Searching for Effective Teachers with Imperfect Information

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Motivation

- Huge literature about "teacher effects" on achievement
  - Difficult to predict at hire
  - Partially predictable after hire
- Growing use of value added to identify effective teachers for pay, promotion, and professional development
  - But concern that current value added estimates are too imprecise to be used in high-stakes decisions

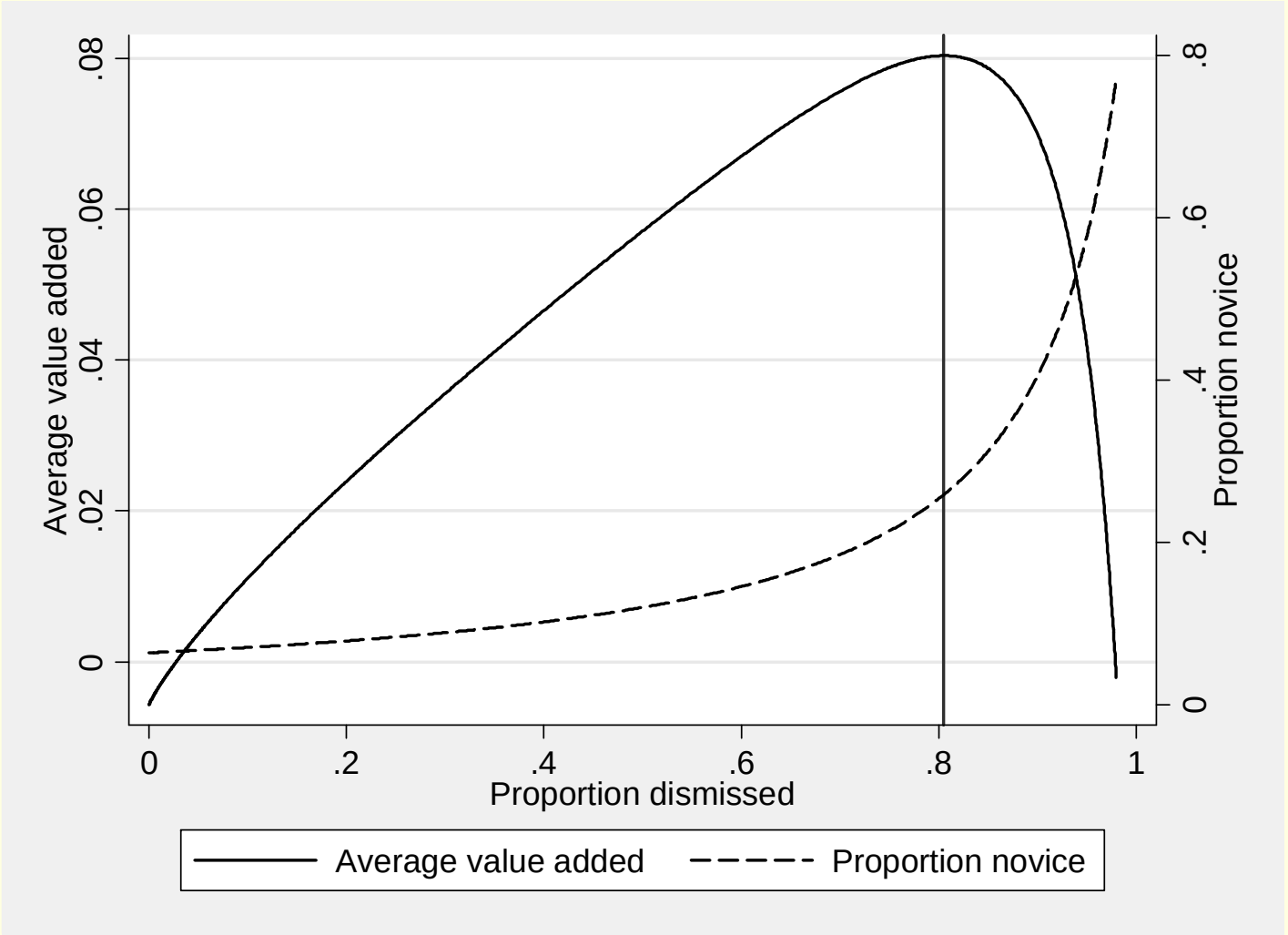
How could such measures be used?

- Use simple search model to illustrate how one could use imperfect information on effectiveness to screen teachers
- Use estimates of model parameters from NYC & LAUSD to simulate the potential gains from screening teachers
- Evaluate potential gains from:
  - Observing teacher performance for more years
  - Obtaining more reliable information on teacher performance
  - Obtaining more reliable information at time of hire

Simple search model

- Maintained assumptions across all simulations
  - SD of teacher effect = 0.15
  - Turnover rate if not dismissed = 5%
- Assumptions for simplest base case (will be varied later)
  - No useful information at time of hire
  - Reliability of annual performance measure = 40%
  - Cost of hiring new teacher = -.07 in 1st year, -.02 in 2nd year
  - Dismissal only after first year (e.g. tenure decision after 1 year)
- Objective: Maximize student achievement by screening out ineffective teachers using imperfect performance measure

Simple model: dismiss 80% of probationary teachers(!)



Why dismiss so many probationary teachers?

- Differences in teacher effects are large & persistent, relative to short-lived costs of hiring a new teacher
- Even unreliable performance measures predict substantial differences in teacher effects
  - Costs of retaining an ineffective teacher outweigh costs of dismissing an effective teacher
- Option value of new hires
  - For every 5 new hires, one will be highly effective
  - Trade off short-term cost of 4 dismissed vs. long-term benefit of 1 retained

Why *not* dismiss so many probationary teachers?

- Smaller benefits than assumed in the model?
  - High turnover rates
  - Teacher differences that do not persist in future (including if PD can help ineffective teachers)
  - High stakes → distortion of performance measures
- Larger costs than assumed in the model?
  - Direct costs of recruiting/firing (little effect if added)
  - Difficulty recruiting applicants (but LAUSD did)
  - Higher pay required to offset job insecurity (particularly if require teacher-training up front)

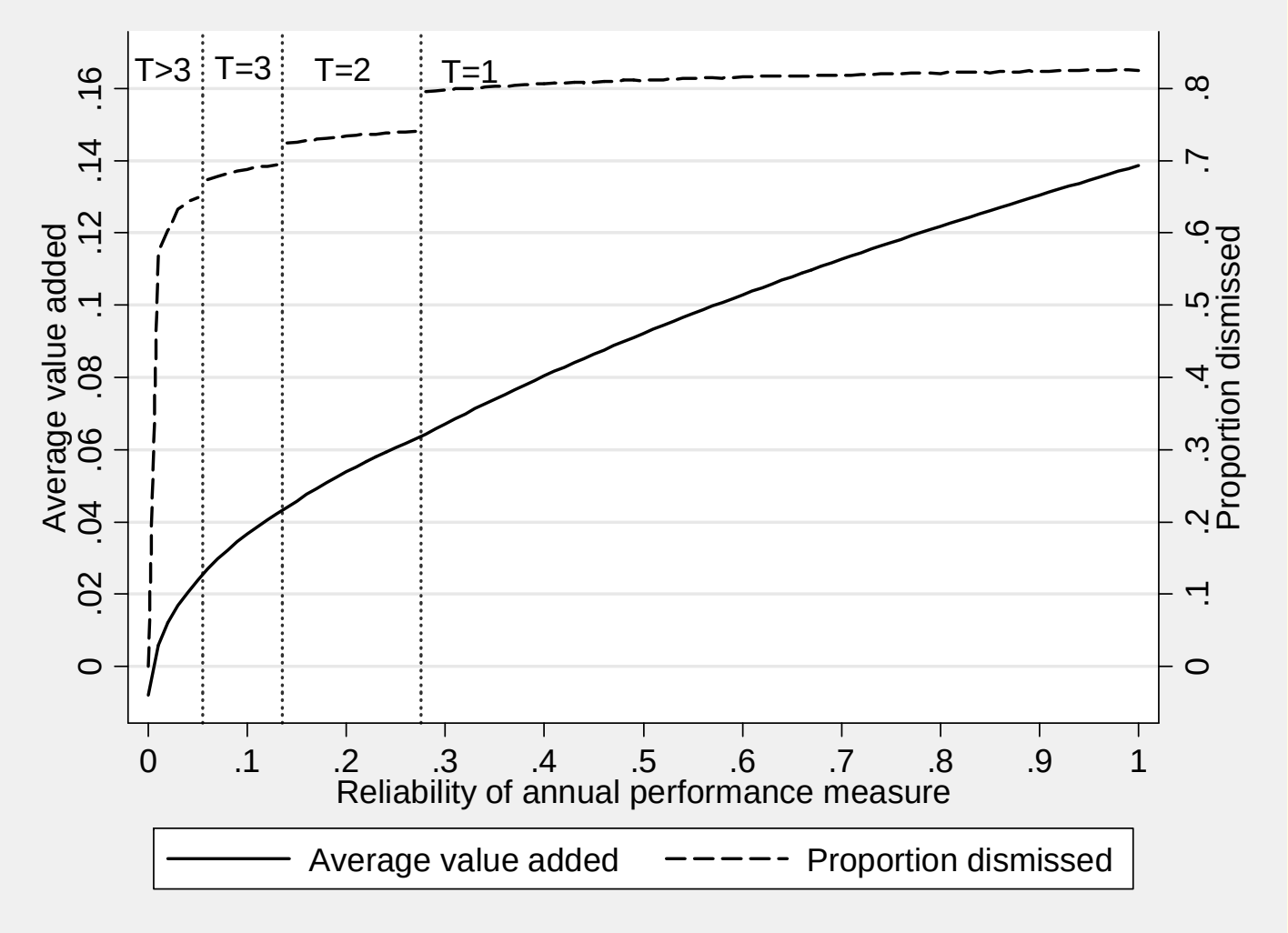
Requiring a 2nd or 3rd year to evaluate a probationary teacher is a bad idea.

	Wait to dismiss until year:			
	T=1	T=2	T=3	T=4
Average value added	0.080	0.075	0.068	0.061
% dismissed	81%	75%	71%	68%

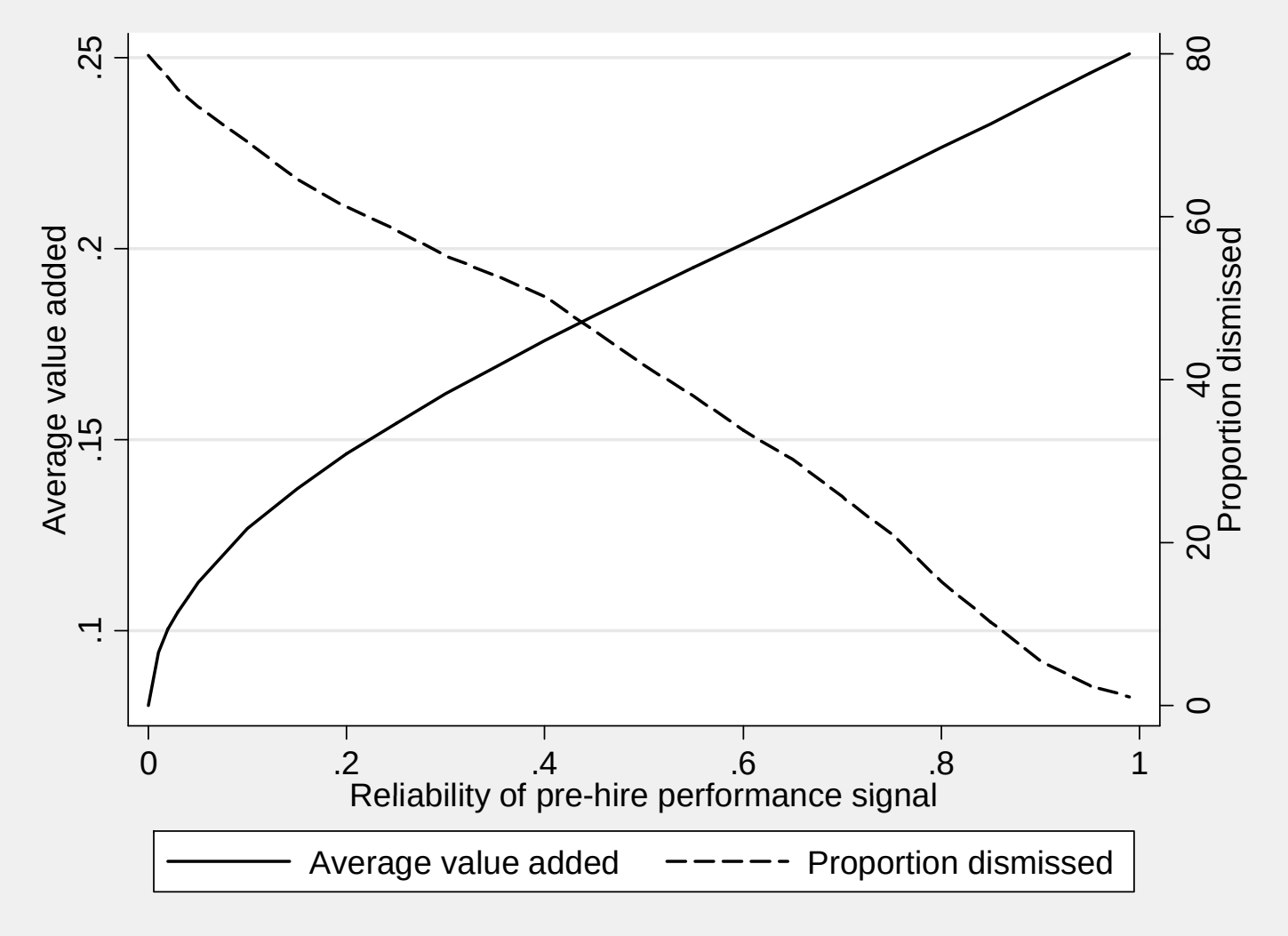
Allowing a 2nd or 3rd year to evaluate a probationary teacher is a good idea.

	Dismissal at any time through year:			
	T=1	T=2	T=3	T=4
Average value added	0.080	0.095	0.099	0.101
% dismissed (total)	81%	83%	84%	84%
% dismissed (by year)				
In year 1	81%	67%	67%	67%
In year 2	0%	16%	8%	8%
In year 3	0%	0%	9%	4%
In year 4	0%	0%	0%	5%

Obtaining more reliable information on teacher performance is valuable, little effect on dismissal



Obtaining more reliable information at time of hire is even more valuable, and reduces dismissal rate.



Summary

- Potential gain is large
  - Could raise average annual achievement gains by ≈0.08
  - Similar magnitude to STAR class-size experiment and to recent results from charter school lotteries
- Gains could be doubled if had more reliable performance measure, and tripled if observed this pre-hire
- Select only the most effective teachers, and do it quickly
  - But may be practical reasons limiting success of this strategy
- Focused on screening, but other uses may yield large gains