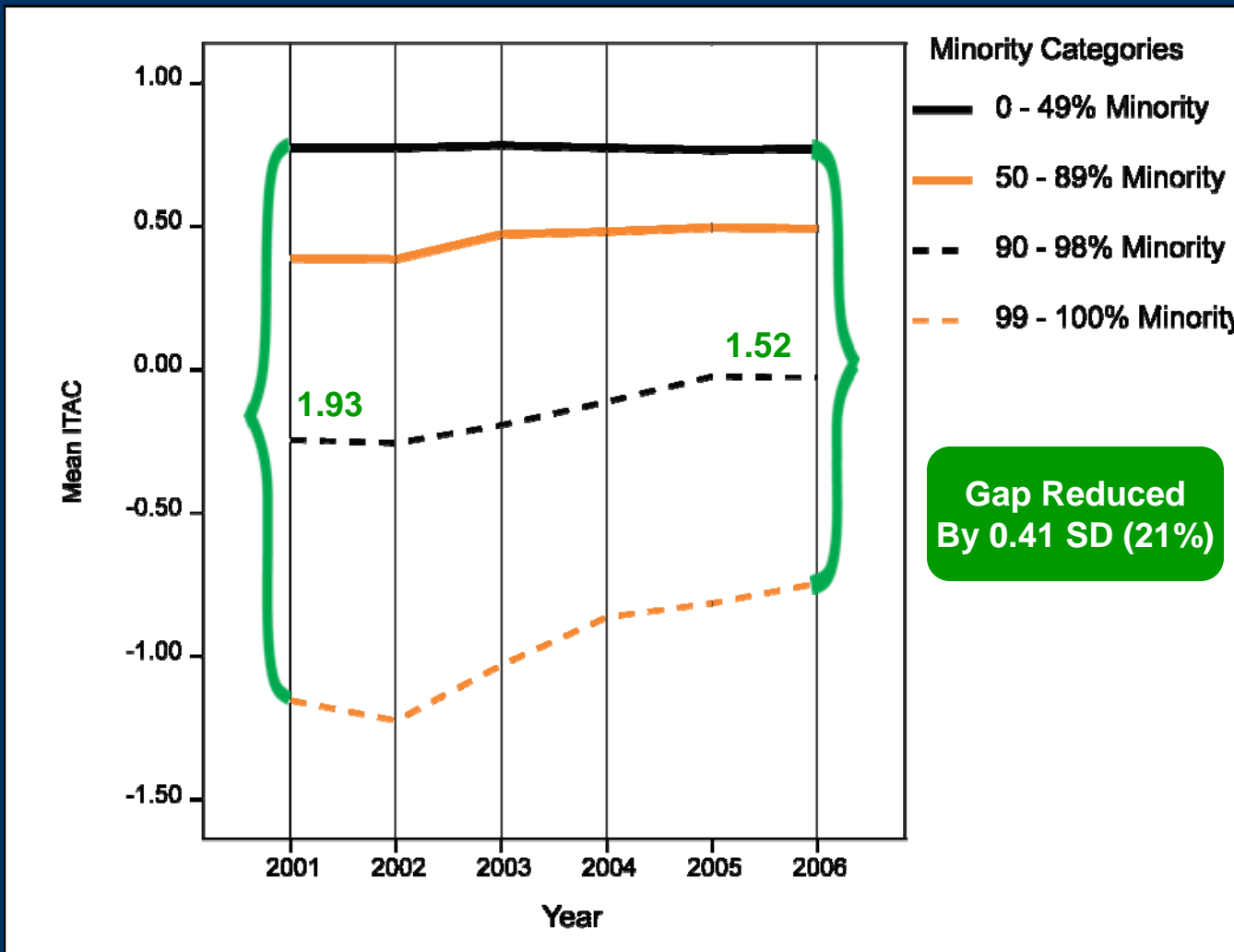
# Even larger ITAC differences by student poverty category...



... but gaps are closing.



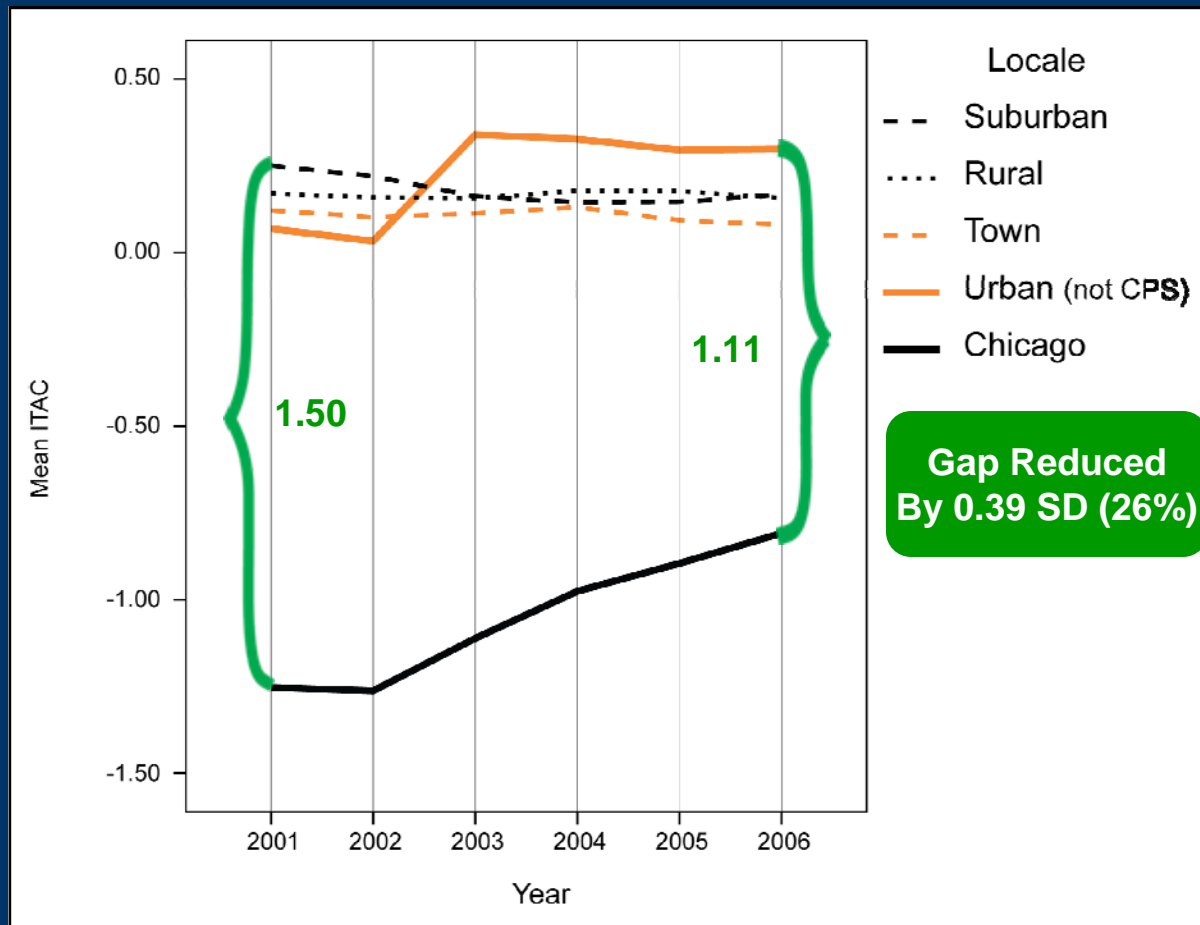
# Also by student minority category...



... but gaps are closing.



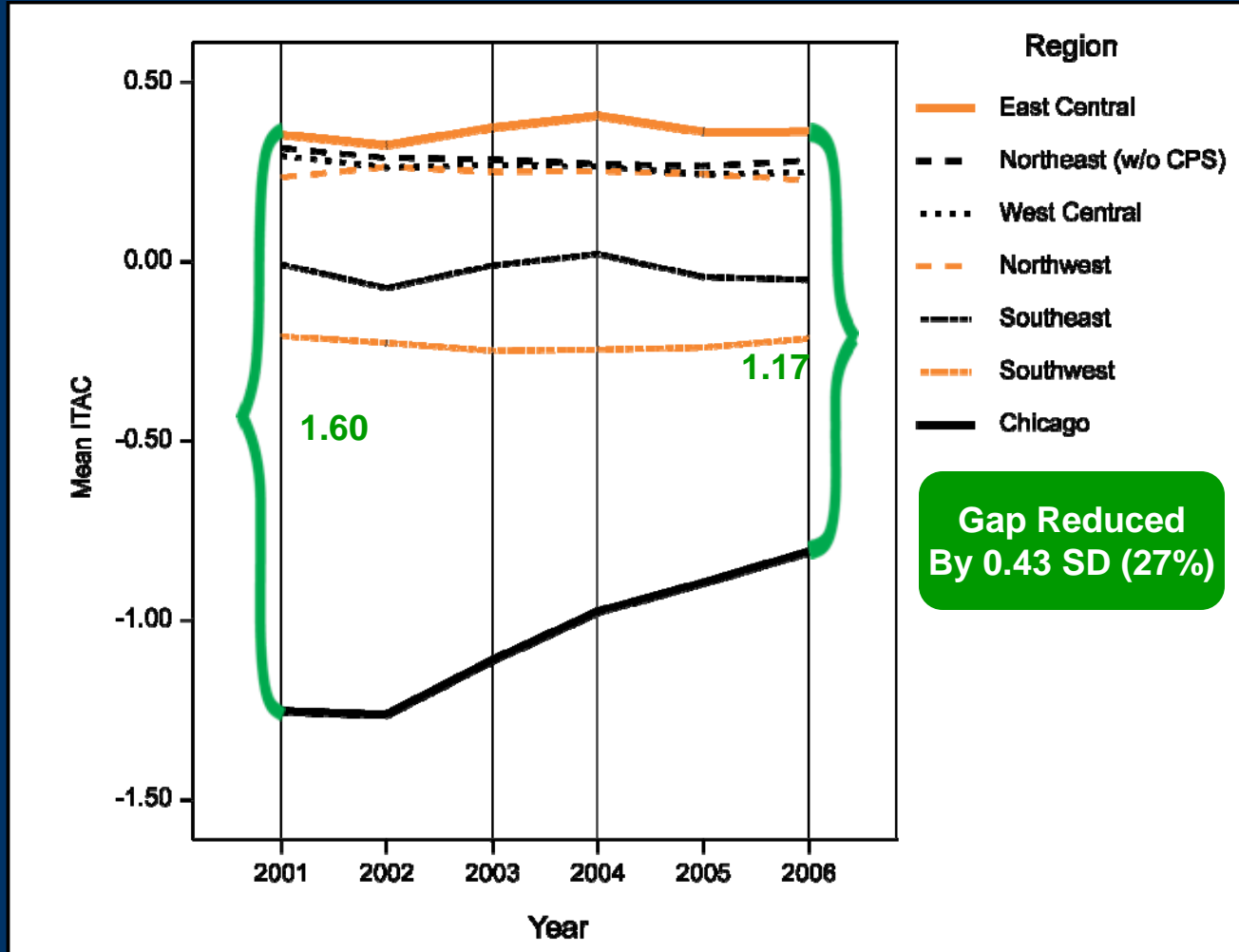
# And Chicago versus other locales...



... but gap is closing (and Urban non-CPS improved also).



# Finally, Chicago versus other regions...



... and gap is still closing.



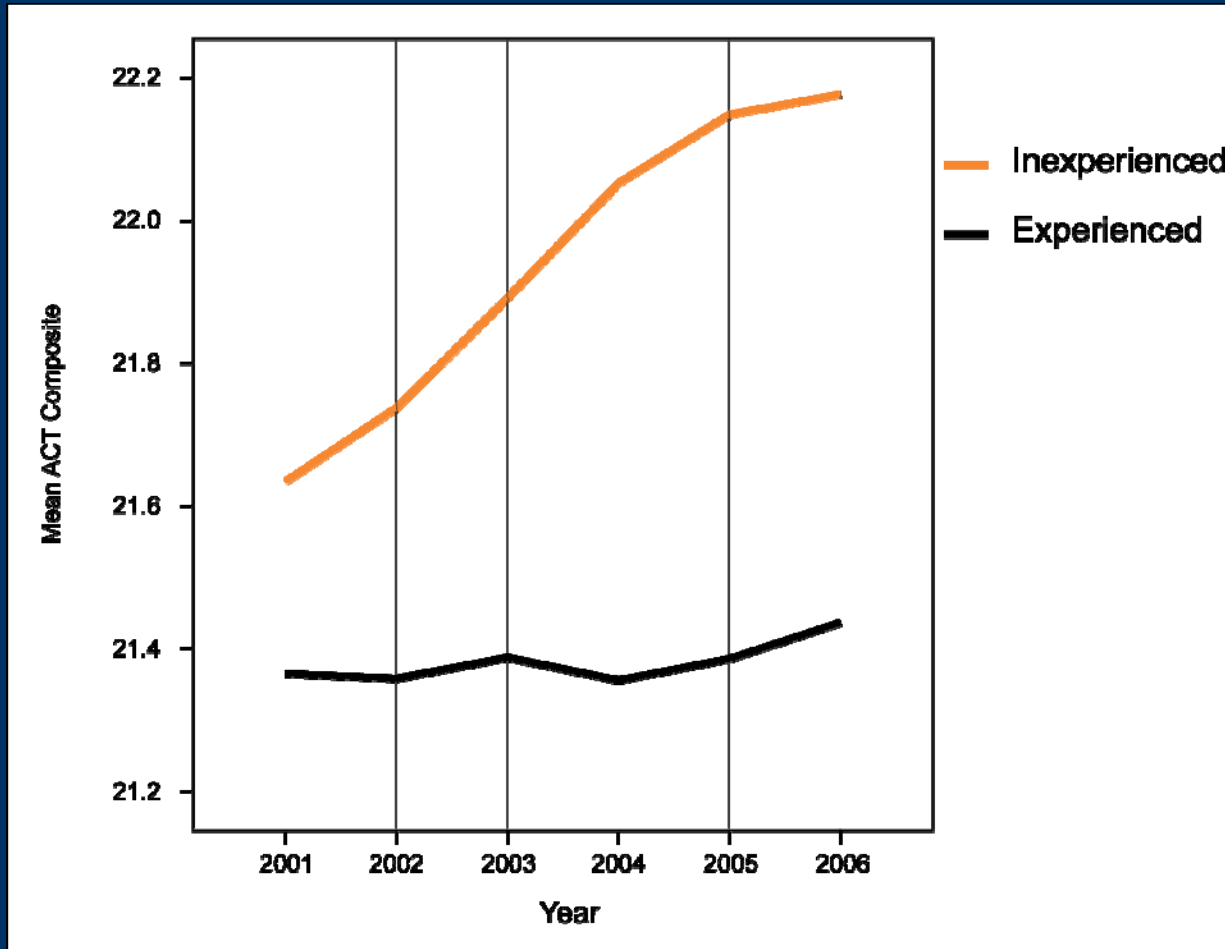
# Large improvements to ITAC in Chicago

ITAC Component	2001	2002	2003	2004	2005	2006	Change
ITAC	-1.25	-1.26	-1.11	-0.98	-0.90	-0.81	+0.44
Emergency Certified	22.03%	22.52.%	21.45%	18.96%	18.49%	16.37%	-5.66
Failed Basic Skills Test	0.66%	1.00%	0.79%	0.84%	0.78%	0.80%	+0.14
ACT Composite	19.11	19.18	19.44	19.69	19.85	19.92	+0.81
ACT English	19.57	19.62	19.87	20.04	20.17	20.23	+0.66
College Competitiveness	2.94	2.93	2.95	2.94	2.95	2.98	+0.04

**How did ITAC change?**



# Inexperienced teachers have higher average ACT Composites...

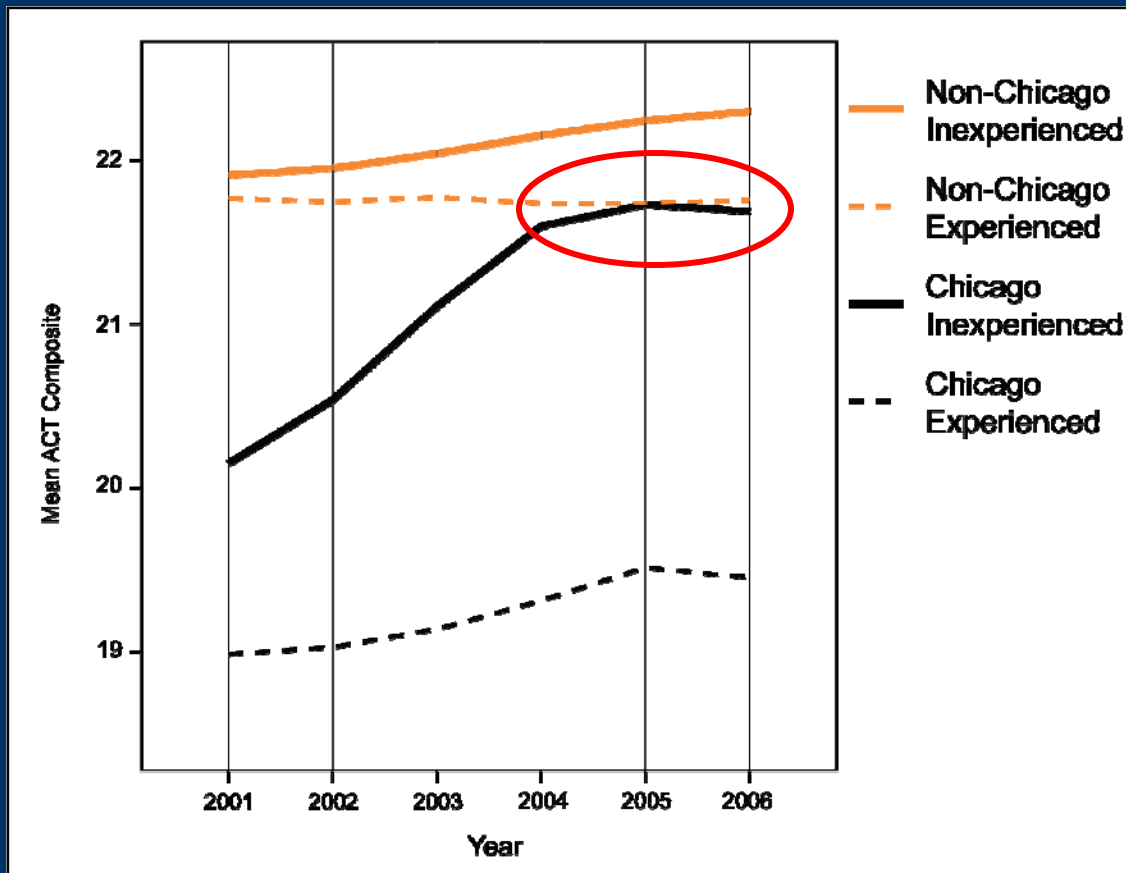


... and the gap is widening.





# Regardless of experience level, ACT Composite averages are lower in Chicago...



... but new teachers in Chicago are improving more quickly and approaching experienced teachers elsewhere.



**How were teacher qualifications related to student achievement in Illinois during this time period?**



# Even within demographically similar elementary/middle schools...

ITAC Quartile	High Poverty, High Minority		Low Poverty, Low Minority	
	N	Mean Test Score	N	Mean Test Score
Lowest 10%	996	-1.84	27	0.79
Lowest 11-25%	557	-1.61	201	0.76
Middle-Low	275	-1.44	636	0.86
Middle-High	75	-1.53	1058	0.87
Highest ITAC	39	-1.45	1629	1.02
<b>Difference</b>	<b>+0.39</b>		<b>+0.23</b>	

...schools with higher ITACs have higher achievement.



# And ITAC appears to have an even larger impact in high poverty, high minority high schools

ITAC Quartile	High Poverty, High Minority		Low Poverty, Low Minority	
	N	Mean Test Score	N	Mean Test Score
Lowest 10%	78	-2.49	13	0.42
Lowest 11-25%	31	-2.46	37	0.40
Middle-Low	22	-2.21	134	0.45
Middle-High	9	-1.99	280	0.58
Highest ITAC	2	N=2	420	1.03
<i>Low to Mid-High</i>	<b>+0.50</b>		<b>+0.16</b>	
<i>Low to High</i>	<b>(Small N)</b>		<b>+0.61</b>	



# Improving ITAC boosts achievement in elementary/middle schools statewide

## School-Level Fixed Effects, Illinois

Predictors	Elementary/Middle		High School	
	Stand. Coeff.	Sig.	Stand. Coeff.	Sig.
% Inexperienced	-0.01	0.16	-0.04	0.00
% Minority	-0.23	0.00	-0.20	0.05
% FRL	-0.01	0.37	-0.10	0.04
<b>ITAC</b>	0.02	0.00	0.00	0.80
Lagged Test Score	0.23	0.00	-0.12	0.00
Constant	-0.18	0.00	-0.08	0.06
$R^2$	0.78		0.19	

*Year dummies included in model but not shown on table*

DV is % of students in school meeting or exceeding standards on state tests



# Improving ITAC has some impact at both school levels in Chicago

## School-Level Fixed Effects, Chicago

Predictors	Elementary/Middle		High School	
	<i>Stand. Coeff.</i>	<i>Sig.</i>	<i>Stand. Coeff.</i>	<i>Sig.</i>
% Inexperienced	-0.02	0.06	-0.02	0.53
% Minority	-0.07	0.48	-0.38	0.13
% FRL	-0.05	0.26	-0.14	0.11
<b>ITAC</b>	0.02	0.08	0.06	0.08
Lagged Test Score	0.34	0.00	0.26	0.00
Constant	-0.85	0.00	-0.38	0.32
$R^2$	0.80		0.93	

*Year dummies included in model but not shown on table*



# Summary

- Bad news: There are quite large ITAC gaps by school level, school poverty and minority concentrations, and between Chicago and other regions and locales.
- Good news: ITAC gaps have shrunk considerably over the past six years, and recent data about new teachers, especially in Chicago, indicates that this trend is likely to continue.
- ITAC has a small independent effect on student achievement – reason to believe that improving ITAC would improve achievement.



# Discussion

- New teacher ITAC is improving considerably, especially in Chicago and other urban areas – to what extent did HQT provisions of NCLB and new basic skills test policies in Illinois contribute to this?
  - Others find similar trends elsewhere with regard to improvements in new teacher academic capital elsewhere.
  - If inexperienced teachers bring with them increasingly stronger academic capital (especially to more needy schools), should we worry if some schools have more inexperienced teachers than others?
- School-level achievement measures are only a rough approximation of performance, so it is difficult to be conclusive about the role of ITAC (or any other measures) in school improvement.
  - But Boyd et al (2007) were able to use student value-added data and found a direct link between teacher academic capital and student progress.





# More Discussion

- Teacher academic capital is not a silver bullet and it is just one of many aspects of teacher quality – but it does mean something.
  - The evidence that ITAC is improving in our neediest schools is significant and gives rise to justified optimism
  - However, in order to make the kind of impact that is needed across the board, ITAC changes may need to be quite large.
- It is possible to improve teacher academic capital, and some schools – especially those in Chicago – have made great strides in a short time.
  - The challenge is to continue to close these ITAC gaps, continue to improve new teacher academic capital, and to ensure that all schools provide working conditions suitable to the retention of successful teachers.



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