

Learning to Teach? Pathways into Teaching and Student Achievement in NYC

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NYU



New York Teachers Project

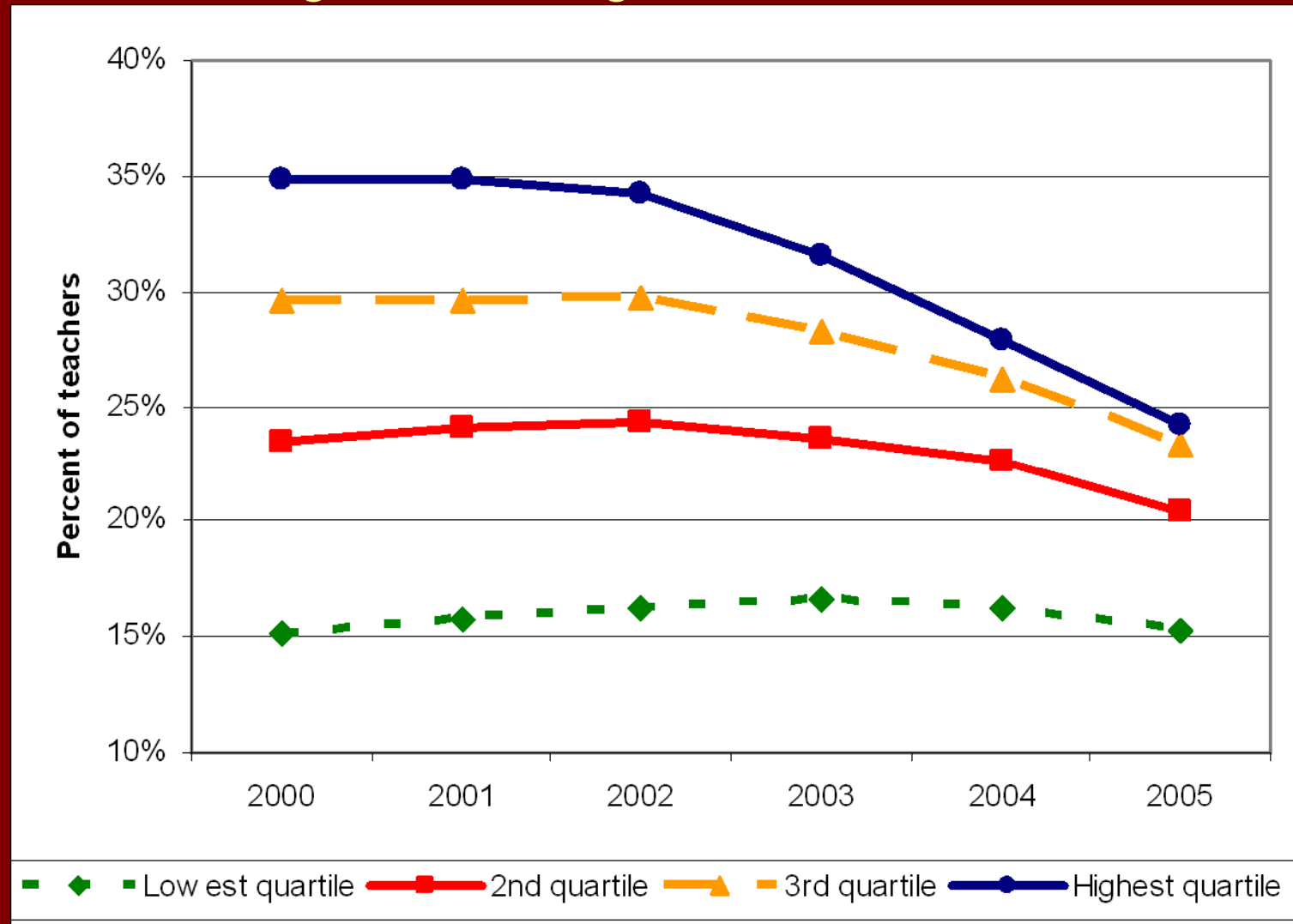
All with Don Boyd, Hamp Lankford & Jim Wyckoff
Part with Pam Grossman or Jonah Rockoff

- **Teacher Labor Market Dynamics**
 - Describing the sorting of teachers
 - Who leaves and who stays
 - Effects of distance / location
- **Teacher and Teacher Policy Effects**
 - Pathways into teaching
 - Pre-service experiences
 - Mentoring
 - Instruction

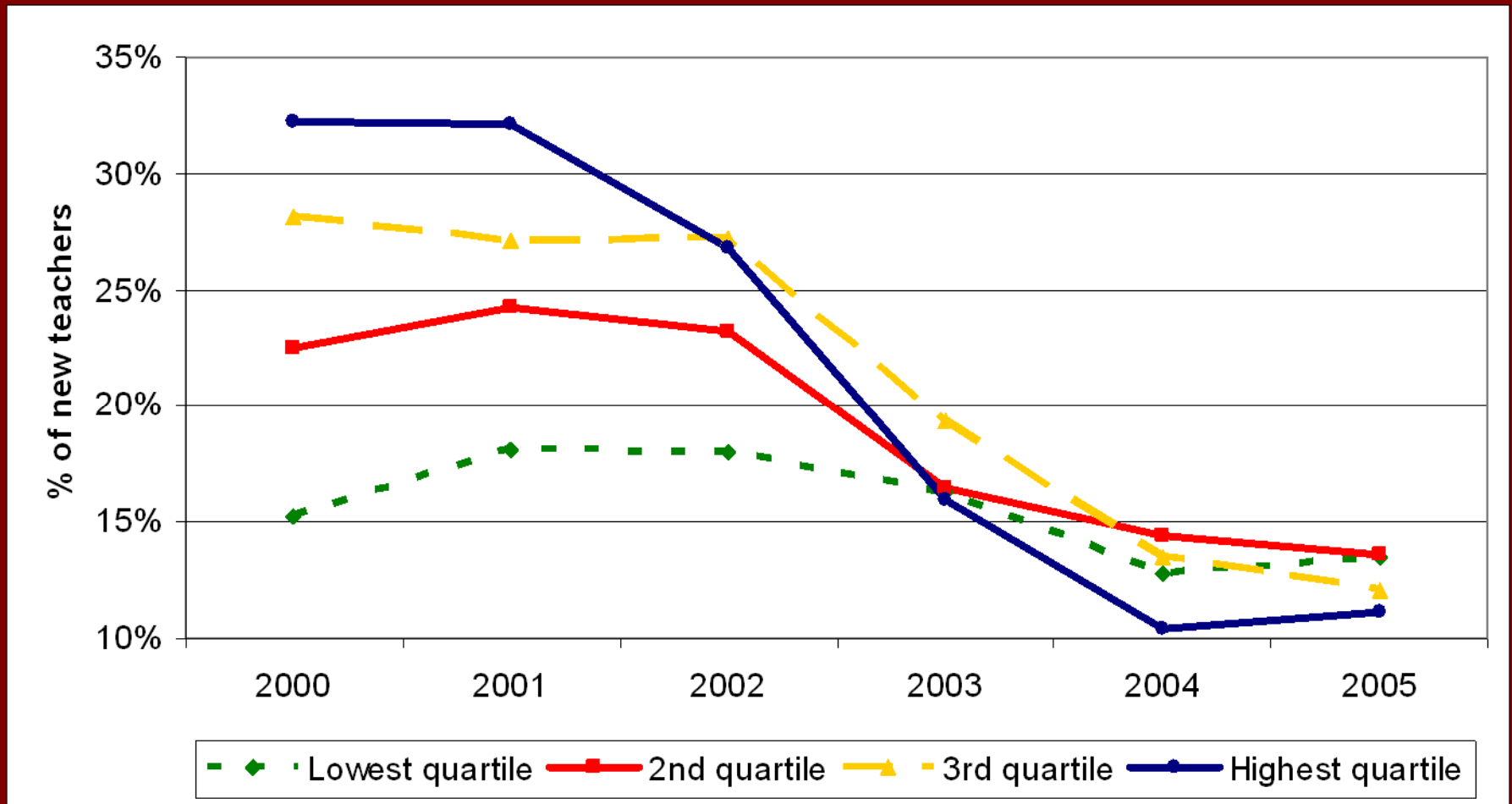
(Recent) Policy Change

- In 2000 the NYS Regents created alternative certification routes
- In 2000 the NYC Department of Education created its first cohort of Teaching Fellows
- Highly Qualified Teacher Provision of NCLB 2001
 - Required teachers to be fully State-certified, bachelor's degree and demonstrate competency in the core academic subject or subjects taught
- Effective September 2003, NYS Regents eliminated temporary licenses for uncertified teachers with very limited exceptions
- Between 2000 and 2003 starting salaries in NYC increased from \$33,186 to \$39,000

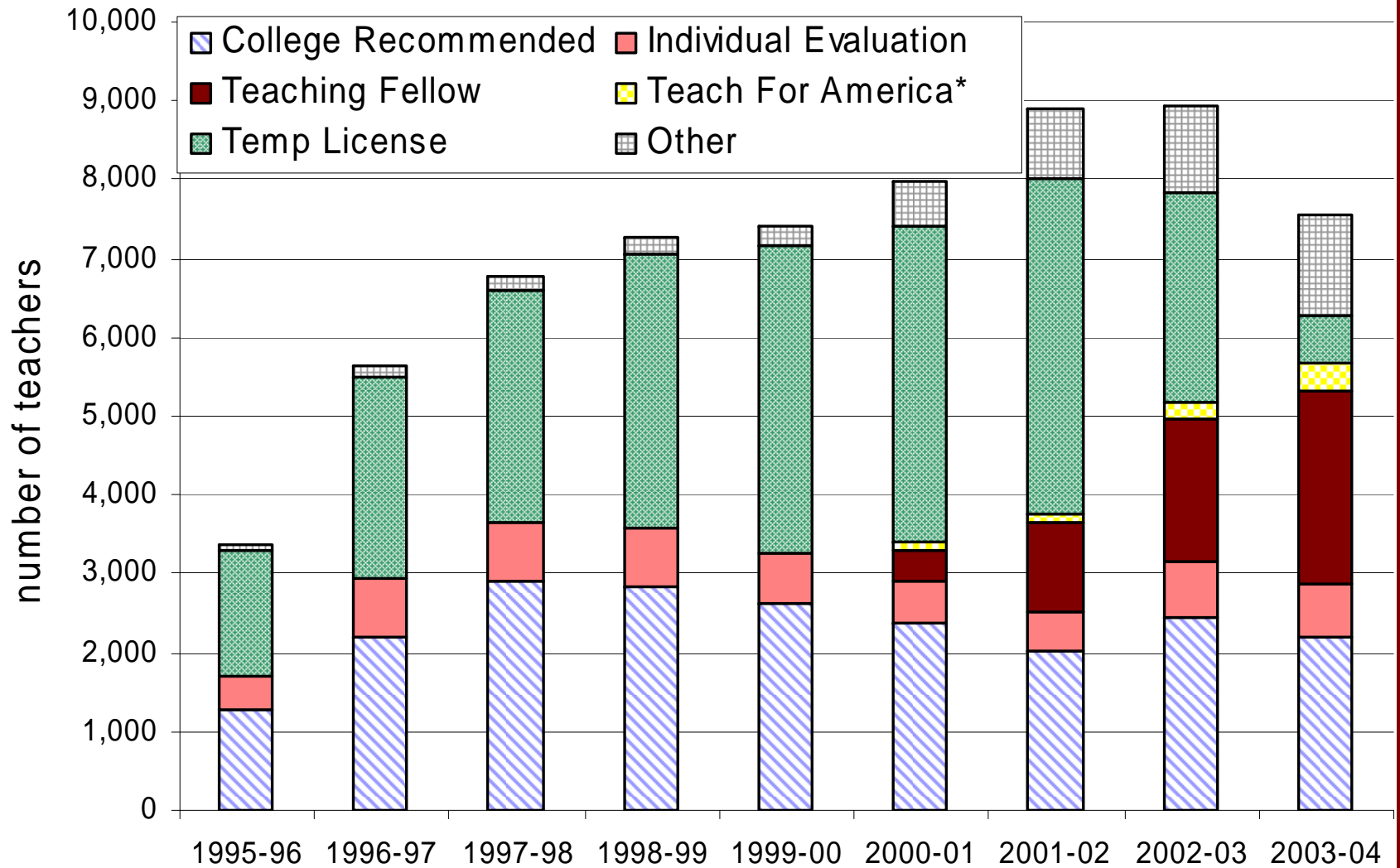
LAST Exam Failure Rate of Elementary Teachers by Poverty Quartile, 2000-2005



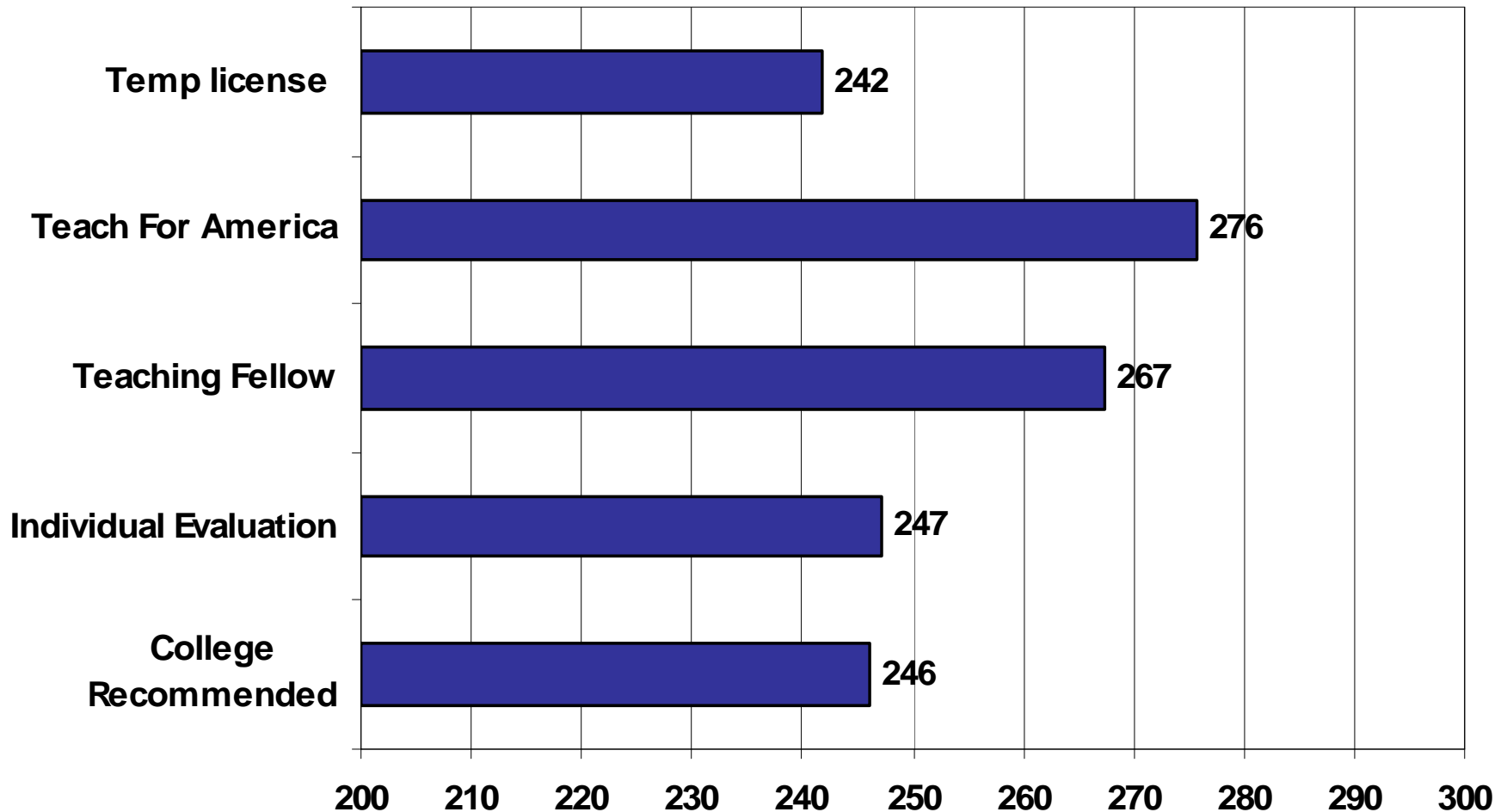
LAST Exam Failure Rate of New Teachers by Poverty Quartile, 2000-2005



New Teachers by Pathway, 2000-2005



Average Certification Exam Scores, First Taking (2004; Passing= 220,SD=~30)



Three Research Questions

- What are the average differences in teachers' value-added to student achievement across pathways? (quickly)
- To what extent have the changes in the distribution of teachers across schools affected student learning? (changes were not on averages)
- What *features* of pathways into teaching affect the value-added of teachers to student achievement?

may touch on current messy research

- Attrition and Transfer
 - What are the patterns
 - How is supply and demand interacting to create these
 - What are the underlying causes
- Given the importance of school administration
 - Seek to understand principals and principal labor markets

Three Questions

- What are the differences in teachers' value-added to student achievement across pathways?
- To what extent have the changes in the distribution of teachers across schools affected to learning?
- What features of pathways into teaching affect the value-added of teachers to student achievement?

Data and NYC context

- Achievement data from NYC for 1999-2000 through 2003-2004
 - student gains in grades 4-8 linked to teacher.
- Defining Pathways
 - The route teachers follow into their first teaching job.
 - All teachers in New York must ultimately complete the same set of requirements to receive initial certification)
- Caveat: overlap across and variation within pathways.
 - For example, in 2004-05 about 1/4th of traditional fulfilled their student teaching requirement as a teacher of record.

Characteristics of First-Year Teachers By Pathway into Teaching

	CR (1241)	IE (186)	TF (770)	TFA (134)	Temp (1108)	Other (331)
Age	28.35 <i>(6.975)</i>	32.86 <i>(8.664)</i>	30.91 <i>(8.514)</i>	24.14 <i>(2.361)</i>	31.07 <i>(7.869)</i>	31.65 <i>(9.155)</i>
Female	0.87	0.82	0.67	0.72	0.71	0.77
White	0.74	0.66	0.60	0.57	0.38	0.56
Black	0.10	0.05	0.08	0.11	0.19	0.09
Hispanic	0.10	0.22	0.23	0.12	0.38	0.29
Grade 4	0.41	0.35	0.21	0.18	0.22	0.28
5	0.43	0.39	0.41	0.40	0.29	0.27
6	0.08	0.14	0.12	0.26	0.17	0.14
7	0.05	0.06	0.17	0.12	0.20	0.19
8	0.03	0.06	0.09	0.05	0.12	0.12
Barron's (n)	<i>1074</i>	<i>152</i>	<i>620</i>	<i>98</i>	<i>967</i>	<i>209</i>
Most	0.08	0.11	0.38	0.75	0.12	0.22
Least	0.25	0.30	0.12	0.02	0.27	0.24
Exam(n)	<i>1182</i>	<i>166</i>	<i>726</i>	<i>124</i>	<i>911</i>	<i>202</i>
Failed	0.16	0.19	0.05	0.00	0.31	0.25

Characteristics of Students By Pathway

	CR (1241)	IE (186)	TF (770)	TFA (134)	Temp (1108)	Other (331)
female	0.50 <i>0.10</i>	0.50 <i>0.10</i>	0.51 <i>0.10</i>	0.51 <i>0.10</i>	0.51 <i>0.10</i>	0.50 <i>0.11</i>
White	0.16 <i>0.23</i>	0.12 <i>0.22</i>	0.03 <i>0.08</i>	0.01 <i>0.02</i>	0.07 <i>0.14</i>	0.09 <i>0.18</i>
Black	0.34 <i>0.32</i>	0.42 <i>0.34</i>	0.42 <i>0.31</i>	0.29 <i>0.21</i>	0.42 <i>0.33</i>	0.44 <i>0.33</i>
Hisp	0.38 <i>0.28</i>	0.36 <i>0.28</i>	0.50 <i>0.30</i>	0.68 <i>0.21</i>	0.44 <i>0.31</i>	0.39 <i>0.30</i>
Asian	0.12 <i>0.17</i>	0.10 <i>0.15</i>	0.05 <i>0.11</i>	0.02 <i>0.04</i>	0.07 <i>0.14</i>	0.07 <i>0.14</i>
Poor	0.76 <i>0.26</i>	0.80 <i>0.22</i>	0.88 <i>0.14</i>	0.92 <i>0.09</i>	0.83 <i>0.19</i>	0.82 <i>0.22</i>
Eng	0.58 <i>0.27</i>	0.62 <i>0.29</i>	0.59 <i>0.28</i>	0.43 <i>0.23</i>	0.56 <i>0.30</i>	0.62 <i>0.28</i>
Absent	11.6 <i>3.69</i>	12.3 <i>4.20</i>	13.7 <i>3.97</i>	13.7 <i>3.77</i>	13.0 <i>3.90</i>	12.8 <i>4.23</i>
Susp	0.02 <i>0.04</i>	0.02 <i>0.03</i>	0.02 <i>0.05</i>	0.02 <i>0.04</i>	0.03 <i>0.05</i>	0.02 <i>0.05</i>
Lag	-0.14 <i>0.59</i>	-0.22 <i>0.53</i>	-0.38 <i>0.46</i>	-0.51 <i>0.40</i>	-0.29 <i>0.53</i>	-0.22 <i>0.60</i>

Methodology

School, Grade, and Year Fixed Effects

$$A_{isgjt} = \beta_0 + \beta_1 A_{isgj(t-1)} + K_{it} \beta_2 + C_j \gamma_2 + E_j \gamma_1 + P_j \gamma_1 + \pi_g + \pi_t + \pi_s + \varepsilon_{isgjt}$$

- Specification Checks
- Alternative Definitions of Pathway
- Subgroups of Students
- Incorporating Turnover

*Caution – small sample size for TFA in some models

Non-Pathway Results of Base Math Model

also grade, year & school fixed effects (n=960970)

Student Measures		Class Average Measures		Teacher Experience			
Lag score	0.659*** (0.00)	Lag score	0.154*** (0.01)	2	0.048*** (0.01)	12	0.065*** (0.01)
Lag sq	0.001 (0.00)	Std Dev	0.006 (0.01)	3	0.067*** (0.01)	13	0.062*** (0.01)
Female	-0.009*** (0.00)			4	0.073*** (0.01)	14	0.080*** (0.01)
Other Eth	-0.088*** (0.01)	Other Eth	-0.177 (0.12)	5	0.077*** (0.01)	15	0.056*** (0.01)
Asian	0.114*** (0.00)	Hispanic	-0.182*** (0.03)	6	0.080*** (0.01)	16	0.054*** (0.01)
Hispanic	-0.083*** (0.00)	Black	-0.230*** (0.03)	7	0.068*** (0.01)	17	0.053*** (0.01)
Black	-0.109*** (0.00)	Asian	-0.061* (0.03)	8	0.075*** (0.01)	18	0.059*** (0.01)
English	-0.047*** (0.00)	English	0.042** (0.02)	9	0.070*** (0.01)	19	0.040*** (0.01)
Free lunch	-0.046*** (0.00)	Free lunch	-0.057*** (0.01)	10	0.074*** (0.01)	20	0.049*** (0.01)
Lag Abs	-0.004*** (0.00)	Lag Abs	-0.010*** (0.00)	11	0.071*** (0.01)	>20	0.055*** (0.01)
Lag Susp	-0.052*** (0.00)	Lag Susp	-0.078** (0.03)				

Non-Pathway Results of Base ELA Model

also grade, year & school fixed effects (n=960970)

Student Measures		Class Average Measures		Teacher Experience			
Lag score	0.606*** (0.002)	Lag score	0.199*** (0.004)	2	0.030*** (0.005)	12	0.041*** (0.009)
Lag sq	-0.004*** (0.001)	Std dev	0.020*** (0.007)	3	0.042*** (0.005)	13	0.060*** (0.009)
Female	0.058*** (0.002)	Other	-0.280*** (0.102)	4	0.041*** (0.006)	14	0.051*** (0.009)
Other	-0.100*** (0.012)	Asian	0.047 (0.031)	5	0.052*** (0.006)	15	0.059*** (0.009)
Asian	0.051*** (0.004)	Hispanic	-0.182*** (0.026)	6	0.056*** (0.007)	16	0.073*** (0.012)
Hispanic	-0.088*** (0.003)	Black	-0.236*** (0.027)	7	0.056*** (0.007)	17	0.056*** (0.012)
Black	-0.115*** (0.003)	English	0.023 (0.016)	8	0.060*** (0.008)	18	0.054*** (0.012)
English	-0.019*** (0.002)	Poor	-0.075*** (0.013)	9	0.060*** (0.008)	19	0.029** (0.013)
Poor	-0.069*** (0.002)	Lag Abs	-0.008*** (0.001)	10	0.054*** (0.009)	20	0.031** (0.012)
Lag Abs	-0.003*** 0.000	Lag Sus	0.001 (0.031)	11	0.058*** (0.009)	>20	0.046*** (0.007)
Lag Sus	-0.057*** (0.005)						

Results Separately By Grade

	Year 1				Year 2			
	Math 4&5	ELA 4&5	Math 6 th -8 th	ELA 6 th -8 th	Math 4&5	ELA 4&5	Math 6 th -8 th	ELA 6 th -8 th
Coll Rec	0	0	0	0	0.048	0.035	0.049	0.032
IE	-0.009	0.005	-0.02	0.013	0.045	0.031	-0.017**	0.032
Fellows	-0.040***	-0.035***	-0.012	-.025*	0.055	0.006*	0.030	-0.016**
TFA	-0.034	-0.055*	.046**	-.030*	0.042	-0.015*	0.057	0.033
Temp	-0.021	-0.015	-0.018	-0.005	0.034	0.041	0.016**	0.004

ELA RESULTS

	Gain as Outcome	<= 3 Years	Stud FE on Gains	Schl/Year/Grade FE	Two Stage	2 Stage Exp<=3
IE	-0.005 (0.005)	0.000 (0.010)	0.002 (0.005)	-0.003 (0.004)	-0.003 (0.005)	-0.004 (0.010)
Fellows	-0.030*** (0.007)	-0.022*** (0.008)	-0.016** (0.007)	-0.031*** (0.006)	-0.032*** (0.007)	-0.028*** (0.009)
TFA	-0.031*** (0.012)	-0.030** (0.013)	-0.031** (0.014)	-0.022* (0.012)	-0.033** (0.013)	-0.035** (0.014)
Temp	-0.012*** (0.004)	-0.011** (0.006)	-0.002 (0.004)	-0.009*** (0.003)	-0.012*** (0.004)	-0.014** (0.006)
Other	-0.021*** (0.007)	-0.016* (0.009)	-0.008 (0.008)	-0.021*** (0.006)	-0.023*** (0.008)	-0.025** (0.011)

TFA&TF ~ = 4.2% std dev, 26% Black, 29% Hispanic, 100% 2nd year gain

Math Results

	Base/Gain	<= 3 Years	Stud FE on Gains	Schl/Year/ Grade FE	Two Stage	2 Stage Exp<=3
IE	-0.012** (0.005)	-0.028** (0.011)	-0.009 (0.006)	-0.011** (0.005)	-0.015** (0.006)	-0.032** (0.013)
Fellows	-0.023*** (0.008)	-0.025*** (0.009)	-0.014 (0.009)	-0.030*** (0.007)	-0.025*** (0.009)	-0.031*** (0.010)
TFA	0.007 (0.015)	-0.001 (0.016)	0.015 (0.017)	-0.005 (0.015)	-0.004 (0.016)	-0.011 (0.018)
Temp	-0.021*** (0.004)	-0.026*** (0.006)	-0.010** (0.004)	-0.017*** (0.004)	-0.023*** (0.005)	-0.034*** (0.007)
Other	-0.021*** (0.008)	-0.025*** (0.010)	-0.018** (0.008)	-0.015** (0.007)	-0.026*** (0.009)	-0.039*** (0.012)

TF effect \sim 3.5% std dev, 20% Black, 25% Hispanic, 50% 2nd Year Gain

How Meaningful Are These Effects?

- Comparison to other effects
 - Teaching Fellows student gains in grade 4-5 Math are 0.04 lower than for College Rec. ~ 83% of 2nd year of teaching experience.
- Comparison to the variation in the total teacher effect
 - The standard deviation of the empirical Bayes shrinkage estimates of teacher fixed-effects is .13 in math for our sample. The positive middle school math TFA effect of .034 is 26%.
- Conversion to scale score
 - For example, 7th grade math exam in 2002 had mean score=670, std dev=48
 - Measurement Error makes this conversion and effect sizes problematic - ~ 4 times underestimate

Summary

- Gap in teacher qualifications narrowed, likely result of state and city policy changes
- New routes into teaching not dramatically better (and sometimes worse) at value-added than traditional
- Lots of variation within pathways
- Designing policy...
 - Should there be any selection on qualifications (test scores, certifications, degrees, undergrad institutions...)?
 - What types of preparation are useful?
 - When selecting, what other attributes (dispositions, experiences working with children, life experiences...) should be considered?

Three Questions

- What are the differences in teachers' value-added to student achievement across pathways?
- To what extent have the changes in the distribution of teachers across schools affected to learning?
- What features of pathways into teaching affect the value-added of teachers to student achievement?

The Narrowing the Gap in NYC Teacher Qualifications and its Implications for Student Achievement

- New teachers did not necessarily replace average teachers from other pathways.
- Here we estimate the effects of the changing qualifications in NYC 2000-05
- The effect on Student Achievement
 - Can't measure effectiveness directly because of difficulty of separating teacher effects from school effects.
 - Can compare teachers within schools more confidently and use this to estimate the effects of measured characteristics

Similar Methodology

$$A_{isgty} - A_{is'g(g-1)t'(y-1)} = \beta_0 + S_{iy} \beta_1 + C_{ty} \beta_2 + T_{ty} \beta_3 \\ + \pi_i + \pi_g + \pi_y + \varepsilon_{isgty}$$

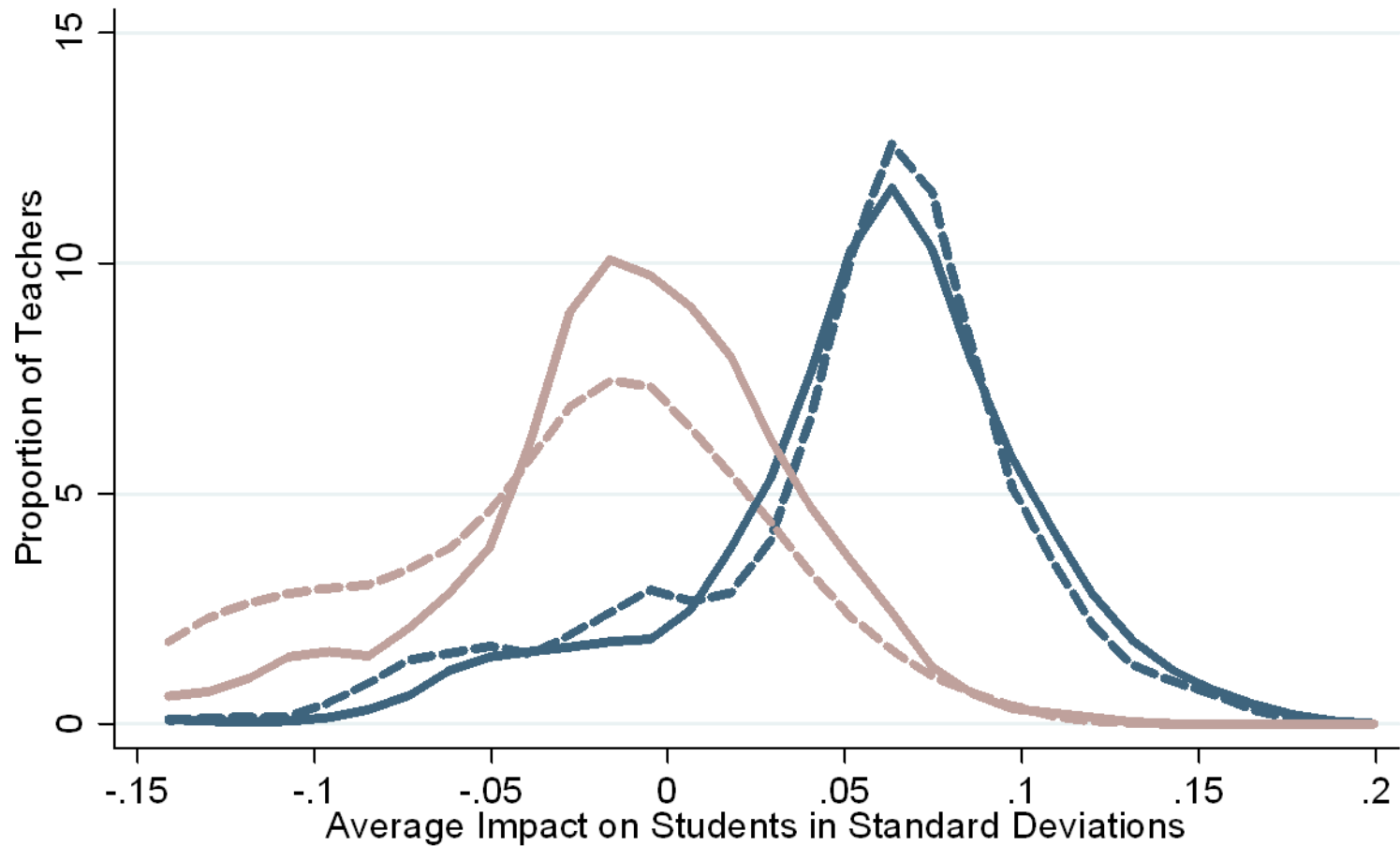
- Change in student achievement (2000-'05):
 - *student*, grade and year fixed effects,
 - time varying student characteristics,
 - time varying classroom characteristics, and
 - **teacher characteristics.**
- Specification checks
 - Achievement levels with school fixed effects
 - Only those with fewer than 3 years of experience
 - Alternatives for missing teacher test scores

SD ELA score t-1	-0.02332 [1.91]	14	0.1263 [8.21]**	Not certified	-0.04235 [5.72]**	
SD math score t-1	-0.11722 [8.27]**	15	0.1252 [6.82]**	Barrons undergrad college		
Teacher Variables	Experience			Most competitive	0.01498 [1.48]	
			16	0.12464 [6.36]**	Competitive	0.01426 [2.24]*
		2	17	0.06549 [10.61]**	Least Competitive	0.00686 [1.25]
		3	18	0.1105 [16.56]**	Imputed Math SAT	0.00043 [9.05]**
		4	19	0.13408 [17.91]**	Imputed Verbal SAT	-0.00034 [6.06]**
		5	20	0.117 [14.24]**	SAT missing	-0.01535 [2.94]**
		6	21 or more	0.13365 [14.58]**	Initial path into teaching	
		7	Cert pass first	0.12307 [12.27]**	Individual evaluation	-0.02243 [2.81]**
		8	Imputed LAST score	0.11898 [10.81]**	NYC Teaching Fellows	-0.01935 [1.89]
		9	LAST missing	0.12433 [10.04]**	Teach for America	-0.00744 [0.37]
		10	Certified Math	0.13693 [9.85]**	Temporary License	-0.03109 [4.95]**
		11	Certified Science	0.12592 [9.41]**	Other	-0.03246 [2.31]*
		12	Certified special ed	0.10209 [7.66]**	Teacher LAST*	-0.00024 [0.49]
13	Certified other	0.11831 [8.23]**	class proportion free lunch			
				Observations	578,630	

Effect of observed characteristics on math achievement, different specifications

		<u>Imputed SAT and LAST</u>		Drop SAT Variables	Drop Missing SAT Obs	School FE	No Experience
		All Obs	Exp < 3				
Most affluent decile							
	2001	0.049	-0.011	0.093	0.129	0.074	0.050
	2005	0.056	-0.008	0.102	0.125	0.077	0.048
Change		0.007	0.003	0.009	-0.004	0.004	-0.002
Poorest decile							
	2001	-0.040	-0.106	-0.053	-0.083	-0.047	-0.032
	2005	-0.011	-0.062	-0.015	-0.027	-0.014	-0.016
Change		0.029	0.044	0.038	0.056	0.033	0.016
Gap between most affluent and poorest decile							
	2001	0.089	0.095	0.146	0.212	0.121	0.082
	2005	0.067	0.054	0.117	0.152	0.091	0.064
Change		-0.022	-0.041	-0.029	-0.060	-0.029	-0.018
Percentage reduction in gap		24.8	43.0	19.7	28.4	24.3	21.9

Changes in Grades 4 & 5 Math Attributable to Teacher Qualifications, Rich and Poor Deciles



Teachers in Poorest Quartile of Schools by their VA Attributable to Observables

VA 5th	Mean VA	LAST Pass	No Cert	LAST Score	Math SAT	Verb. SAT	Barrons			
							Most Comp.	Comp.	Less Comp.	Not Comp.
1	-0.068	0.460	0.731	227	355	440	0.036	0.065	0.548	0.351
2	-0.032	0.656	0.141	239	414	467	0.052	0.069	0.539	0.340
3	-0.010	0.779	0.076	245	423	462	0.094	0.130	0.440	0.336
4	0.010	0.851	0.031	252	450	470	0.156	0.196	0.374	0.274
5	0.045	0.908	0.013	254	512	474	0.245	0.249	0.354	0.152
Δ	0.113	0.448	-0.718	27	157	34	0.208	0.184	-0.193	-0.199

Summary

- variation in qualifications together explain some variation in effectiveness
- Yet substantial variation across observably similar teachers
- In designing policy, some selection on observables likely warranted

Three Questions

- What are the differences in teachers' value-added to student achievement across pathways? (quickly)
- To what extent have the changes in the distribution of teachers across schools affected to learning?
- What features of pathways into teaching affect the value-added of teachers to student achievement?
 - messier

Teacher Preparation and Student Achievement

- Estimating the effects of pathways tell us only so much
 - Variation in experiences within
 - Overlap in experiences between
 - Yes or no recommendations, but little for improvement
- Large literature on Teacher Education
- Very little empirical research exploring the link between teacher preparation and student learning
- This is a *FIRST* step in that direction
 - Focusing on childhood education

Questions

- What is the distribution of the average value-added of teachers from different preparation programs?
- How do features of those preparation programs affect teachers' value-added to student achievement gains in math and ELA?
- How do teachers' reported experiences in teacher preparation affect their value added?

program features spring/summer 2004

- 18 institutions: 26 univ. programs + 4 TF + 1 TFA
- Document collection, interviews with director and director of field experiences, surveys of math and ELA methods faculty
- Many many measures but here focus mainly on link to practice. Program data are not ideal for this.
 - whether or not the program required a capstone project
 - a composite measure of the extent that the program maintains oversight over student teaching experiences
 - requires a minimum number of years of teaching experience for its cooperating teachers (32%)
 - program picks the cooperating teacher (42%)
 - program supervisor observes their participants a minimum of five times during student teaching (27%)
 - for comparison math and English content course requirements and the percent of tenure-line.

Reported Experiences: survey spring 2005

- All first year teachers in NYC
- Survey available at www.teacherpolicyresearch.org
- Practice Variables
 - extent to which preparation included links to practice;
 - opportunities to listen to an individual child read aloud for the purpose of assessing his/her reading achievement;
 - ...Plan a guided reading lesson, and
 - ...Study or analyze student math work (each 5-point scale).
 - opportunities to study curriculum used in New York City ;
 - whether or not the teacher had student teaching experiences, not as the teacher-of-record in the classroom;
 - the congruence between student teaching placement and their current job assignment in terms of subject matter or grade level;
 - Additional measures of preparation as controls and comparisons
 - opportunities to learn about teaching math and ELA;
 - ...to learn about learning;
 - ...to learn about handling student misbehavior; and
 - ...to learn about teaching English language learners.

Methods – 3 analyses

- **Programs /Institutions**

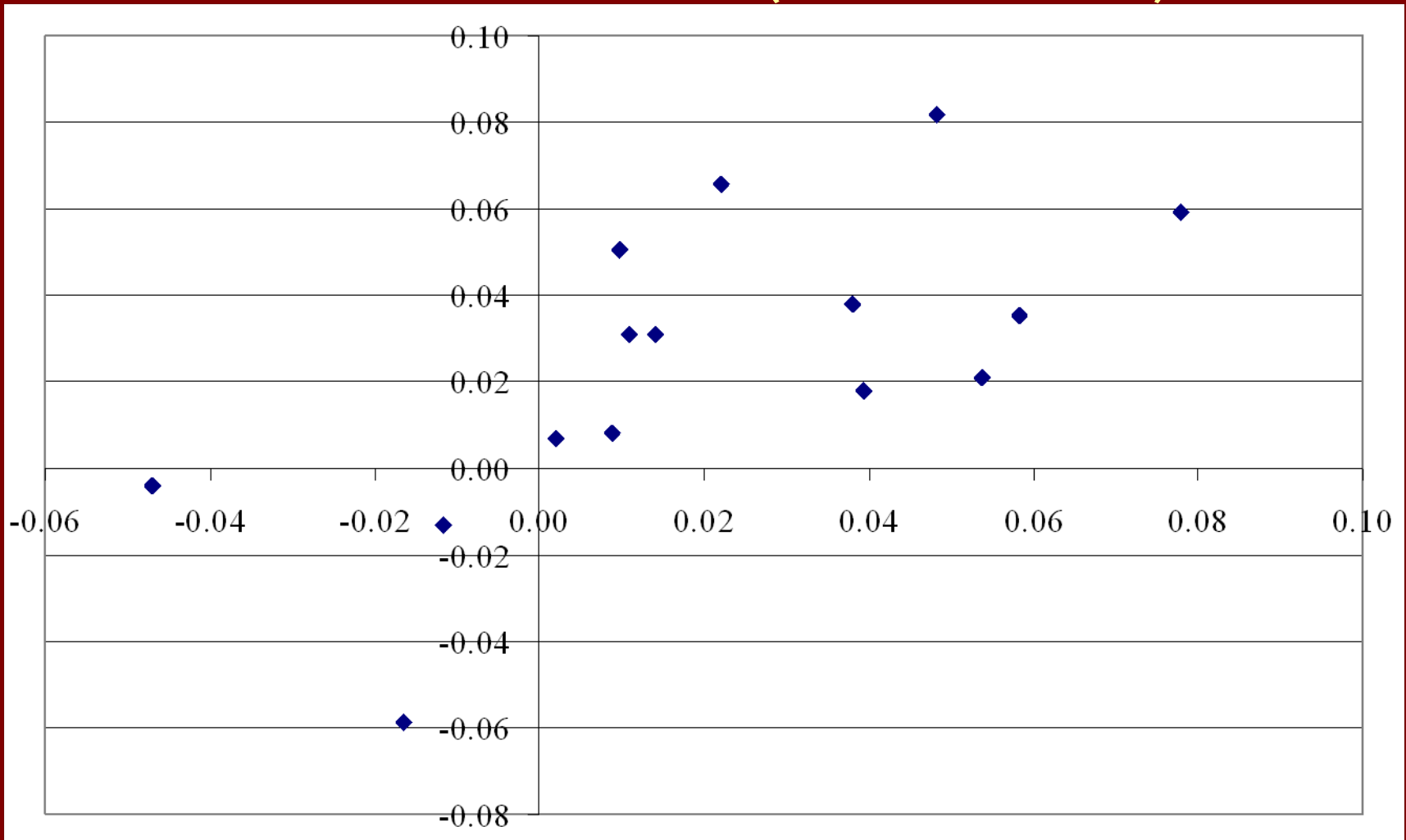
$$A_{ijst} = \beta_0 + \beta_1 A_{ijs(t-1)} + X_{it} \beta_2 + C_{ijst} \beta_3 + T_{jst} \beta_4 + \pi_j + \omega_s + \varepsilon_{ijst}$$

Achievement as a function of program/institution (π), plus :

- prior achievement,
 - student characteristics
 - classroom characteristics
 - random error
 - school fixed-effects (in most specifications)
 - teacher characteristics (in some specifications)
- **Program Features**
 - substitute $P_{jst} \beta_5$ for π_j cluster at program level
 - **Reports of Experiences**
 - substitute $R_{jst} \beta_6$ for π_j cluster at teacher level

Institution Effects

Math (x-axis) and ELA (y-axis), first-year teachers 2001-2006 (40+ teachers)



Effects jointly significant in all specifications

Program Analysis Implications

- Variation across institutions
 - $>.10$, $>>$ 1st year vs. 2nd year teacher
- Variation approximately the same in math in ELA
- Positive correlation between math and ELA average value-added (0.65)
- Not much difference in effects with and without basic teacher controls
 - age, gender, race, test-performance.

Program Features

- Features linked to practice
 - Capstone project
 - In most case, either a portfolio capturing work in courses and in the field or an action research project, which requires data collection during field experience
 - Oversight of Student Teaching:
 - whether the program requires a minimum number of years of teaching experience for its cooperating teachers (32 percent),
 - whether the program picks the cooperating teacher as opposed to the K-12 school or the student teacher selecting (42 percent)
 - whether a program supervisor observes their participants a minimum of five times during student teaching (27 percent).
 - Combined these binary variables into a single sum.

Other Program Features

- Content Requirements
 - Number of Math Classes Required
 - Number of English language arts Classes Required
- Consistency? Investment?
 - Percent tenure-line faculty

Program Characteristics

Program Features	Mean	Std Dev	Min	Max	# programs
Capstone project	0.50	0.50	0	1	28
Oversight of Std Teach.	0.95	1.07	0	3	21
Percent Tenure	0.45	0.23	0	0.88	27
Math courses	1.16	1.13	0	4	31
ELA courses	1.29	1.74	0	8	31

First Year Teacher Results

	Math		ELA	
	2001-2006	2005&2006	2001-2006	2005&2006
Capstone	0.041** (0.016)	0.122** (0.055)	0.050*** (0.011)	0.102* (0.050)
Oversight	0.032*** (0.008)	0.124*** (0.0345)	0.012 (0.007)	0.104** (0.039)
%Tenure	0.118** (0.050)	0.061 (0.124)	0.018 (0.034)	-0.048 (0.087)
Math courses	0.024*** (0.006)	0.010 (0.017)	-0.003 (0.008)	0.001 (0.020)
ELA courses	-0.002 (0.005)	-0.0272*** (0.009)	-0.009** (0.004)	-0.006 (0.010)

Second Year Teacher Results

	Math	ELA
	2001-2006	2001-2006
Capstone project	-0.008 (0.022)	-0.027 (0.018)
Oversight	-0.015 (0.013)	0.002 (0.014)
Percent Tenure	0.086 (0.081)	0.008 (0.055)
Math courses	0.023** (0.009)	0.001 (0.009)
ELA courses	0.0087 (0.0056)	0.011** (0.005)

Reported Experiences

- Teaching of Math
 - One measure, non-normal distribution so split into 4 groups
- Teaching of ELA
 - One measure, normal distribution
- Knowledge of Learning
- Focus on Handling Student Misbehavior
- Focus on English Language Learners
- Features linked to practice
 - Opportunities in coursework to practice
 - Opportunities to review curriculum
 - Student Teaching
 - Congruence of Student Teaching

Opportunities to Learn Math Methods

- alpha = 0.97
- In your teacher preparation program, prior to September 2004, how much opportunity did you have to do the following (5-point scale)?
 - learn typical difficulties students have with place value;
 - learn typical difficulties students have with fractions;
 - use representations (e.g., geometric representation, graphs, number lines) to show explicitly why a procedure works;
 - prove that a solution is valid or that a method works for all similar cases;
 - study, critique, or adapt math curriculum materials;
 - study or analyze student math work;
 - design math lessons;
 - learn how to facilitate math learning for students in small groups;
 - adapt math lessons for students with diverse needs and learning styles;
 - And practice what you learned about teaching math in your teacher preparation program in your field experience.

Opportunities to Learn ELA Methods

- alpha = 0.96
- In your teacher preparation program, prior to September 2004, how much opportunity did you have to do the following (5-point scale)?
 - learn about characteristics of emergent readers;
 - learn ways to teach students meta-cognitive strategies for monitoring comprehension;
 - learn ways to teach decoding skills;
 - learn ways to encourage phonemic awareness;
 - learn ways to build student interest and motivation to read;
 - learn how to help students make predictions to improve comprehension;
 - learn how to support older students who are learning to read;
 - learn ways to organize classrooms for students of different reading ability;
 - study, critique, or adapt student curriculum materials;
 - learn how to activate students' prior knowledge;
 - listen to an individual child read aloud for the purpose of assessing his/her reading achievement;
 - plan a guided reading lesson;
 - discuss methods for using student reading assessment results to improve your teaching; and practice what you learned about teaching reading in your field experiences.

Opportunities to Learn about Learning

- alpha = 0.80
- In your teacher preparation program, prior to September 2004, how much opportunity did you have to do the following (5-point scale)?
 - study stages of child development and learning;
 - develop strategies for handling student misbehavior;
 - develop specific strategies for teaching English language learners (those with limited English proficiency);
 - develop specific strategies for teaching students identified with learning disabilities;
 - develop specific strategies for teaching students from diverse racial and ethnic backgrounds;
 - develop strategies for setting classroom norms;

Other Non-Practice Variables

- Focus on handling student misbehavior
 - Difference between opportunities to “develop strategies for handling student misbehavior” and average of learning (standardized)
- Focus on English language learners
 - Difference between opportunities to “develop specific strategies for teaching English language learners” and average of learning (standardized)

Practice Variables

- Practice
 - Avg of opportunities to “listen to an individual child read aloud for the purpose of assessing his/her reading achievement,” “plan a guided reading lesson,” and “study or analyze student math work” each differenced from math or reading.
- Review Curriculum
 - Avg of opportunities to “review New York City mathematics curriculum” and “review New York City reading curriculum” differenced from math and reading
- Student Teaching
 - Whether they did no supervised student teaching prior to teaching
- Congruence of Field Experiences
 - Average of agreement with the statements “My experiences in schools were similar to my current job in terms of grade level” and “My experiences in schools were similar to my current job in terms of subject area”

Math Results for First Year

	Together Fixed effects	Separately Fixed Effects	Together Random Effects	Together OLS
Practice	0.061***	0.062***	0.044***	0.027***
Curriculum	0.026**	0.028**	0.028**	0.026***
No Std. Teach	-0.088**	-0.109***	-0.015	0.056*
Congruence	0.069***	0.065***	0.037***	0.023***
Math2	-0.072	-0.042	-0.023	-0.016
Math3	-0.114*	-0.106	0.000	0.034
Math4	-0.114*	-0.013	0.010	0.014
Learning	0.011	0.002	-0.005	-0.001
ELL	0.032**	0.023	0.005	0.001
Misbehavior	0.017	0.027*	0.015	0.016**

Other Math Results

	College Rec First Year Teachers	Year 1 Random	X Year 2
Practice	0.053***	0.042***	-0.028
Curriculum	0.026*	0.039***	-0.015
No Std. Teach	0.052	0.010	0.029
Congruence	0.048***	0.029***	-0.049**
Math2	0.033	-0.003	0.037
Math3	0.015	0.049	0.022
Math4	0.022	0.043	-0.002
Learning	-0.012	-0.012	-0.009
ELL	0.029*	0.001	-0.021
Misbehavior	0.016	0.007	0.016

ELA – Somewhat Similar Results for College Recommended

	Together	Separately	Random
Practice	0.038*	0.035**	0.021**
Curriculum	0.037	0.054***	0.028**
No Std. Teach	-.111	-0.045	0.027
Congruence	-0.018	-0.020	0.000
ELA	-0.031	-0.042	-.021
Learning	-0.015	-0.032*	0.009
ELL	0.023	0.057	0.012
Misbehav	-0.020	0.002	0.009

ELA – College Rec by Year, nothing in Year 2

	Year 1 Random	X Year 2
Practice	0.018*	-0.028
Curriculum	0.025*	-0.005
No Std. Teach	0.002	0.029
Congruence	0.029***	0.061
ELA	-0.001	-0.021
Learning	0.012	0.009
ELL	-0.001	-0.021
Misbehavior	0.011	-0.003

ELA – nothing overall

	Random
Practice	0.010
Curriculum	0.015
No Std. Teach	-0.028
Congruence	-0.005
ELA	0.004
Learning	0.010
ELL	0.004
Misbehavior	0.013

Conclusions

- Variation across programs
- Opportunities linked to practice appear to help teachers in their first year
- Content knowledge may help after the first year
- **Caveats – only a first step**
 - Big district but small number of programs and of teachers within schools
 - May be missing important features
 - May not be measuring features well; developing instruments
 - Value-added analysis may have omitted variables or, alternatively, may eliminate the most important variation (e.g. between schools)
 - Tests themselves may not proxy well for full range of learning that we care about

Overall Conclusions

- Policy changes dramatically changed who is teaching
- In a district with highly selective early-entry routes, changes appear to have benefited student learning
- These early-entry routes are more effective in math than in ELA and more effective in middle and high than elementary
- Preparation linked to practice shows positive effects for first year teachers
- Still far from knowing how to optimize pathways
 - Some combination of (a) recruitment and selection and (b) opportunities to learn how to teach
 - Learning opportunities directly linked to practice appear particularly effective for first year teachers.

Learning to Teach? Pathways into Teaching and Student Achievement in NYC

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September 24, 2008



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Now currently messy questions

- Attrition and Transfer
 - What are the patterns
 - How is supply and demand interacting to create these
 - What are the underlying causes
- Given the importance of school administration
 - Seek to understand principals and principal labor markets

What are the patterns?

Female	1.0000	1.0436	0.8313~
Black	0.9621	0.9928	0.9737
Hispanic	0.9623	0.9746	0.8735
Other race/ethnicity	1.1800**	1.1500~	1.3893*
Experience	0.9398***	0.9448***	0.9293***
Teaching Fellow	1.4501***	1.4883***	1.4613**
TFA	0.6267***	1.0931	0.6999
Temp	1.2673***	1.2855***	1.4176**
Other	1.1750**	1.1709**	1.1181
First LAST Score	1.0038***	1.0029***	1.0040*
Age	0.9929***	0.9902***	0.9856**
Most Comp Undergrad		1.1486**	
Teacher Value Added			0.5497**

But is it driven by supply or demand?

- Change in transfer policy in NYC
- Applications to transfer data
 - Better measure of supply
 - Not perfect measure of supply

Who applies for transfer

VARIABLES	Model 1	Model 2	Model 5
Female	1.0071	1.0246	0.9947
Black Teacher	0.7086***	0.7328***	0.6258***
Hispanic Teacher	0.8369***	0.8639**	0.6514***
Other, Non-White Teacher	1.1842***	1.0542	1.0264
Years Experience	0.9266***	0.9288***	0.9121***
Teaching Fellow	1.1957***	1.2479***	1.4218***
TFA	0.2796***	0.4487***	0.3281***
Temporary License	1.1354**	1.1483**	1.2981**
Other Path	1.1121**	1.0923~	1.1003
LAST	1.0015**	1.0021***	1.0013
Age	1.0032*	1.0003	1.0031
Most Comp College		1.0556~	
Teacher Value Added (VA)			0.4969***

Success (Application-level; to-school FE)

Female	1.0235	1.0352	1.1247
Black Teacher	1.4106***	1.4668***	1.0607
Hispanic Teacher	1.5659***	1.6302***	1.3698~
Other, Non-White Teacher	0.7513***	0.9028	0.6618*
Experience	1.0926***	1.0849***	1.1013***
Teaching Fellow	1.3039***	1.3312***	1.1170
TFA	2.2011***	1.7765***	2.9206**
Temporary License	1.0260	1.0410	0.8578
Other Pathway	0.8870~	0.8605~	0.8488
LAST	1.0067***	1.0052***	1.0063**
Age	0.9623***	0.9635***	0.9624***
Most Competitive College		1.0998~	
Teacher Value-Added			2.2792***

School-level requests to and away

Middle School	0.3847***	0.5398~	-0.4258***	0.4183
High School	0.0303	0.3029	0.0254	0.6662
Other Non-Elementary	0.5491	0.7780*	-0.8834*	-0.5647
% Black Students	0.0072***	0.0020	-0.0059**	-0.0047*
% Hispanic Students	0.0059**	0.0008	-0.0039~	-0.0039
% Asian Students	0.0027	0.0018	0.0041	0.0044
% ELL Students	-0.0040~	-0.0010	-0.0008	0.0028
% Free Lunch	0.0082***	0.0100***	-0.0041*	-0.0062*
Attendance Rate	-0.0193**	-0.0682***	0.0042	-0.0369
New School (1998)	0.1289	0.1232	0.0021	-0.0399
% Teachers 5+ Experience	-0.0132***	-0.0164***	0.0002	0.0057*
Enrollment/100	-0.0271***	-0.0492***	-0.0161**	-0.0079
New School * Enrollment	-0.0081	-0.0161	0.0092	0.0256
% Special Ed Students	0.0105~	0.0048	-0.0054	-0.0074
Suspensions/enrollment	0.9158***	1.3717**	0.3633	0.1143
School Crime (Highest 25%)	0.0896	-0.0526	-0.2500**	-0.3181**
% taking level 1 math test		0.0090*		-0.0063
8 th grade exam dummy		-0.2999		-0.7166~

What are the underlying causes (first year teacher survey)

- Teachers' assessment of working conditions
 - Teacher Influence
 - Administration
 - Staff Relations
 - Students
 - Facilities

<p>Teacher influ.</p>	<p>Selecting textbooks and other instructional materials Selecting content, topics, and skills to be taught Selecting teaching techniques Evaluating and grading students Disciplining students Determining the amount of homework to be assigned</p>	<p>0.784 (0.775)</p>
<p>Administ</p>	<p>The school administration's behavior toward the staff is supportive and encouraging The school administration usually consults with staff members before making decisions that affect us The school administration has a well-planned and enforced school discipline policy The school administration deals effectively with pressures from outside the school (for example, from the district or from parents) that might interfere with my teaching. The administration does a good job of getting resources for schl The school administration evaluates teachers' fairly Data on student learning are regularly collected and reviewed with all members of the school community (teachers, administrators, etc.)</p>	<p>0.887 (0.882)</p>

School Contextual Factor Descriptive Statistics by School Free/Reduced Lunch Quartiles

	<i>Quartile 1</i> (<i>n=7,509</i>)		<i>Quartile 2</i> (<i>n=7,440</i>)		<i>Quartile 3</i> (<i>n=7,446</i>)		<i>Quartile 4</i> (<i>n=7,320</i>)		<i>F</i>
	M	SD	M	SD	M	SD	M	SD	
Teacher influence	0.169	0.704	-0.014	0.678	-0.075	0.728	-0.033	0.705	173.11***
Administration	0.326	0.733	0.051	0.692	-0.061	0.764	-0.184	0.740	648.52***
Staff relations	0.304	0.653	-0.007	0.591	-0.021	0.661	-0.163	0.651	693.81***
Students	0.489	0.858	0.086	0.746	-.0181	0.703	-0.297	0.607	1655.71** *
Facilities	0.320	0.717	0.059	0.659	-0.090	0.766	-0.171	0.670	686.36***
Safety	2.737	0.444	2.587	0.491	2.475	0.491	2.406	0.523	644.94***

Method

- multinomial logits
 - (1) stayed at the same school
 - (2) transferred to another school within New York City, or
 - (3) left New York City.
 - control for:
 - initial pathway into teaching, gender, ethnicity, whether they passed the LAST exam on their first attempt score on the LAST exam.
 - the proportion of student eligible for free lunch, student ethnicity, enrollment
- Model
 - Own teacher's decision in the next year based on their assessment
 - All other teacher's decisions based on survey

Summary of Multinomial Logistic Regression Models for First Year Teachers

	<i>Transferred</i>	<i>Left NYC</i>
Teacher influence	0.761** (0.070)	0.931 (0.091)
Administration	0.518*** (0.060)	0.649*** (0.061)
Staff relations	0.692*** (0.069)	0.749** (0.081)
Students	0.615*** (0.078)	0.692** (0.080)
Facilities	0.632*** (0.070)	0.667*** (0.069)
Safety	0.819 (0.109)	0.863 (0.117)

Full Multinomial Logistic Model for First Year of Teachers

	<i>Transfere d</i>	<i>Left NYC</i>
Teacher influence	1.009 (0.010)	1.134 (0.118)
Administration	0.556*** (0.083)	0.717* (0.101)
Staff relations	0.972 (0.122)	0.972 (0.136)
Students	0.894 (0.128)	0.895 (0.136)
Facilities	0.954 (0.120)	0.841 (0.117)
Safety	1.120 (0.161)	1.108 (0.170)

So now study principals

- Multiple districts
- Shadowing
- Admin Data
- Surveys
- Interviews.....