CENTER FOR EDUCATION POLICY ANALYSIS at STANFORD UNIVERSITY

Salary Incentives and Teacher Quality: The role of compensation in teacher recruitment and retention

Heather Hough

PACE Seminar
February 15, 2013

The problem: Salary disparities across districts cause inequality

- Variations in salary exist between districts
  - In CA, district salaries range from $42,000 to over $110,000 for teachers with 10 years of experience and 60 additional education credits
- Districts with high-need students have lowest salaries

The problem: Salary disparities across districts cause inequality

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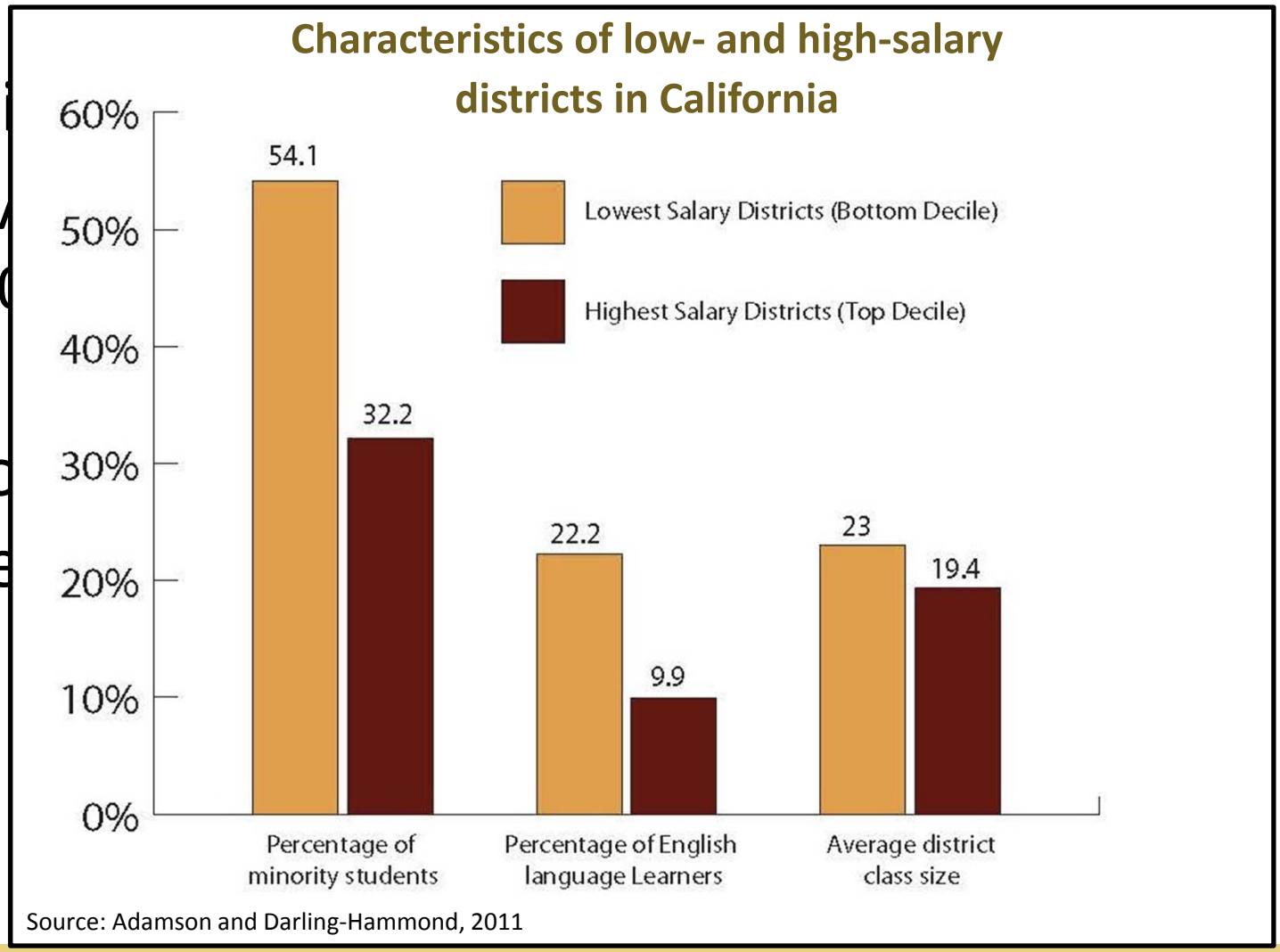

Source: Adamson and Darling-Hammond, 2011

The problem: Salary disparities across districts cause inequality

- Variations in salary exist between districts
  - In CA, district salaries range from $42,000 to over $110,000 for teachers with 10 years of experience and 60 additional education credits
- Districts with high-need students have lowest salaries
- Lower salary + difficult working conditions ➔difficulty recruiting and retaining teachers
- This leads to disparities in teacher quality

The problem: Salary disparities across districts cause inequality

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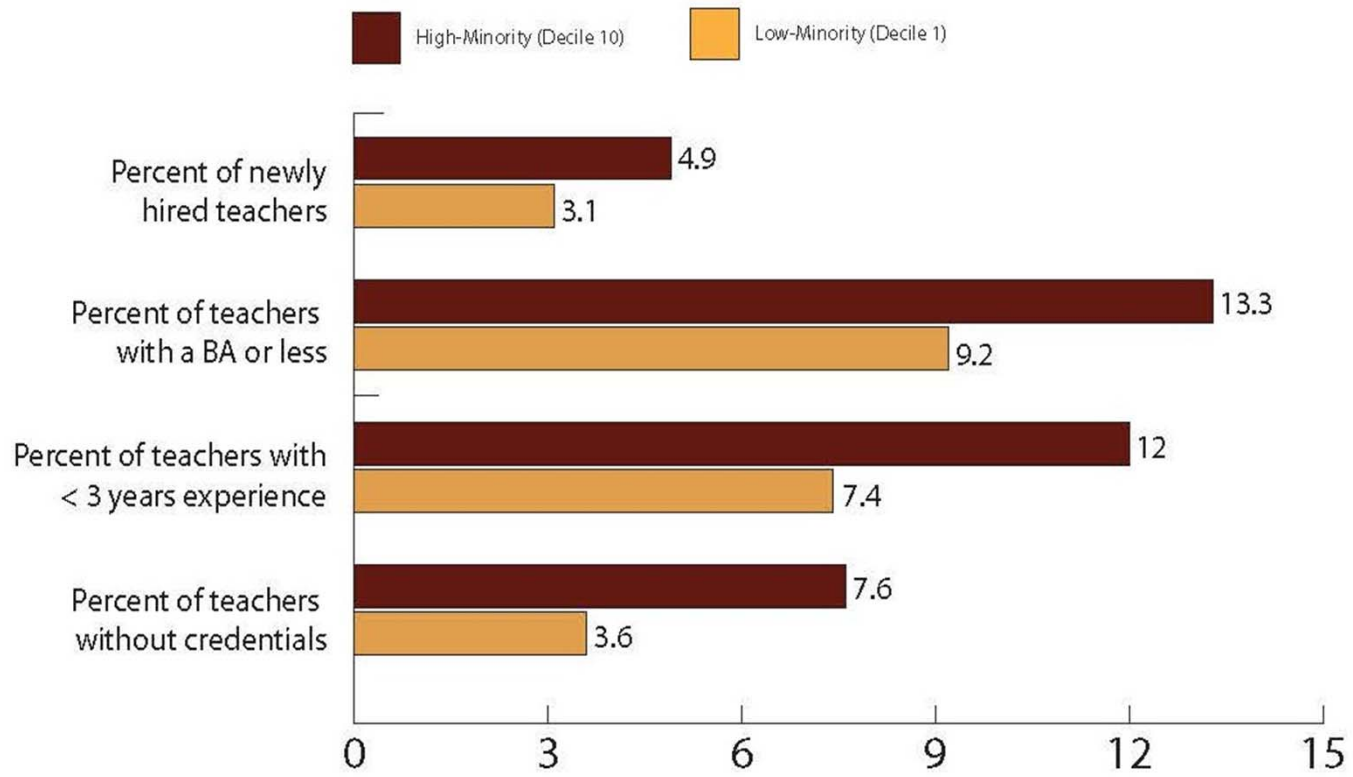
Teacher characteristics in low- and high-minority districts in California



Source: Adamson and Darling-Hammond, 2011

A solution: Compensation?

- Districts often use compensation to attract and retain teachers
- Will wages help attract teachers?
  - Research literature suggests teachers respond to wage changes in their decisions to become teachers
  - Little research on how relative salary increases improve teacher recruitment or retention in a particular district
  - Existing research in recruitment looks at teachers' ultimate placement, not changes in teachers' application preferences

The Quality Teacher and Education Act (QTEA) in the San Francisco Unified School District

- Parcel tax passed by SF voters in June 2008
- $500/student for 20 years
- Policy elements
  - Master Teacher program
  - Professional development hours
  - Expansion of Peer Assistance and Review (PAR)
  - Whole school rewards
  - Compensation
    - Salary increases ranging from $500-$6,300
    - Hard-to-staff school bonus: $2,000
    - Hard-to-fill subject bonus: $1,000
    - Retention bonuses: $2,500 after 4 years, $3,000 after 8 years

Data collection

	2007-08	2007-08	2009-10	2010-11	2011-12
Administrative Data (from 2002)	X	X	X	X	X
Surveys of teachers and principals	X		X	X	X
Surveys of teacher applicants	X		X		
Interviews with district staff and stakeholders	X	X	X	X	X
School case studies			X		

Presentation contents

- The effect of QTEA's compensation increases on:
  - Teacher recruitment
  - Teacher retention

Presentation contents

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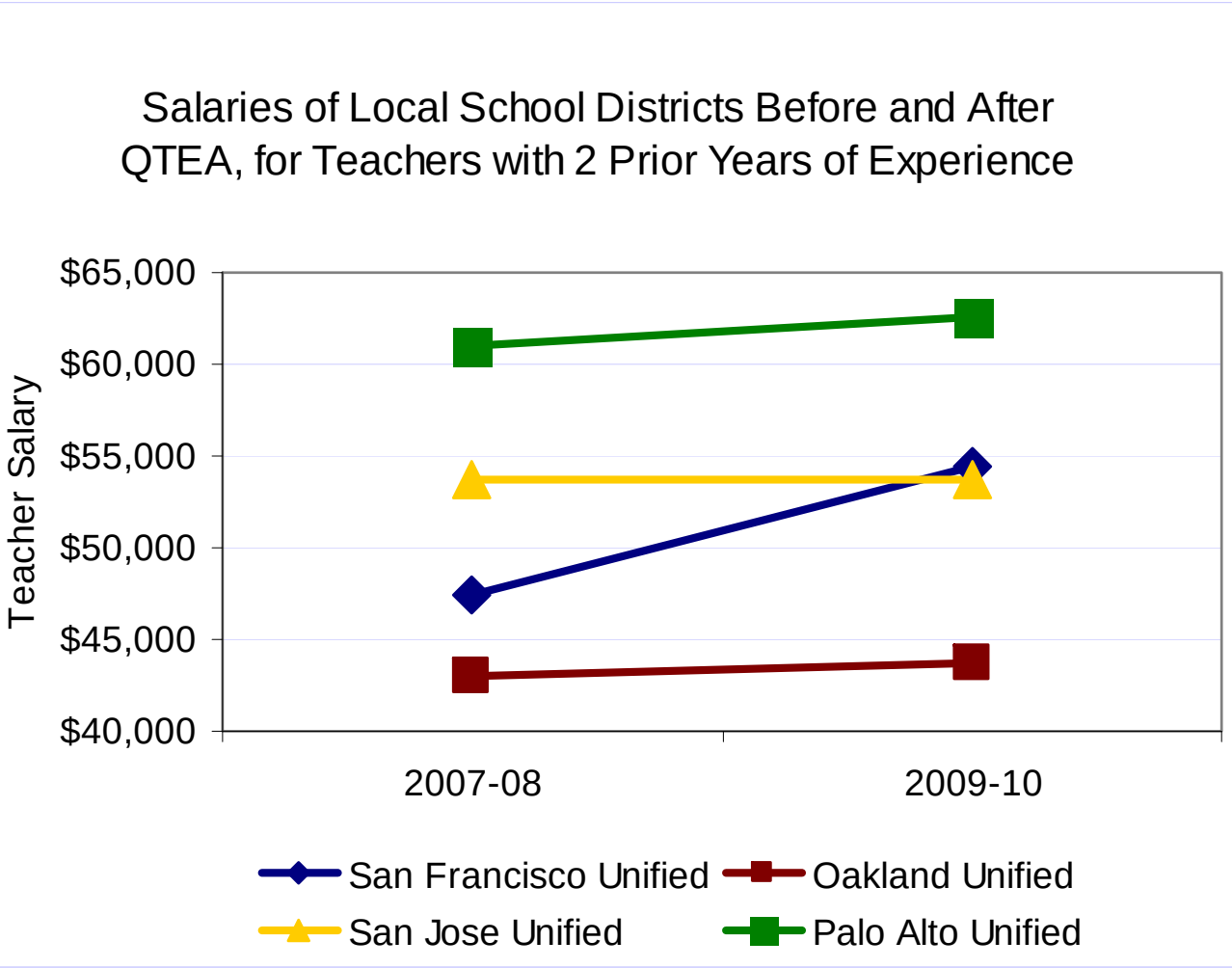
  - Teacher recruitment
  - Teacher retention

Focus of research
QTEA's overall salary increase

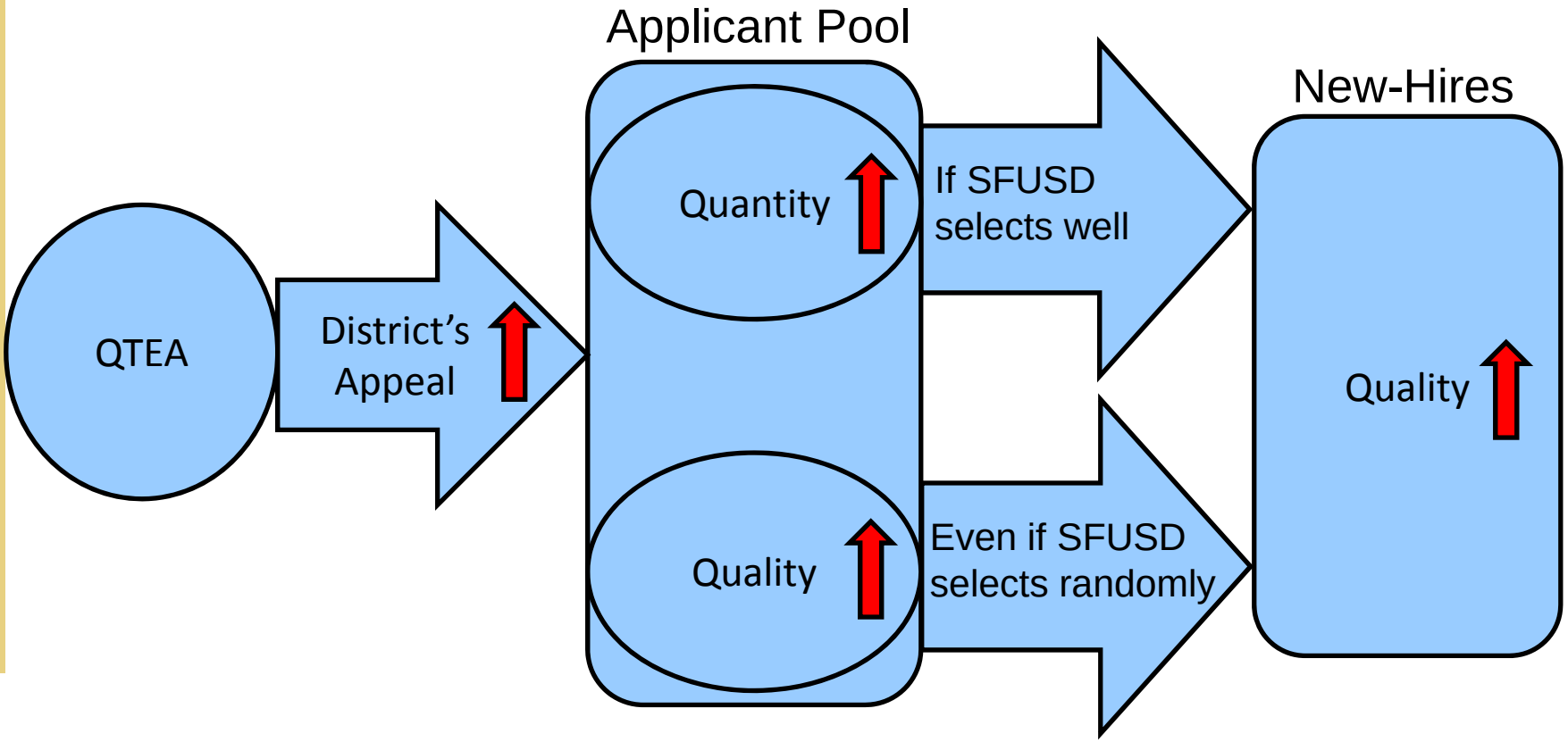


How could QTEA affect recruitment?

- If QTEA was effective in attracting teacher applicants:
  - More teachers would apply to SFUSD after QTEA
  - Teachers who would only have applied to districts with higher salaries now apply to SFUSD as well
  - New teacher applicants attracted from other districts could be higher quality

Teachers who apply to higher-paying districts	*--proxies for--*	"Higher-quality" applicants

How could QTEA affect recruitment?



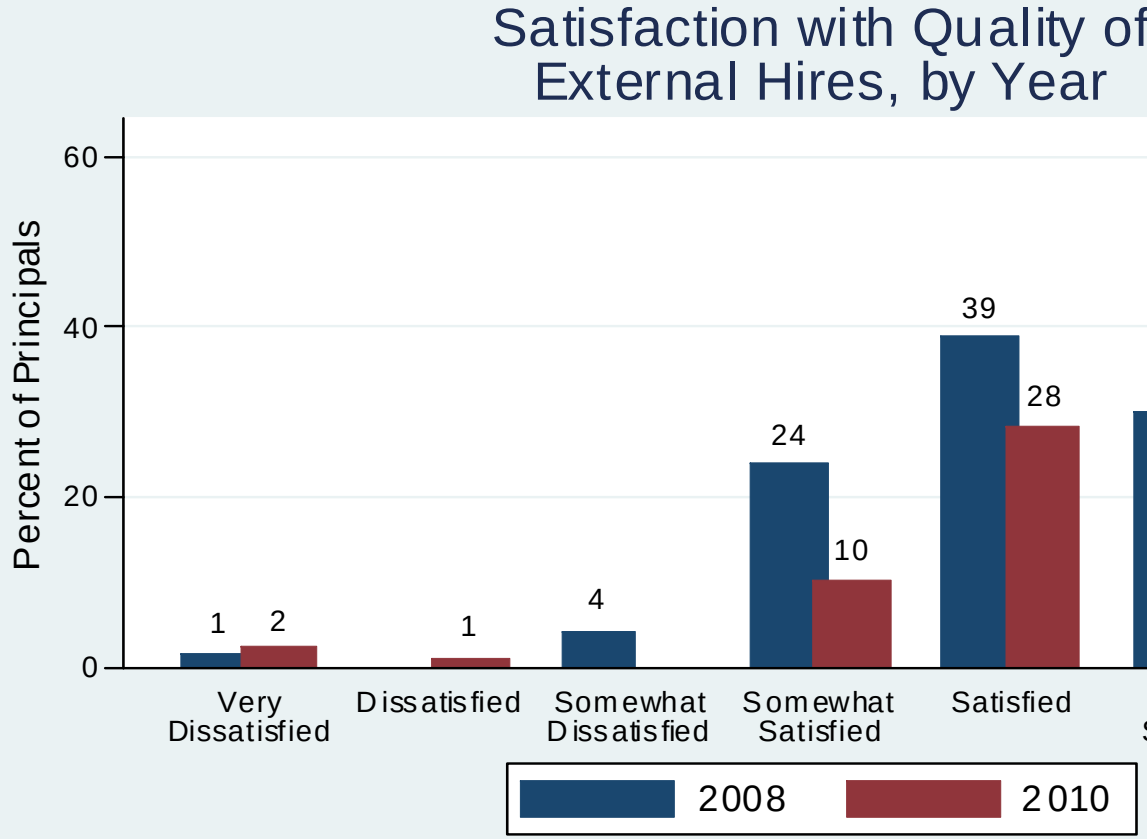
QTEA's impact on teacher recruitment

Principal reports

Source:
2008 TNTP Principal Survey (N=67)
2010 Stanford Principal Survey (N=88)
Chi-square = 16.45, p = 0.01

QTEA's impact on teacher recruitment

Principal reports



Source:
2008 TNTP Principal Survey (N=67)
2010 Stanford Principal Survey (N=88)
Chi-square = 16.45, p = 0.01

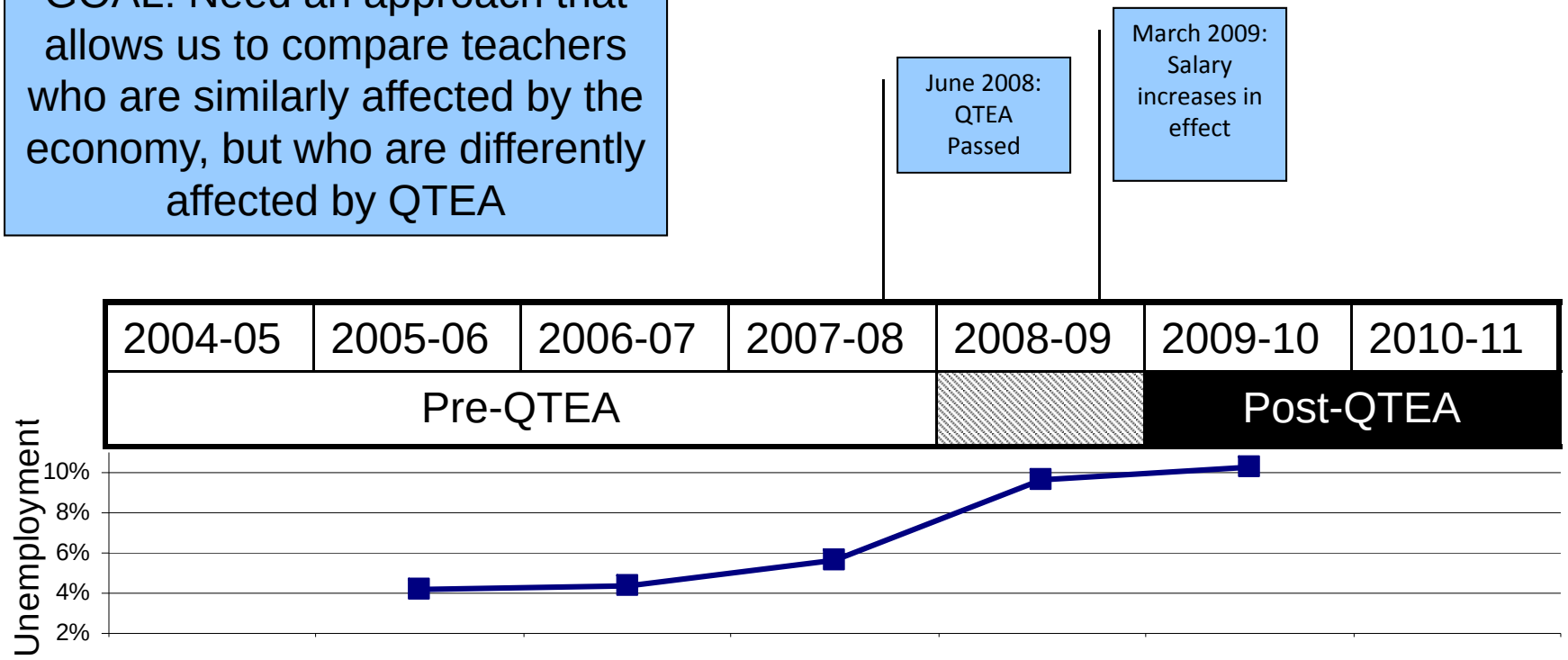
This year…there's just a lot of stronger teachers coming in to interview. (Principal, 2010)

I used to [have a hard time recruiting teachers in hard-to-fill areas], but last year because of the economy – and it is going to be the same this year – there are a lot of candidates out there. (Principal, 2010)

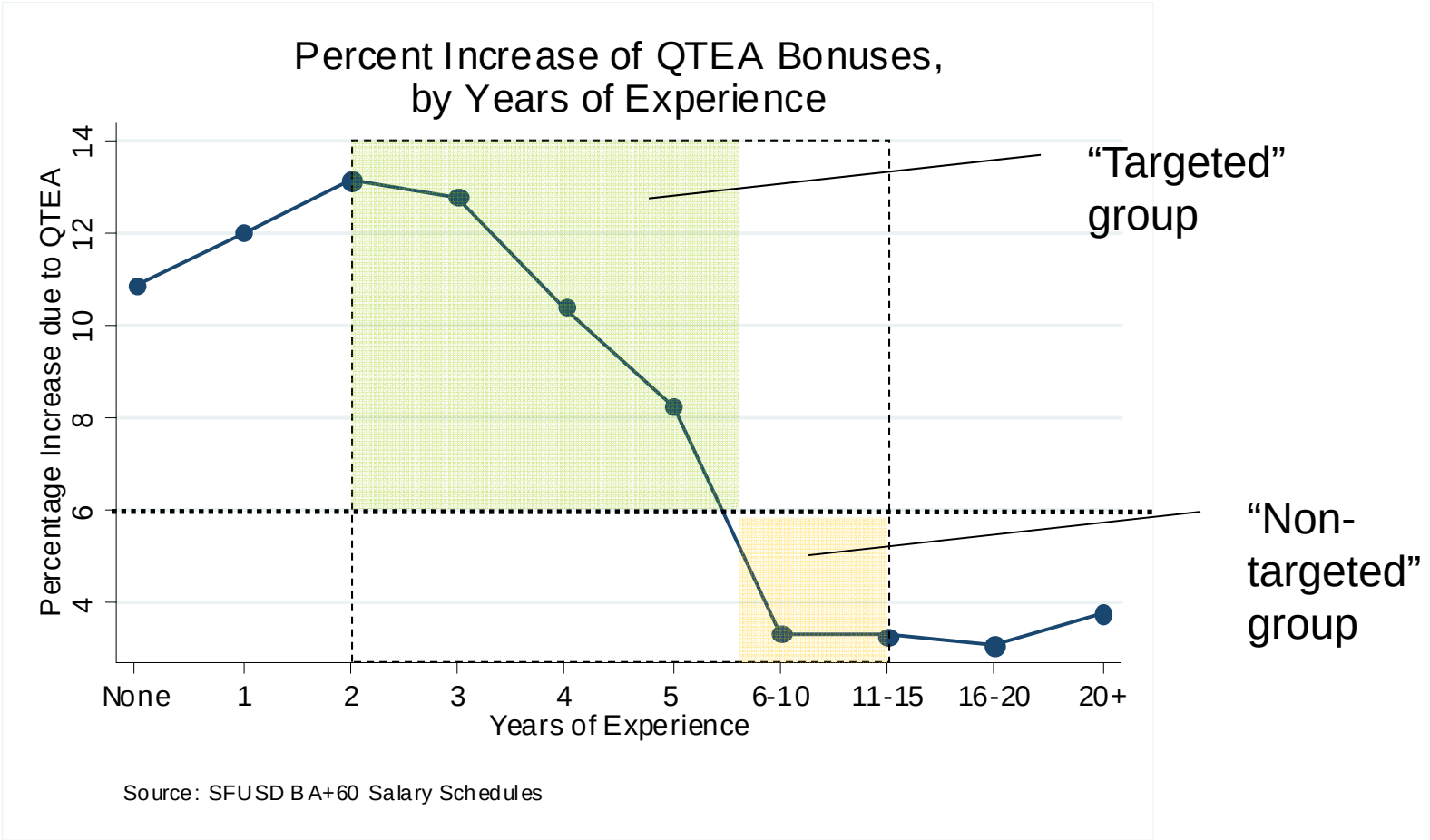
QTEA implementation period

Why a causal approach is needed

GOAL: Need an approach that allows us to compare teachers who are similarly affected by the economy, but who are differently affected by QTEA



General approach: Exploit natural variation in salary increases



Research questions

1. Changes to the applicant pool
   - Did QTEA attract more applicants in targeted areas?
   - Did QTEA attract applicants from higher-paying school districts?
2. Changes to the cohorts of new-hires
   - Did SFUSD hire more teachers in areas targeted by QTEA?
   - Did QTEA improve the quality of new-hires in SFUSD?

Data

- Changes to the applicant pool
  - Surveys of teachers and applicants
    - Applicant cohorts from 2005-2011
  - Contains:
    - Estimated placement on SFUSD salary schedule
    - Other local districts applied to
- Changes to the cohorts of new-hires
  - SFUSD administrative data
    - Cohorts of new-hires (and all other teachers) from 2005-2011
  - Contains:
    - Placement on SFUSD salary schedule
    - Teacher-by-year estimations of contribution to student achievement

Q1: Changes to the applicant pool

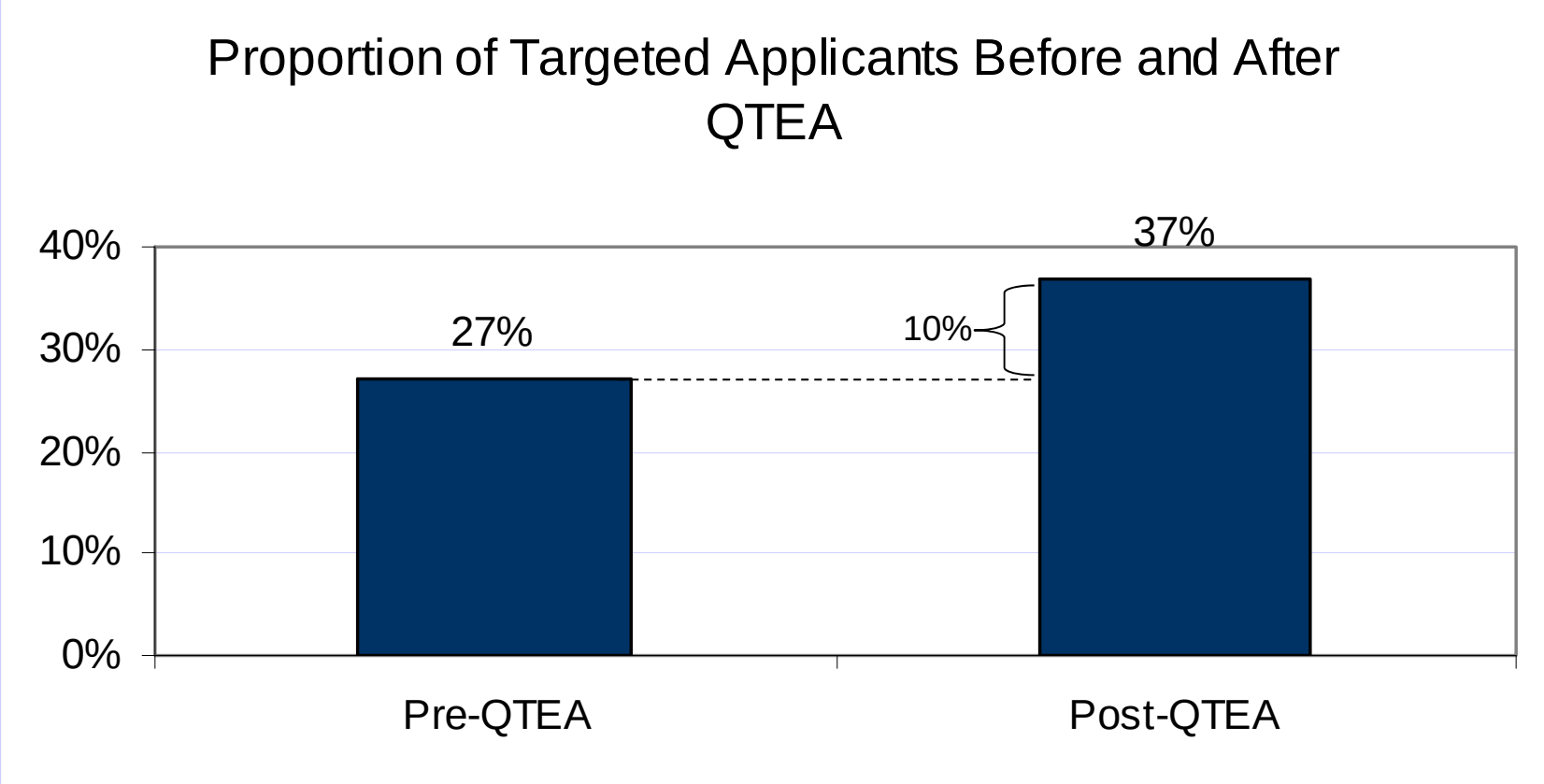
Did QTEA attract more applicants in targeted areas?

- Approach: Compare the proportion of targeted applicants before and after QTEA
  - An increase in proportion of targeted applicants after QTEA would indicate there were more applicants in the "targeted" group after QTEA
  - Would provide an indication that the size of the applicant pool increased
- Limit sample to applicants with only with 2-15 years of prior experience
  - Compare teachers who are similarly affected by economic changes but differently affected by QTEA

Q1: Changes to the applicant pool

Did QTEA attract more applicants in targeted areas?

YES



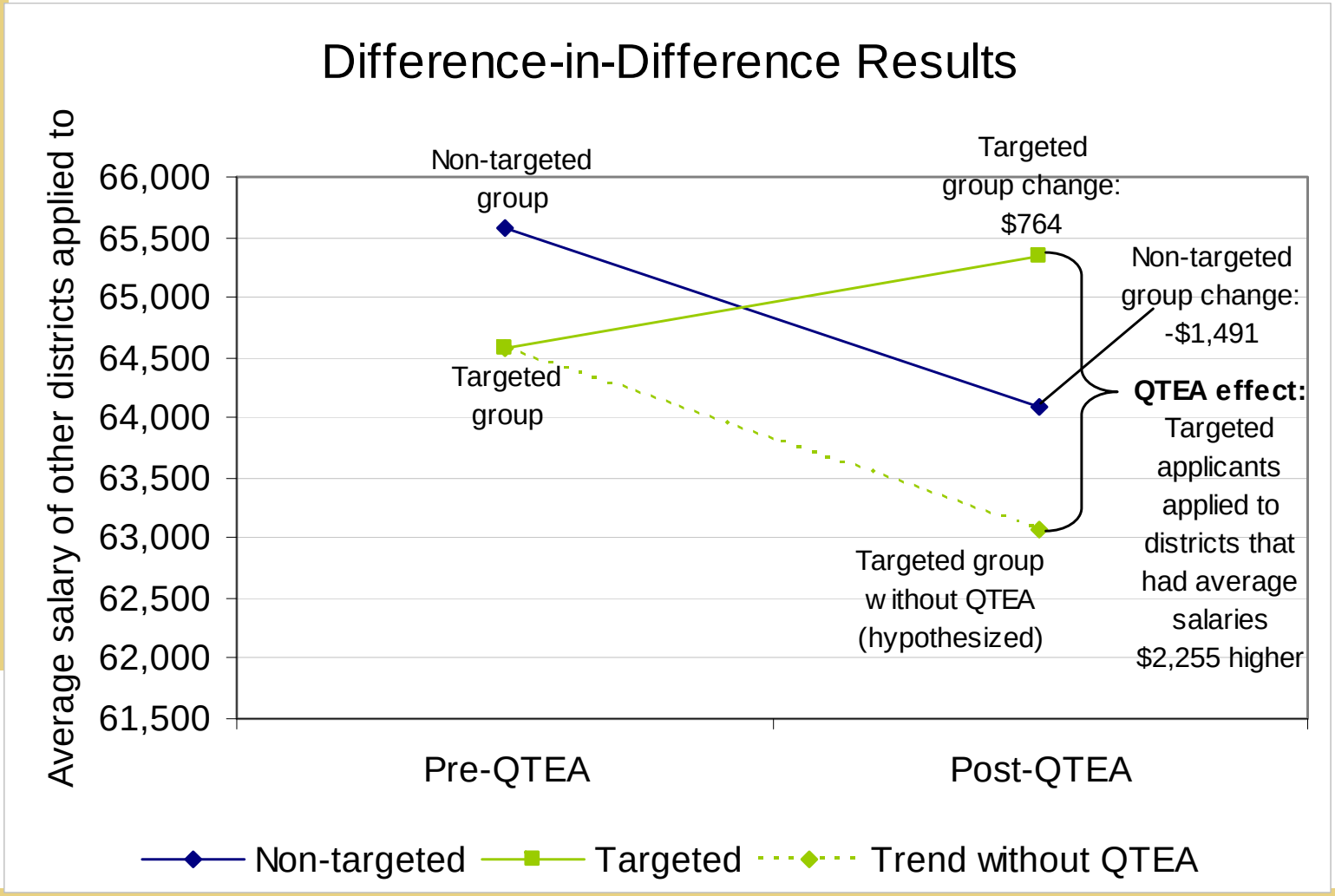
Q1: Changes to the applicant pool

Did QTEA attract applicants from higher-paying districts?

- Approach: Compare the average salary of other districts applicants applied to before/after QTEA
  - An increase in the average salary of other districts after QTEA would indicate applicants were drawn by the salary, or that they have a "preference for higher salary"
- Again, limit sample to applicants with only with 2-15 years of prior experience
  - Compare teachers who are similarly affected by economic changes but differently affected by QTEA

Q1: Changes to the applicant pool

Did QTEA attract applicants from higher-paying districts?



YES

Q2. Changes to the cohorts of new-hires

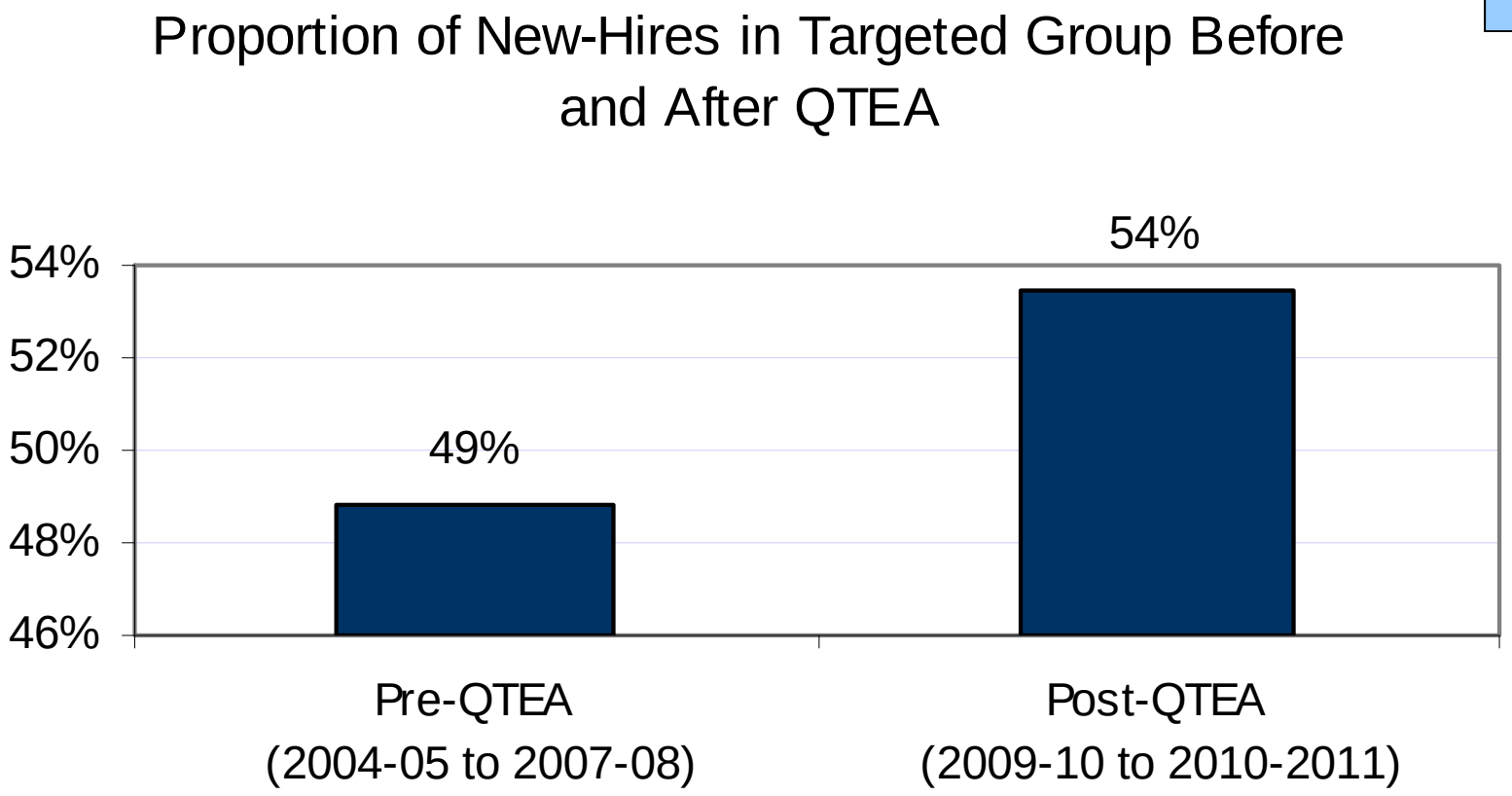
Did SFUSD hire more teachers in areas targeted by QTEA?

- Approach: Compare the proportion of "targeted" new-hires before and after QTEA
  - More new-hires in the targeted group provides an indication that:
    - There were more of them in the pool
    - That they may be higher quality candidates, since they were ultimately hired

Q2. Changes to the cohorts of new-hires

Did SFUSD hire more teachers in areas targeted by QTEA?

YES



Q2. Changes to the cohorts of new-hires

Did QTEA improve the quality of new-hires in SFUSD?

- Approach: Compare the "quality" of new-hires before/after QTEA
  - "Quality": A quantitative measure of a teacher's contribution to student achievement

A teacher-by-year score in ELA and Mathematics, controlling for student background characteristics and prior achievement

Includes teachers in grades 3-8

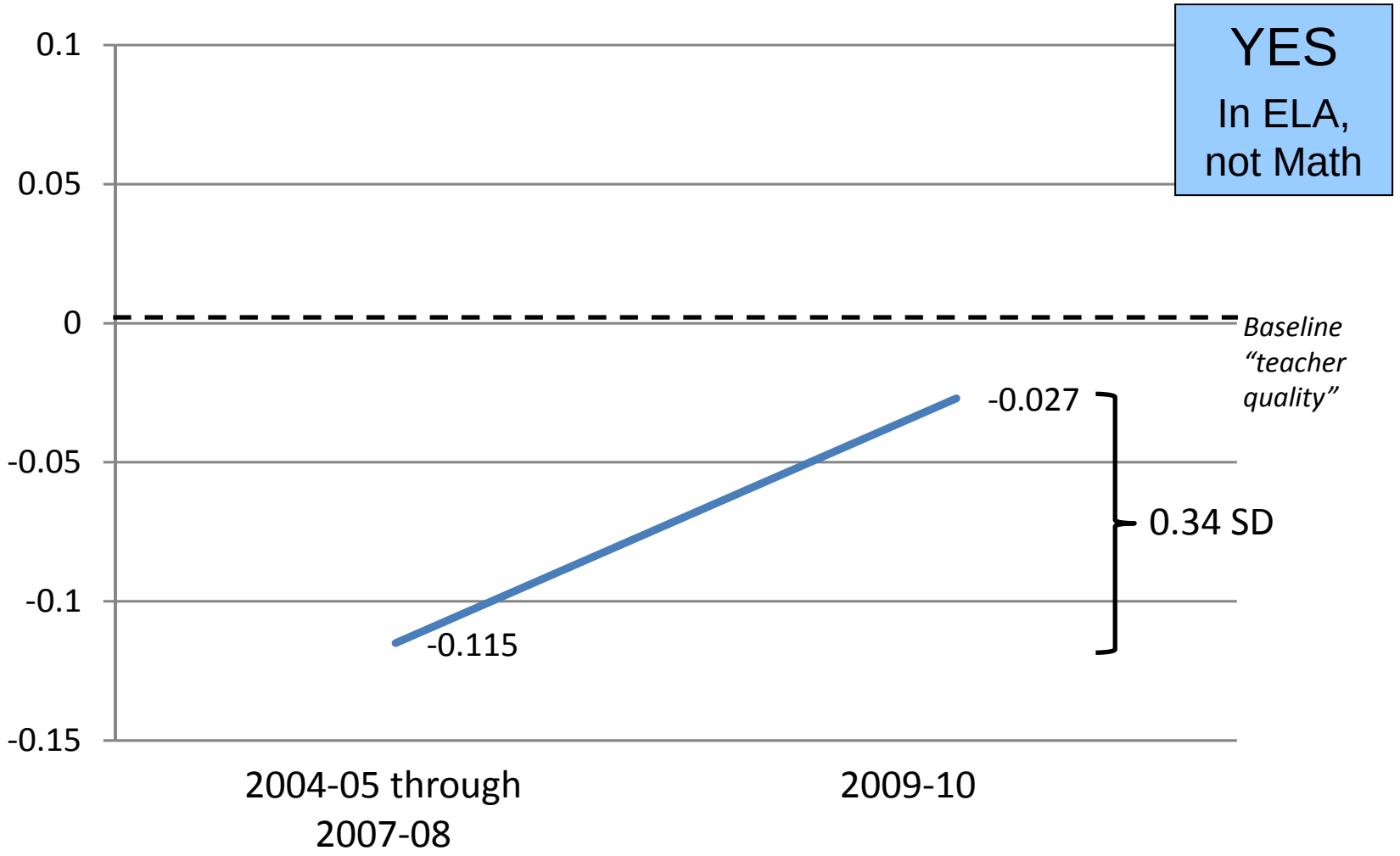
Q2. Changes to the cohorts of new-hires

Did QTEA improve the quality of new-hires in SFUSD?

- Approach: Compare the "quality" of new-hires before/after QTEA
  - "Quality": A quantitative measure of a teacher's contribution to student achievement
  - An increase in the overall quality of new-hires provides confirmation that QTEA has been effective in improving teacher recruitment

Q2. Changes to the cohorts of new-hires

Did QTEA improve the quality of new-hires in SFUSD?



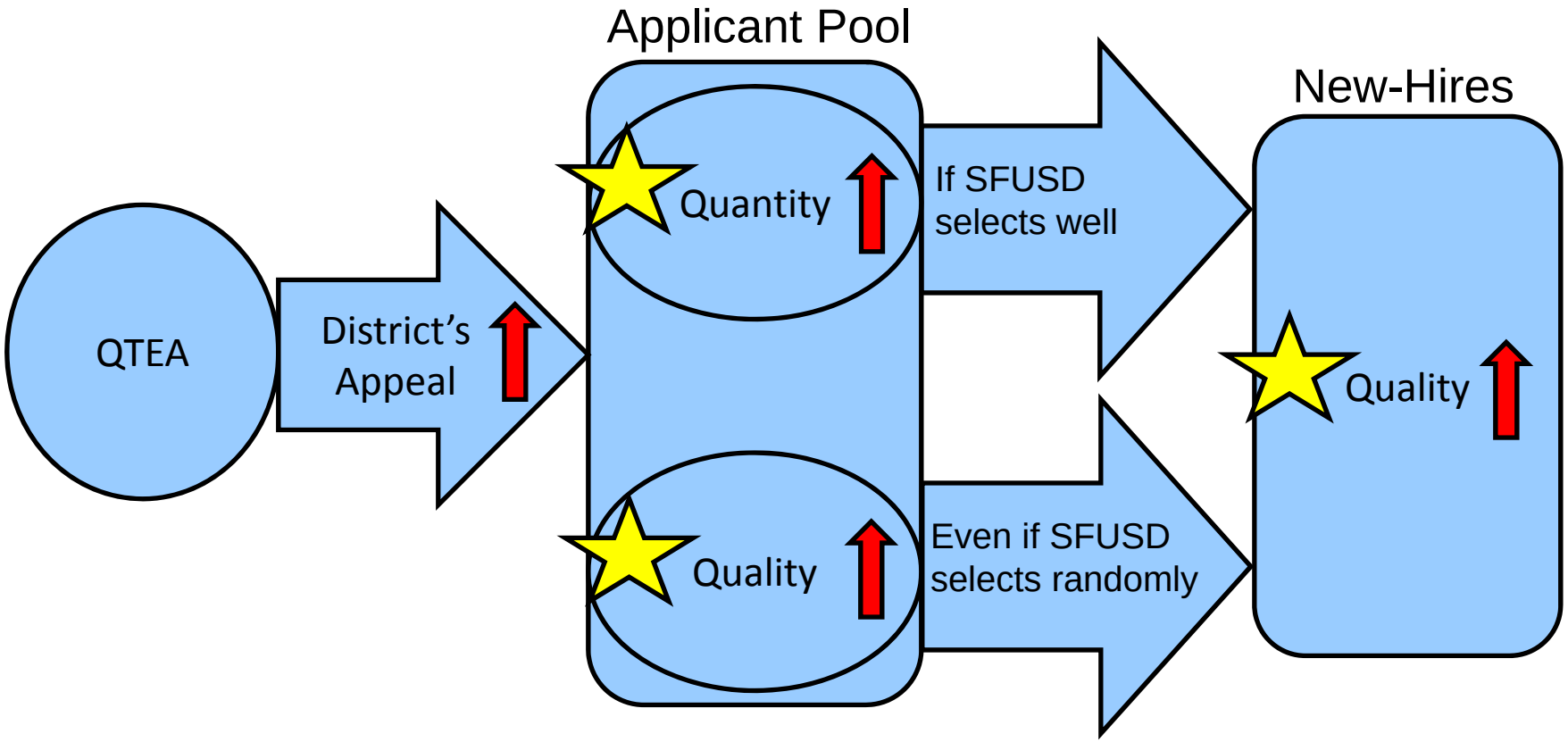
Q2. Changes to the cohorts of new-hires

Did QTEA improve the quality of new-hires in SFUSD?

YES!

- Results: The quality of new-hires increased after QTEA in ELA but not Mathematics
  - For teachers hired in 2009-10, their value-added scores were 0.34 of a standard deviation higher than teachers hired in the time period 2004-05 through 2007-08

In sum:


Applicant Pool
New-Hires
QTEA
District's Appeal
Quantity
Quality
If SFUSD selects well
Even if SFUSD selects randomly
Quality

Presentation contents

- The effect of QTEA's compensation increases on:
  - Teacher recruitment
  - Teacher retention

Research questions

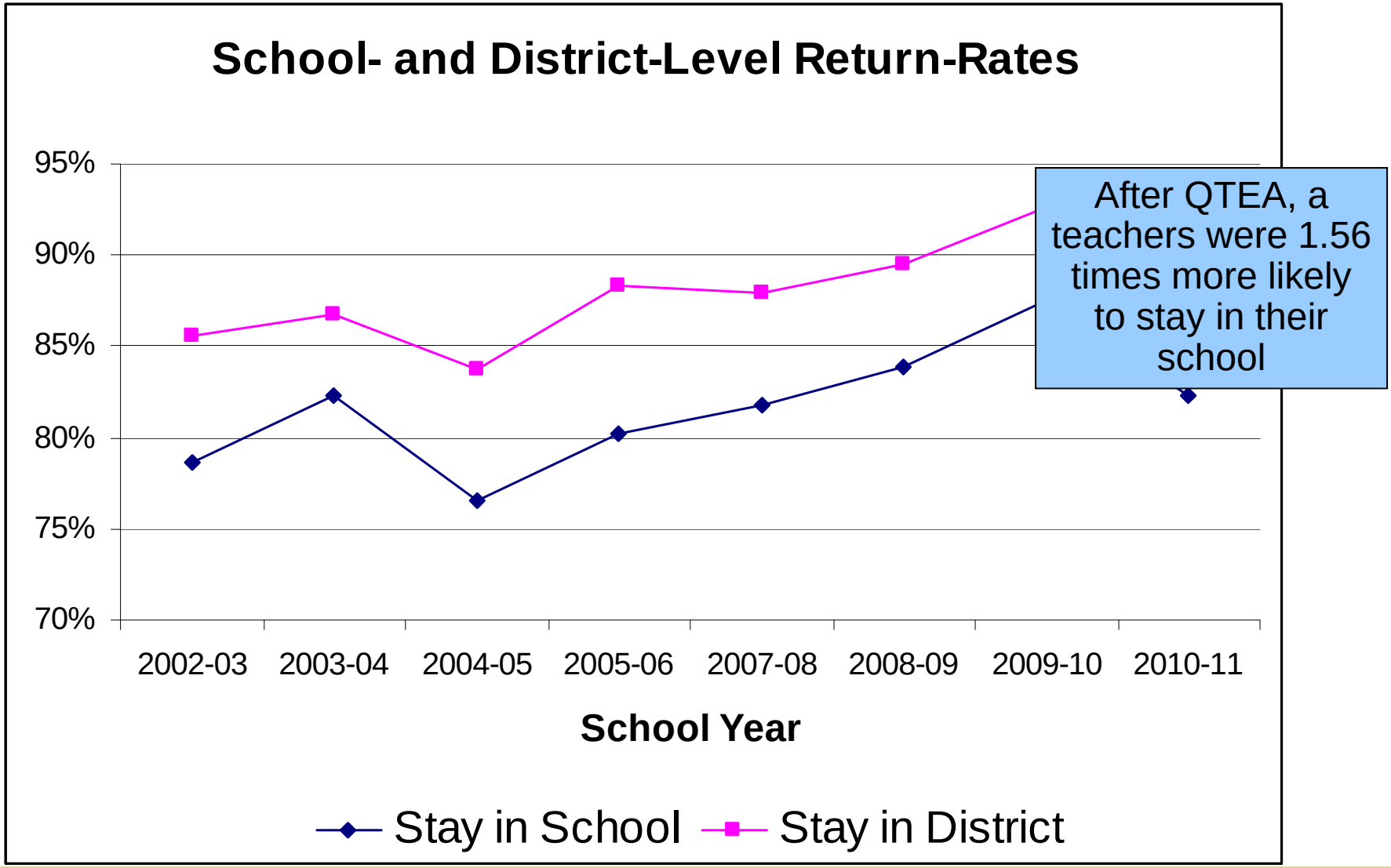
1. To what extent did teacher retention improve for teachers "targeted" by QTEA's:
   - Overall salary increases?
   - Retention bonuses?
   - Hard-to-staff school bonuses?

- **Salary increase: $500-$6,300**
- **Retention bonuses: $2,500 after 4 years, $3,000 after 8 years**
- **Hard-to-staff school bonus: $2,000**

2. Did the retention of highly-effective teachers improve after QTEA?

Center for Education Policy Analysis at Stanford University

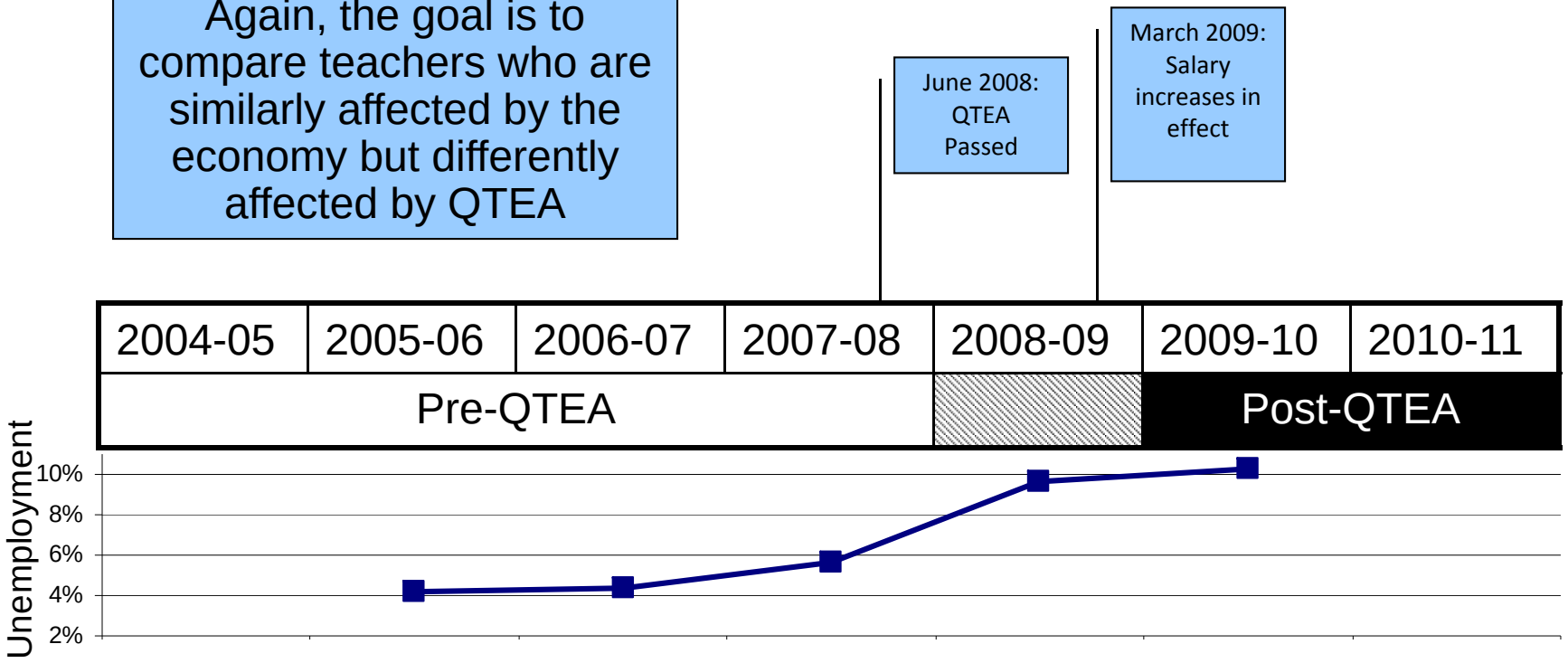
Retention improved after QTEA



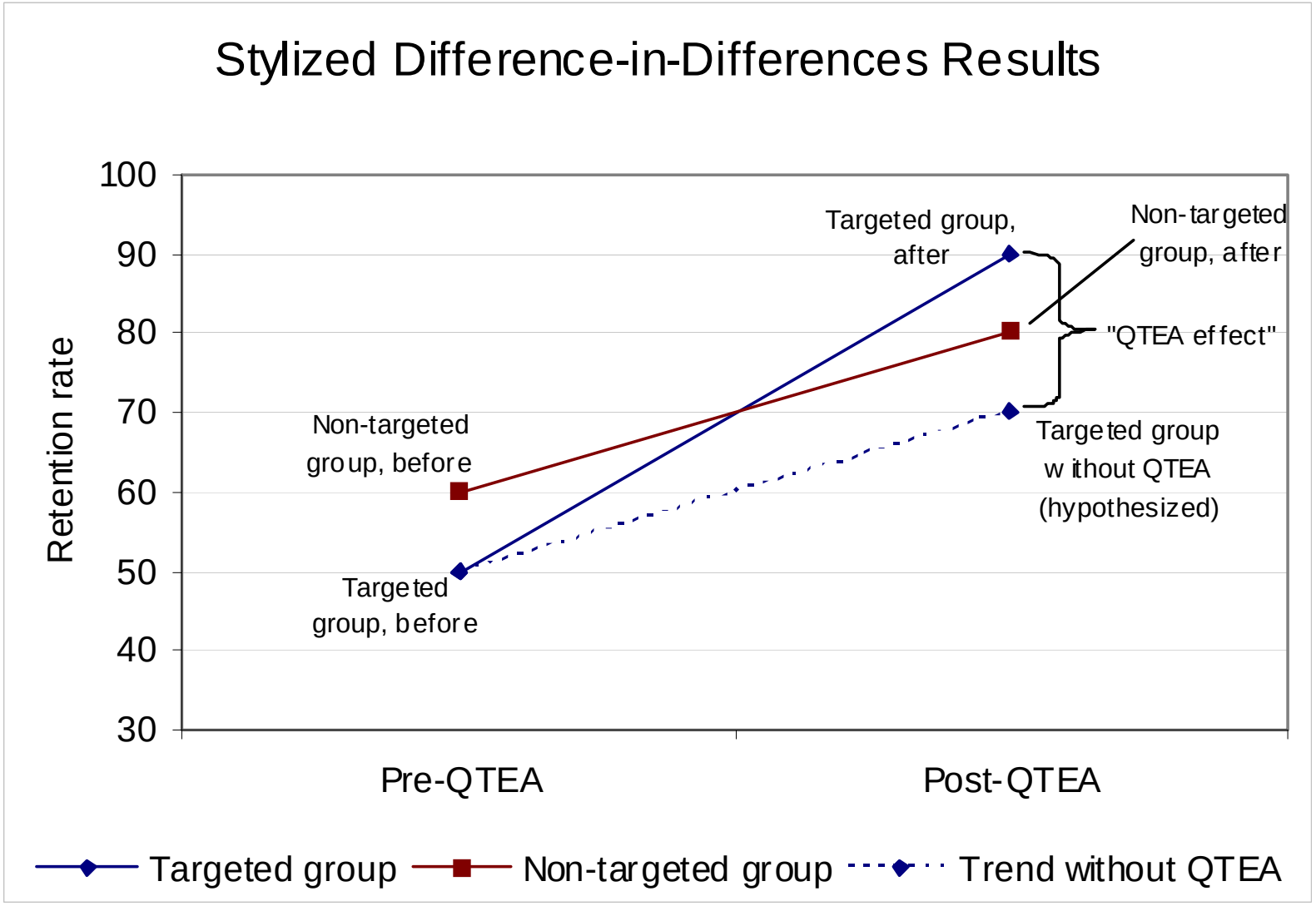
QTEA implementation period

Why a causal approach is needed

Again, the goal is to compare teachers who are similarly affected by the economy but differently affected by QTEA



Again, difference-in-differences



Research approach

- In each question, to ensure that "targeted" teachers are similar to non-targeted teachers:
  - Overall salary increase – compare teachers with 3-16 years of experience
  - Retention bonus – compare teachers with 3-5 years of service (4th year targeted)
  - Hard-to-staff school bonus – compare teachers in HTS schools with a matched comparison group (also limit by teacher experience)

Data

- SFUSD administrative data
  - All teachers from 2002-2011
- Contains:
  - Receipt of QTEA salary and bonuses
    - Placement on SFUSD salary schedule
    - Years of total teaching experience
    - Years of service in SFUSD
  - Teacher-by-year estimations of contribution to student achievement
  - Teaching placement each year

Q1. Did teacher retention improve for teachers "targeted" by QTEA?

NO

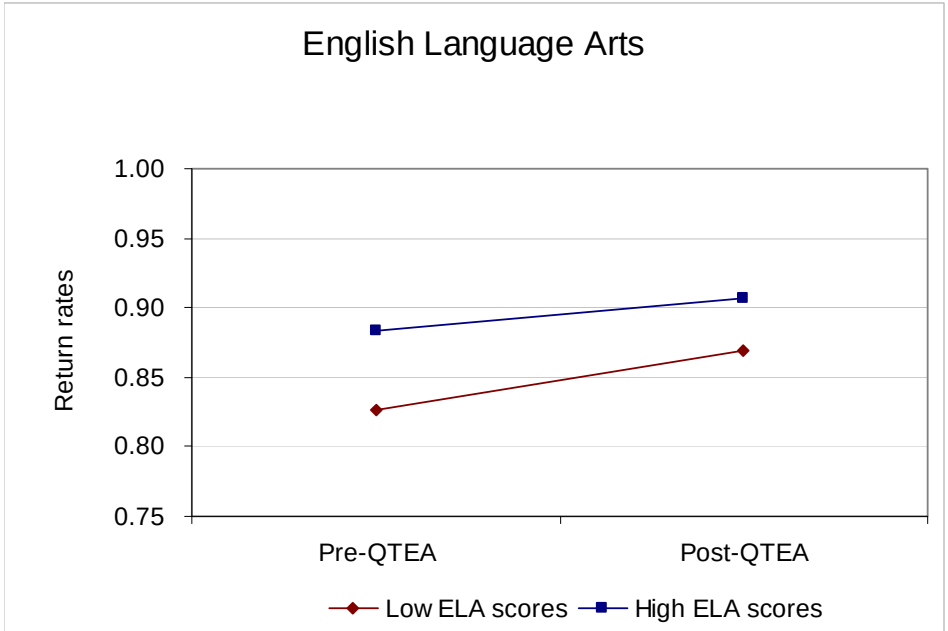
- The pattern of results in this causal analysis shows that QTEA had no effect
  - Teachers targeted by QTEA's salary increases did not have a differential increase in retention rates above the overall trend

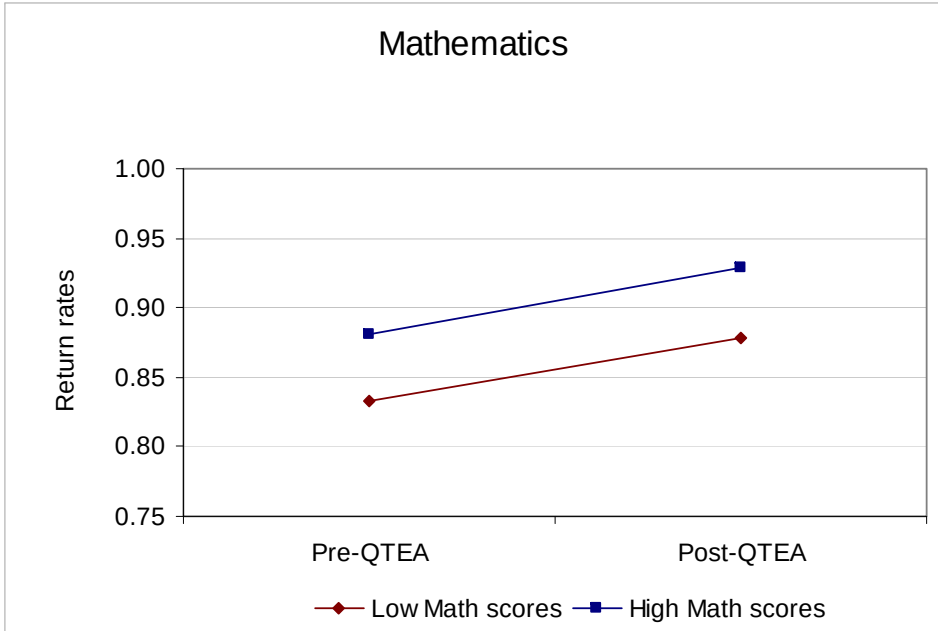
Q2. Did the retention of highly-effective teachers improve after QTEA?

- Approach: compare the retention rates of teachers with high estimates of contribution to student achievement to those with lower estimates
  - A positive finding here would suggest that QTEA has been effective in retaining highly-effective teachers

Q2. Did the retention of highly-effective teachers improve after QTEA?

NO





The retention of highly-effective teachers is higher both before and after QTEA

However, their retention rates are not higher than the trend for teachers overall

Summary of findings

- This study is first to show that salary can improve the attractiveness of an urban school district in California
  - QTEA increased the size and quality of the applicant pool
  - Led to higher quality new-hires overall
  - Important policy goal given substantially unequal sorting
- QTEA had no effect on teacher retention
  - Economic downturn limited the policy's possible effect
  - Retention rates were too high for a differential "QTEA effect"

Implications

- Compensation is only part of what motivates teachers
  - Working conditions are important
  - Teacher salary increases may need to be higher to affect retention than to improve recruitment

Implications

- District personnel practices are important
  - District ability to hire best candidates from improving pool
  - In order for improvements in the applicant pool to be effective, there need to be available positions
  - Points to the need for "strategic retention"

Implications

- Long-run and system-wide implications
  - What happens if other districts respond by raising salaries?
  - Could district salary increases improve teacher quality in the entire labor market?
  - Salary can be used to achieve better distribution of teachers
    - Districts can raise funds themselves
    - State can play a role

For more information

- Visit: http://cepa.stanford.edu/qtea/publications
- Contact: Heather Hough, hough@ppic.org

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