Pricing of Private Education in Urban India

Demand, Use, and Impact

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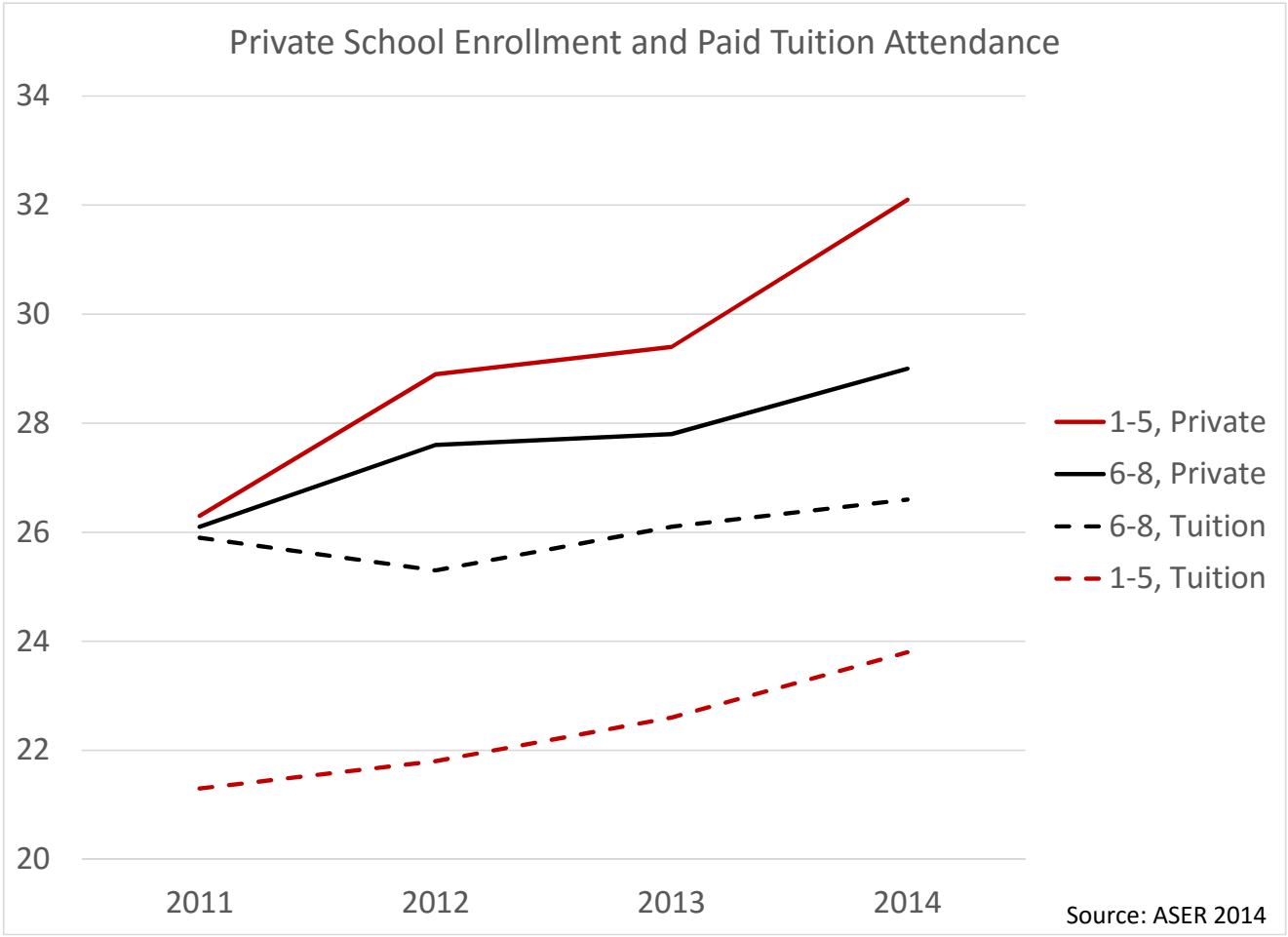
Outline

Motivation

- Poor education outcomes in India:
  - 40% of 6th graders cannot read at a 2nd grade level
  - 42% can't do basic subtraction
  - Similar in other countries (Pritchett, 2013)
- Increasing reliance on the private sector

Rural participation in private education



- Higher in urban areas $\rightarrow$ >50% of primary-aged children in private schools as of 2005 (Desai, et al., 2008)

Research questions

- Lots of open questions, e.g.,
  - How effective are after-school tuitions on average?
  - What determines supply of providers?
  - ***Understanding household demand for providers***
- Our study: private after-school tuitions

Research questions

Our research questions seek to understand household demand for after-school tuitions*:*

1. What are the characteristics of households who are willing to pay more (richer, more educated parents, higher/lower-ability children, child gender)?
2. Does initial willingness to pay reflect private information regarding:
   - higher attendance and less dropout
3. How does the ongoing price influence continued participation ("causal" effect):
   - Higher prices may increase dropout if households decide to continue on an ongoing basis
   - Could be offset by commitment: utilization might be higher if parents are paying more

Together, these can inform pricing policy for the NGO and help understand targeting of subsidies in this market

Our study: Overview

- Study pricing in the market for after-school tuition classes offered by NGO Pratham in Delhi
- 21 "learning centres"
- 5400 children in grades 6-8

Our study: Overview

- Two-part pricing design (Karlan and Zinman, 2009, among others)
  - Offer households a randomly assigned monthly price through the end of the school year
    - 4 prices, from zero up to "posted" price, Rs. 200/250 per month
  - If child enrolls, then offer randomly assigned discount up to original price
- Allows us to separate selection effect of prices from causal effects; that is, for those who enroll:
  - Conditional on the ongoing price, does a higher initial price correlate with higher attendance?
  - Conditional on the first price, does a higher ongoing price cause higher/lower attendance?
- Measure test scores to evaluate effectiveness of tuitions, using random price variation to identify impacts
- Surveys of >1000 alternative tuition providers in the slums

Outline

Setting

- 21 slum areas around Delhi
- In each area, Pratham operates a "Learning Centre"
- Learning Centres teach after-school tutoring classes to children in grades up to 8th
- Types of classes:
  - "Content": teaches school curriculum
  - "Balwadi": kindergarten
  - "Crash": basic reading and writing for those lagging behind
  - Computer skills, other vocational
- Our focus: content classes for children in grades 6-8

Setting


PRATHAM LEARNING CENTRE
PROGRAMME
Balwadi
3-5 years old children
Tuition : Class I to X
Spoken English Classes
COMPUTER
BASIC PAINT, MS-WORD, EXCEL+INTERNET
ADVANCE BASIC
DTP, HTML
Vocational Classes
• Stitching
• Mehandi
• Parlour
• Mobile Repair
D-70, Budh Vihar, Kondli, Delhi-96

Grades 6-8 Content

- Our focus: Content classes, grades 6-8
- Curriculum based on official school curriculum
- 6 days per week, 2 hours per day during the school year
- Classes for groups of up to 20 students
- Segregated by gender because of Delhi's schooling system

Pricing - Pre-experiment

- Prior to 2010, classes were free
- In 2010, Pratham started charging
  - To raise revenue
  - Because it was thought students were less regular when classes were free
- Pratham interested in increasing prices to more closely match prices charged by other providers
- Researchers interested in understanding the impacts of price variation
  - $\rightarrow$ randomly assign prices

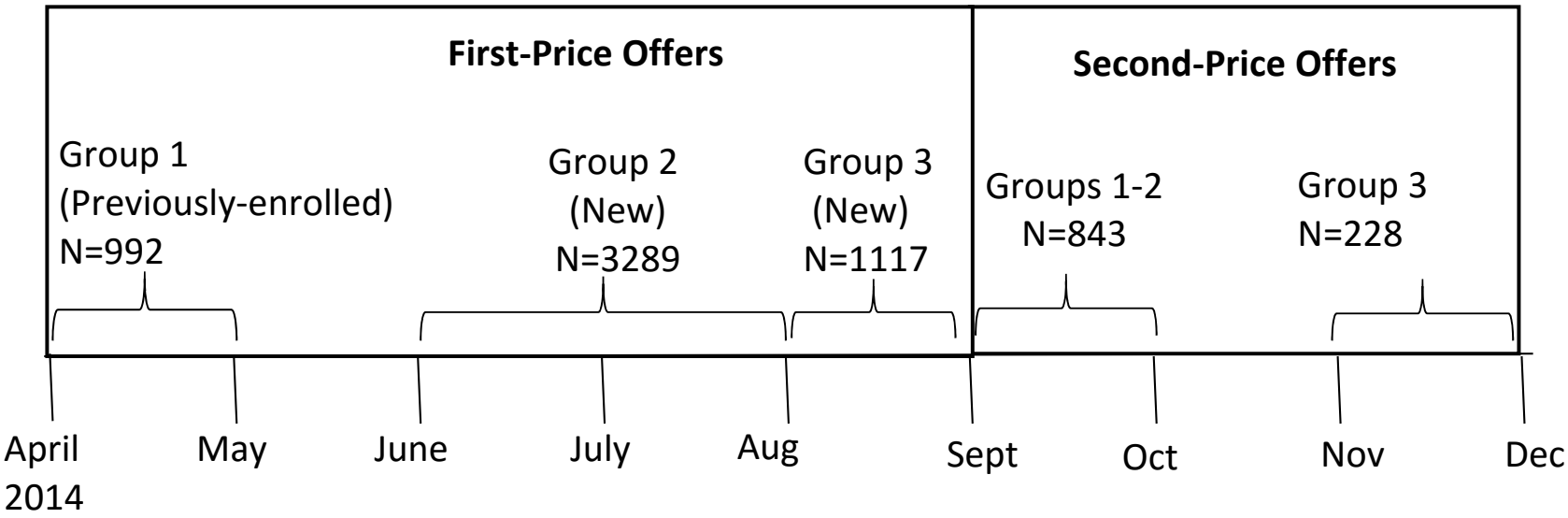
Pricing Pre-experiment

- In 2013-2014 (pre-experimental year), prices varied between Rs. 100 and 200 per month, depending on location and grade
- Somewhat flexible based on ability to pay
- Students not asked to leave if they couldn't/wouldn't pay
- About 1500 children attending

Basic design

- Prices:
  - Set "posted price" at Rs. 200 for 6th grade, 250 for 7th and 8th grade
  - Offer random "first" price of 0, 75, 150, or 200/250 to households
  - After household has enrolled child and started paying, offer additional randomly assigned "second" price up to initial offer price, applicable through the end of the school year.
- Sample:
  - Group 1: Previously-enrolled children from 2013-2014 school year
  - Groups 2, 3: Door-to-door offers for households in vicinity of learning centres that did not have previously enrolled children (done over two rounds)
    - One teacher + one enumerator (previously: 1 or 2 teachers)

Experimental Timeline



Groups 1 and 2 had to be enrolled by August to be included in second-price randomization

Group 3 had to be enrolled by September to be included in the second-price randomization.

First price offer

- Household given a short household survey
- Child takes an English and mathematics test
- Pratham staff accompanies surveyor and gives standard explanation of what the tuition classes are about
- Offer is made

First-price offer: Randomization

- For previously enrolled children, prices randomly assigned to children, stratified by learning centre and grade
- For previously unenrolled children, prices could not be pre-assigned
- Solution: scratch cards

Scratch cards

Randomization for previously unenrolled children

- Scratch cards contain a randomly assigned price
- Respondent chooses a scratch card from a bag
- Scratches off the amount
- To prevent cheating:
  - Both the respondent and surveyor must attest that the card was scratched by the respondent
  - Every scratched card linked to a household
- Offer valid for every month through the remainder of the 2014-2015 school year

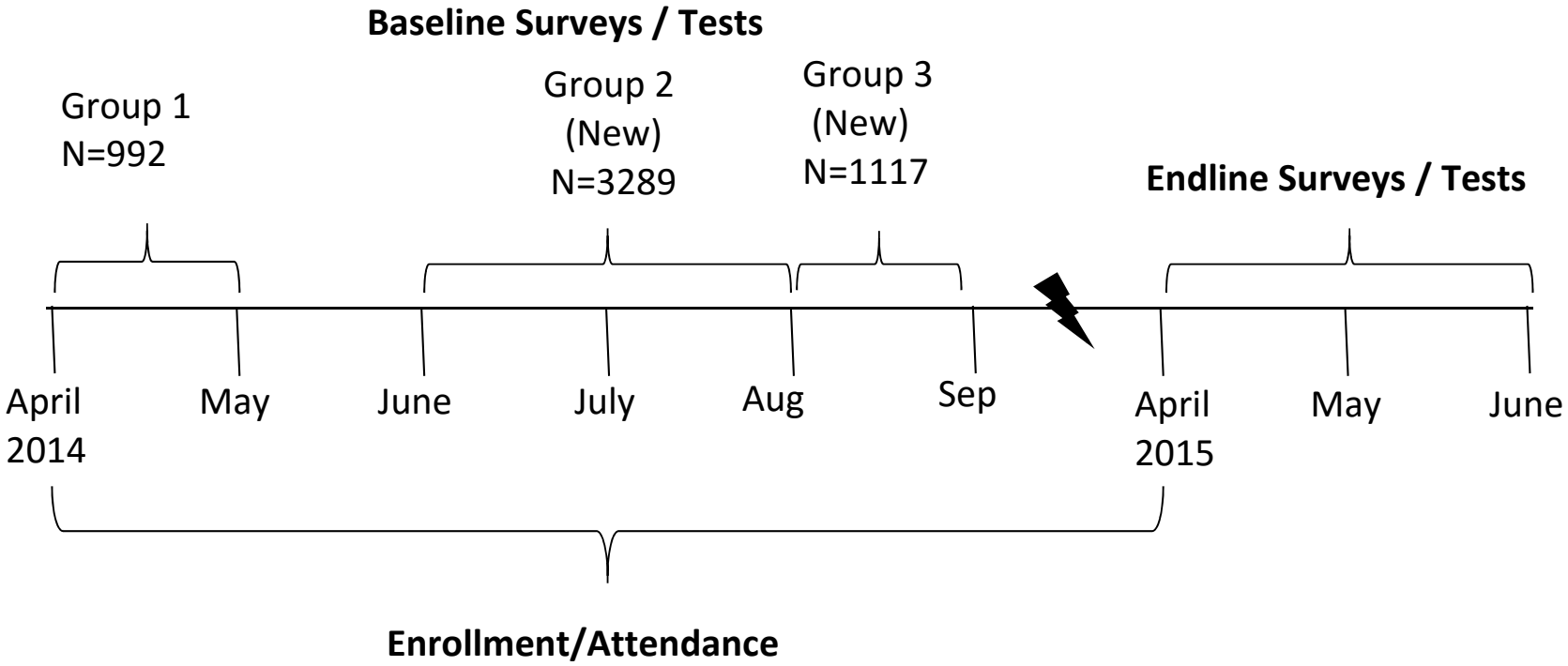
Prices and quality

- Experiment designed to shut down channel of prices as a signal of quality to the extent possible
- Scratch cards made the process appear random
- If the respondents asked, they were told the prices were randomly assigned
- Respondents not told the posted prices unless they asked (few did)

Second price offer

- After child is enrolled and payments have been made for 1-3 months, household is visited again
- Second price offer is made, assigned to the household in equal proportions to all prices up to and including the original offer price
- Applies through the end of the school year
- Again using scratch cards

Data collection



Data collection

Main sources of data

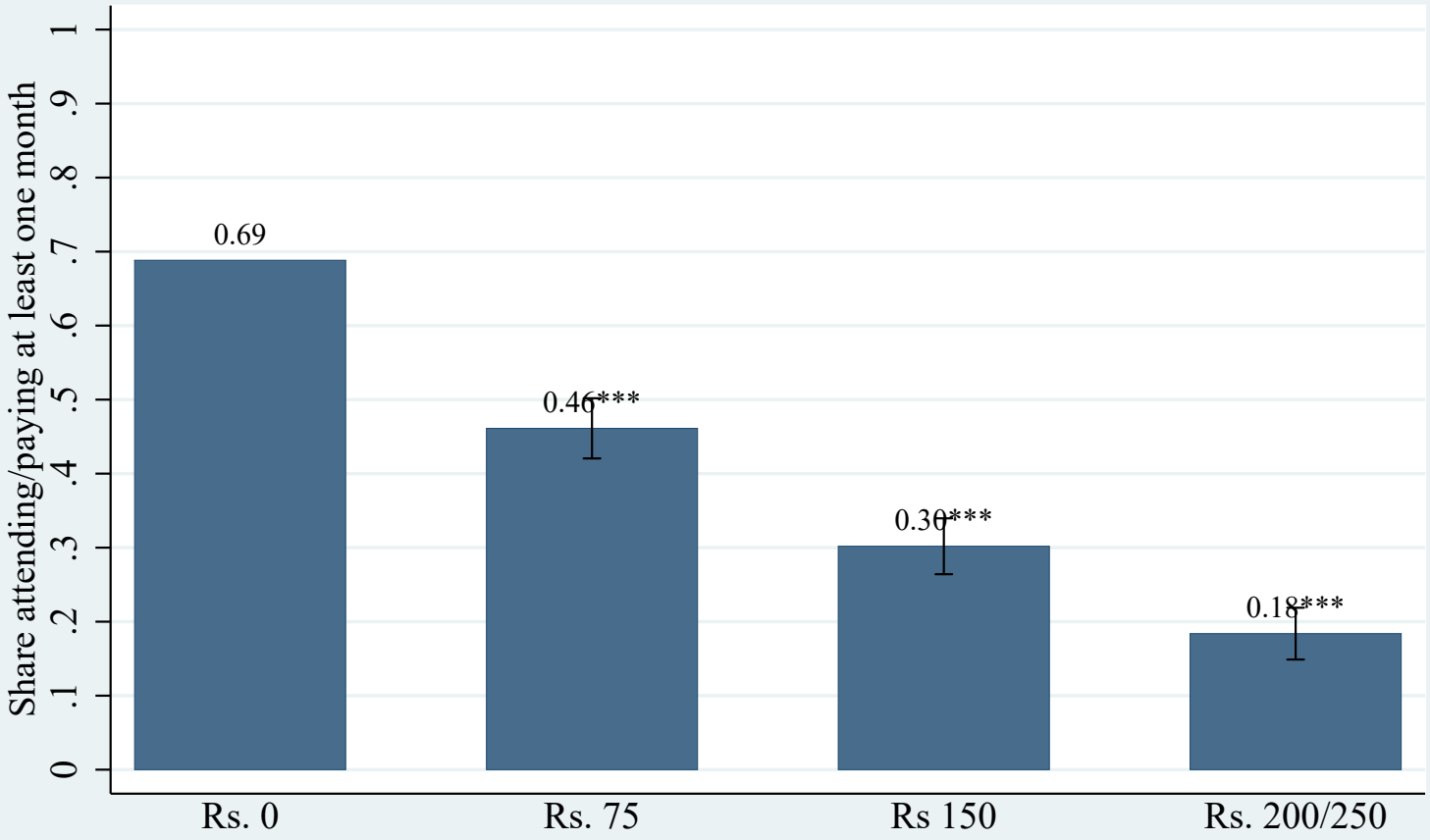
- Enrollment / Attendance Data (taken from Pratham administrative records) - also post-experiment after posted prices took effect
- English and math testing data (baseline and endline)
- Survey data (baseline and endline)
- Alternate Tuition Surveys

Outline

Demand

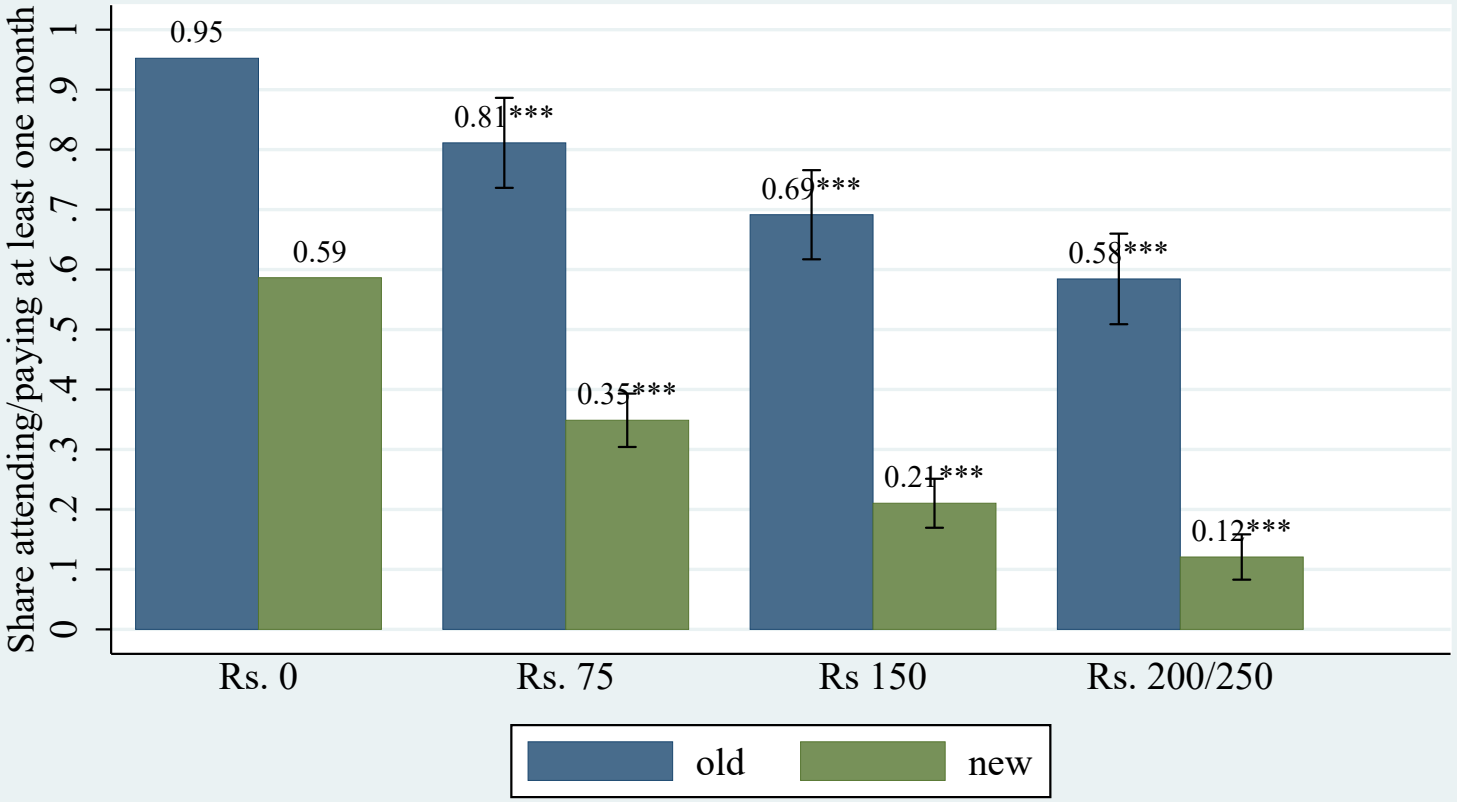
- At a price of 0, $\sim$ 69% of students enroll.
- A 100 Rupee higher price results in 17% lower takeup. (elasticity of demand at Rs75 is 0.27)

Demand



Whiskers: 95 percent CI of difference from 0 price
***: Diff from control sig at 1 percent

Demand



Whiskers: 95 percent CI of difference from 0 price
***: Diff from control sig at 1 percent

Correlates of willingness-to-pay

- Among households that enroll their children, regress:

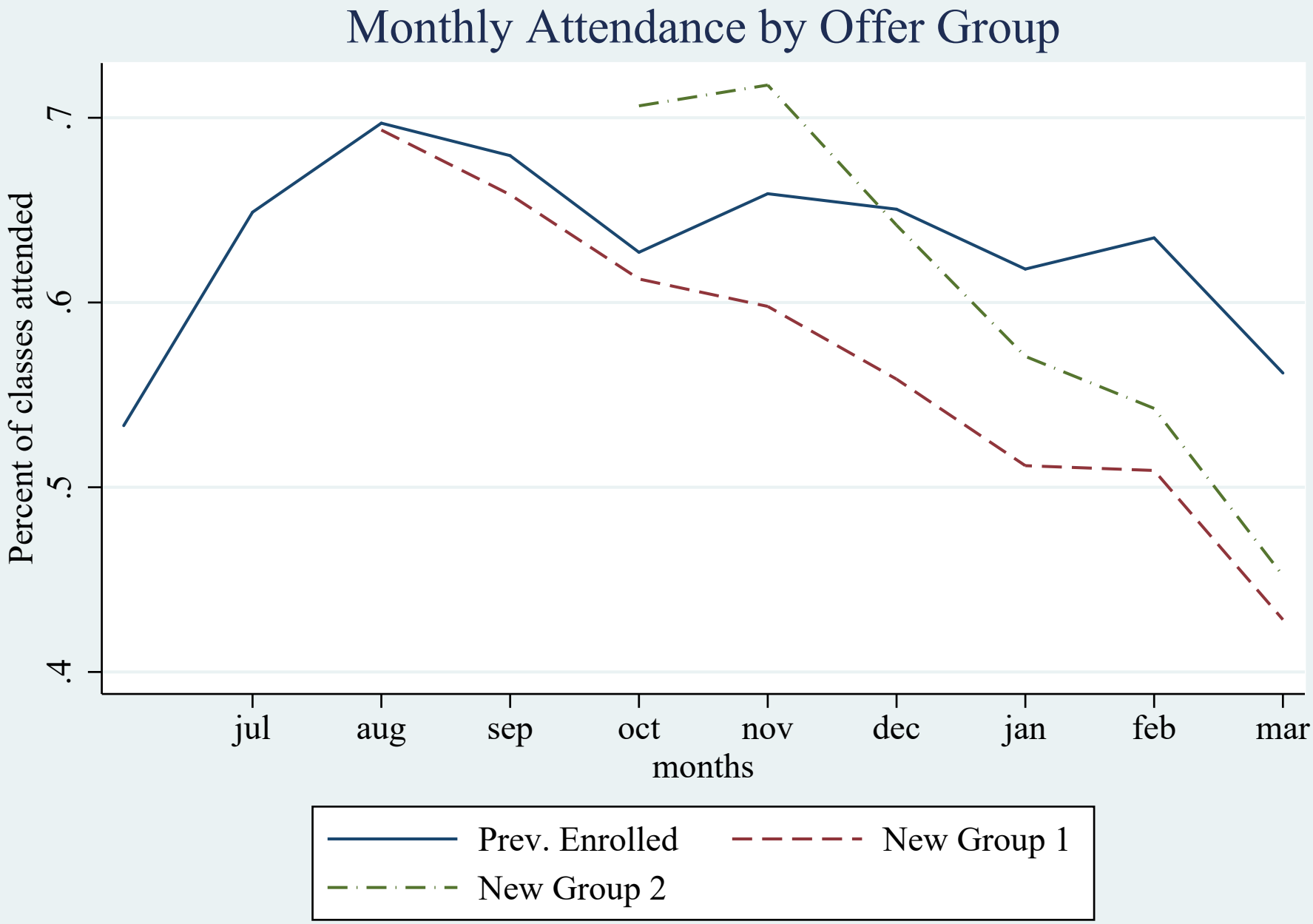
$$first_i = \alpha + X_i\beta + \varepsilon_i$$

X_i is a vector of characteristics
$first_i$ is the offer price

- since those that accept at higher prices have, on average, higher willingness-to-pay, $\beta_j > 0$ indicates that characteristic j is increasing in WTP

Correlates of WTP

	Sample: Attended Any Class	
	Dependent Variable: First Price in 100's	
	(1)	(2)
# HH Members Age 6-14	0.0130	-0.000969
	(0.0237)	(0.0213)
1st PCA of Durables	0.0466***	0.0259*
	(0.0159)	(0.0139)
Mother education (years)	-0.0124**	-0.0113**
	(0.00594)	(0.00531)
Female	-0.0379	-0.0460
	(0.0470)	(0.0424)
Attends private school	-0.0638	-0.0878
	(0.0939)	(0.0834)
Attended tuition past yr	0.172**	0.157**
	(0.0734)	(0.0609)
Normalized math score	-0.0355	-0.0258
	(0.0264)	(0.0233)
Normalized English score	0.0279	0.0384
	(0.0278)	(0.0260)
Attended Pratham tuition prior yr.		0.208***
		(0.0489)
Fixed Effects	Center x Grade x Round	Center
R2	0.149	0.0729
N	1674	1674


Monthly Attendance by Offer Group
Percent of classes attended
.4
.5
.6
.7
jul
aug
sep
oct
nov
dec
jan
feb
mar
months
Prev. Enrolled
New Group 1
New Group 2

Selection And Causal Effects of Prices on Attendance

- Among households that enroll their children, regress:

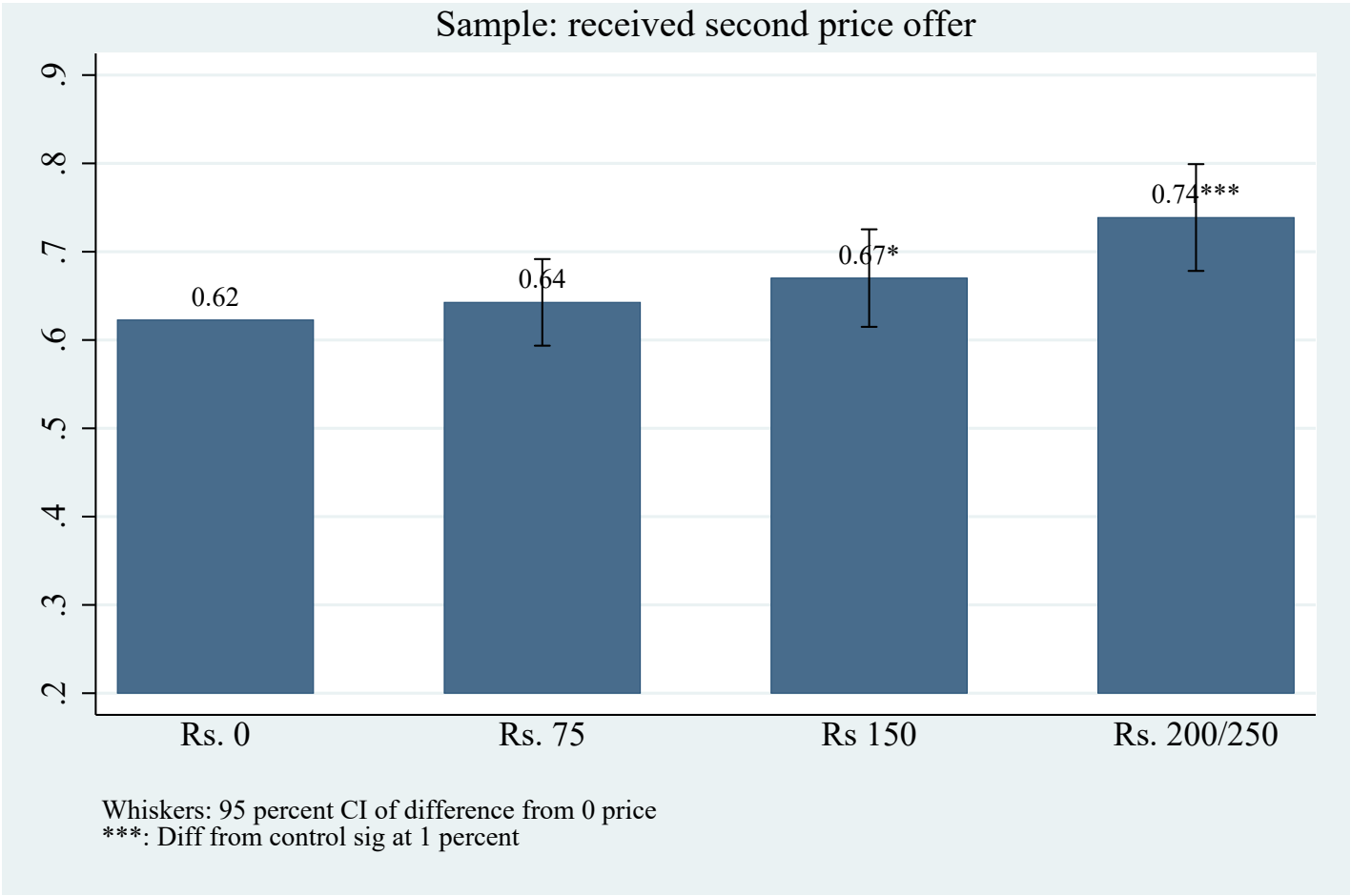
$$att_i = \beta_0 + \beta_1 first_i + \beta_2 second_i + \varepsilon_i$$

att_i represents attendance after second-price offers are given
$first_i$ is the offer price
$second_i$ is the final price

- β_1 provides an estimate of *selection*: conditional on actual price paid, what is the relationship between willingness-to-pay and attendance?
- β_2 provides an estimate of the *causal effect of price paid*: conditional on willingness to pay, what is the impact of the price paid?

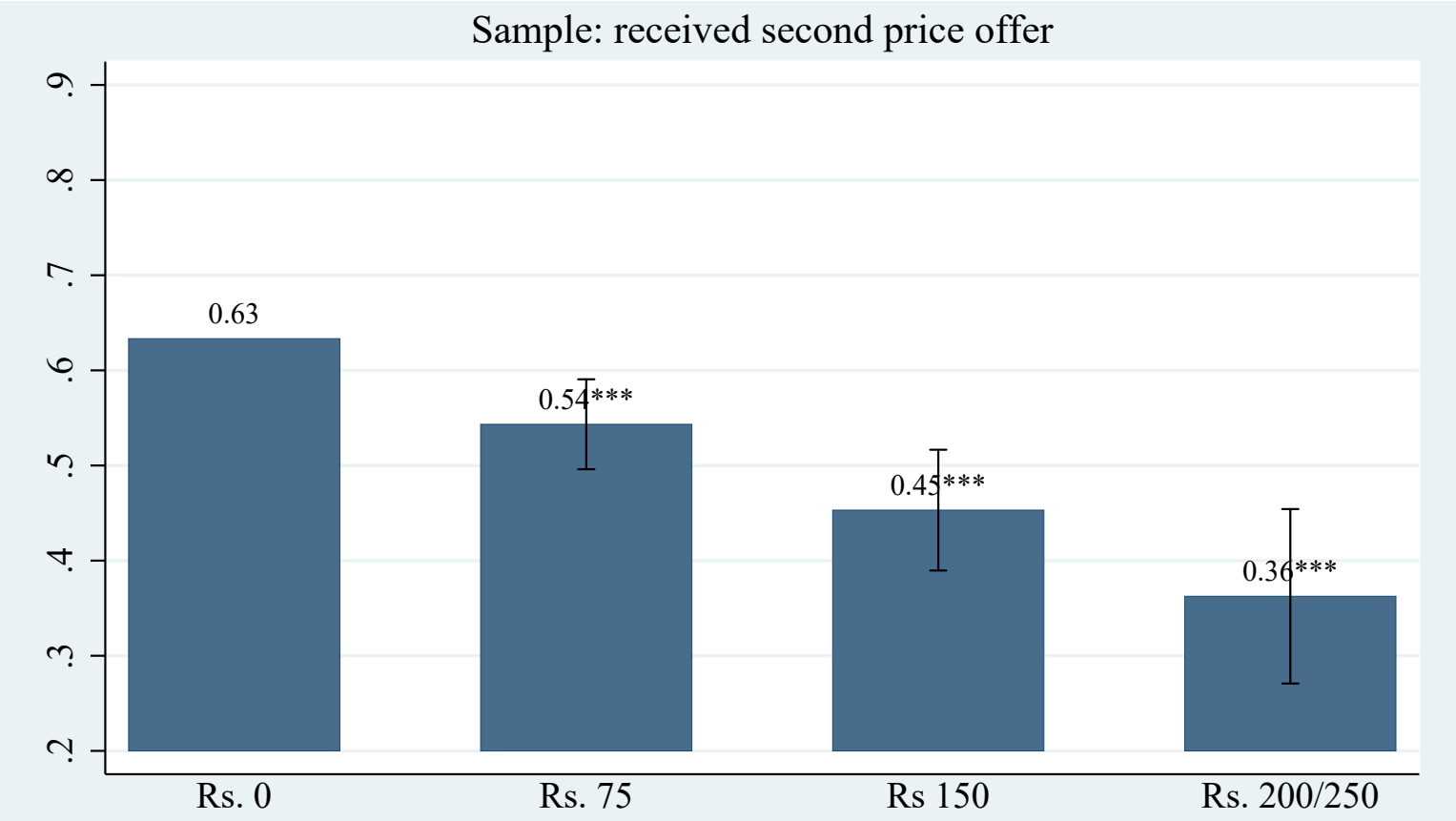
Selection Effects

- Strong selection effects: those paying a Rs. 100 higher price attended 5 percentage points more classes. Broken up:



Causal Effects

- Strong negative effects of the second price on subsequent attendance: a price that is higher by Rs. 100 is associated with 12 percentage points lower attendance, and attendance is monotonically decreasing in price:



Treatment effects

- Interested in understanding the impacts of attendance on test scores

$$y_{i1} = \beta_0 + \beta_1 att_i + \delta y_{0i} + \varepsilon_i$$

  - where y_{i1} is the student's post-test score, y_{i0} is the pretest score, and att_i represents the percentage of classes attended
- Clearly attendance is endogenous
- Can instrument attendance with the first price
  - First price is random, however, since second prices also influence attendance, a lower first price can increase attendance by both increasing takeup *and* reducing dropout later on through the second price

Table. Treatment Effects

	Dependent Variable:			
	English Score		Math Score	
	(1)	(2)	(3)	(4)
Percent of Classes Attended	0.0259	-0.00224	-0.0470	-0.0980
	(0.0868)	(0.0905)	(0.107)	(0.113)
Baseline English Score	0.782***	0.745***	0.345***	0.329***
	(0.00997)	(0.0112)	(0.0134)	(0.0151)
Baseline Math Score	0.0593***	0.0572***	0.354***	0.352***
	(0.0103)	(0.0105)	(0.0139)	(0.0142)
Fixed Effects	Center x Grade x Round	Center x Grade x Round	Center x Grade x Round	Center x Grade x Round
Controls	NO	YES	NO	YES
Mean of Dep. Var	-0.00313	-0.00490	0.00576	0.0103
R2	0.645	0.651	0.345	0.349
N	4427	4183	4789	4508

* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

- No evidence for impacts

Outline

Conclusions

- Downward-sloping demand, sensible correlates of willingness-to-pay
- After enrollment, those with higher willingness to pay attend more often conditional on the ongoing price
- Conditional on willingness to pay, higher ongoing price increases likelihood of dropout
  - outweighs selection effect $\rightarrow$ low prices required for high levels of utilization
- Caveat: no evidence that these particular classes influence test scores
  - mechanisms: are students substituting away to "better" tuition providers?
  - how generalizable? (compare with structure of other providers)
  - On going: detailed data on market for tuitions in each of our study locations...

Thank you