

# Elite schools or Normal schools: Secondary Schools and Student Achievement:

Regression Discontinuity Evidence from Kenya

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## Introduction: Motivation

- Many Developing countries have a tracked or tiered education system
- Literature is unclear about the impacts of attending a high performing school
- In the African Context, demand for secondary education is increasing due to Free Primary Education programs
- Low transition rate to secondary schooling is now a major constraint.
  - 50% transition rate from primary to secondary
  - Kenya has 20000 primary schools but only 4000 secondary schools



# Introduction: Motivation

- With limited budgets governments faced with (potential) tradeoffs of increasing access vs maintaining or improving quality.
  - Educating a secondary school student is 3-6 times more expensive than educating a primary school student in sub-Saharan Africa
- Especially important for many African countries which have a “tracked” or tiered education system
  - The systems often have an “elite” track or category of school that is expensive, exclusive, and not universally available
- Understanding the achievement return from attending an elite secondary school is important
  - Can assist policy makers aiming to maximize the productivity of the education system
  - \$30 Million planned expansion of National school system in 2012




# Prior Literature: Mixed Evidence

- Some studies find no test-score impacts of attending selective/elite schools
  - Clark (2010) in East Riding, Angrist et al (2011) in Boston & NY, Dobbie and Fryer (2011) in NY, De Hoop (2010) in Malawi, Rubinstein and Sekri (2013) in Indian colleges
- Others find positive effects on test scores:
  - Pop-Eleches and Urquiola (2011) in Romania, Jackson (2009) in Trinidad, Park et al (2010) in rural China
- Some evidence of selection in to test-taking
  - De Hoop (2010), Park et al (2010), Ajayi (2011)
- Mixed evidence partly attributable to differences in design
  - Single cutoffs vs multiple cutoffs within a school
  - Quality of fall back school



## Background: Schooling in Kenya

- Primary School: Standard (or grade) 1-8
- Kenya Certificate of Primary Education (KCPE) exam at grade 8
- Over 600,000 students take the KCPE every year
- Secondary School: Form 1- 4 (or grade 9-12)
- Kenya Certificate of Secondary Education (KCSE) exam at Form 4 or grade 12
- Over 250,000 students take the KCSE every year



## Kenyan Setting

- There are approx 18,000 primary schools in Kenya with approx 5 million enrolled
  - 76% net enrollment rate (World Bank, 2004)
- A major constraint in the education system is the lack of access to secondary schools.
  - only about 4,000 secondary schools in Kenya, with about 700,000 enrolled
  - 40% net enrollment rate (World Bank, 2004)
  - 40% transition rate from primary school to secondary school in 1999. (World Bank, 2004)



# The Three Tiers

## ■ **National schools:**

- 18 of these- all single sex boarding schools
- Admit the top students from all over the country based on ranking and choices

## ■ **Provincial Schools:**

- Approximately 1000
- Admit best remaining students from Province based on ranking and choices

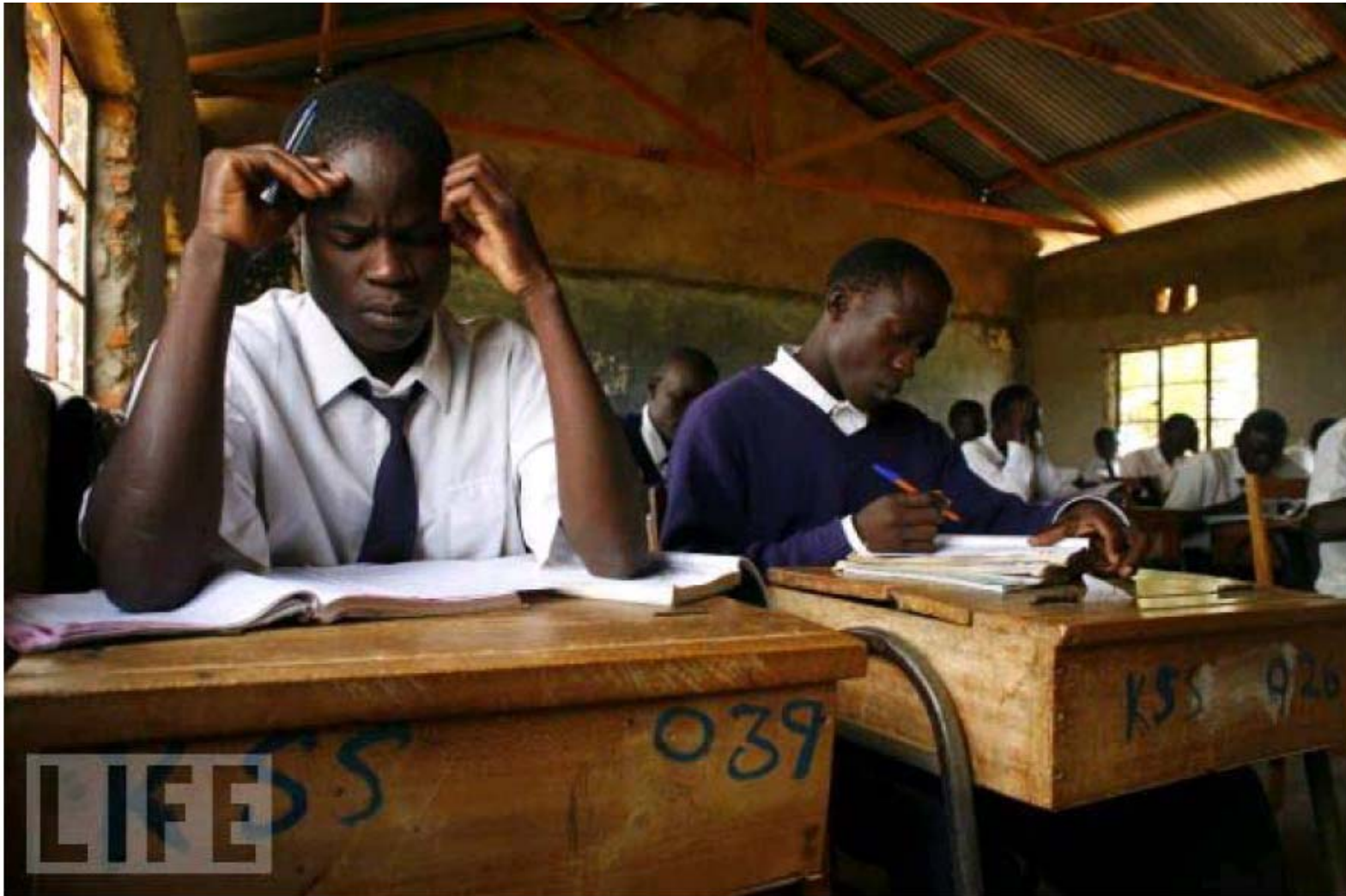
## ■ **District Schools:**

- Approximately 3000
- Admit remainder from District only

## ■ **Private Schools:**

- Mainly a “safety net” for richer low performing students

# District School



**The Senator Obama Kogelo Secondary School**



# Provincial School



Compared with District schools: better facilities, more buildings with electricity and 2/3 of teachers were college graduates (NCKEF, 2004)

# National School



Description of National School:

“... Boasts a large, bright dining hall and assembly building, faculty housing, a computer center and a several storied library with large plate glass windows” (NCKEF, 2004)

# National School Facilities





# National School Characteristics

	National	Provincial	District
% Teachers with college degree	73.5	67.3	69.6
% Teachers with advanced degree	7.0	4.1	3.3
Teacher experience (yrs)	14.8	13.6	12.1
No. of KCSE subjects offered	16.4	12.2	10.8



## Impact of Elite Schools on Achievement: Possible Mechanisms

- Better inputs in education production function (+ve effect)
  - Better teachers and/or principals
  - Better facilities
- Peer effects (+ve effect)
  - “Spillovers” from better peers
  - Students are more similar (makes it easier to teach)
- Alternatively the schools could deliver 0 value added
  - The schools performance is solely due to its selective admittance



# Secondary School Assignment Process

- Students qualify for a particular school based on their KCPE score, preferred schools, and district quota.
- We can examine the differences in outcomes of students who just qualify for the best schools to students who just missed a place
- Students who just missed a place often miss by one or two points on the exam thus they are very similar to students who just scored above the qualification mark.
- This allows us to conduct a “pseudo-experiment”
- This approach is known as a regression-discontinuity design

# Estimating Equations

## IV Approach

Second Stage :

$$KCSE_i = \alpha + \beta gradN_i + f(KCPE_i - c_{sj}) + X_{isj}'\Gamma + \varepsilon_i$$

First Stage :

$$gradN_i = \gamma_0 + \gamma_1 1[KCPE_i \geq c_{sj}] + f(KCPE_i - c_{sj}) + X_{isj}'\Gamma + \eta_i$$

Reduced Form :

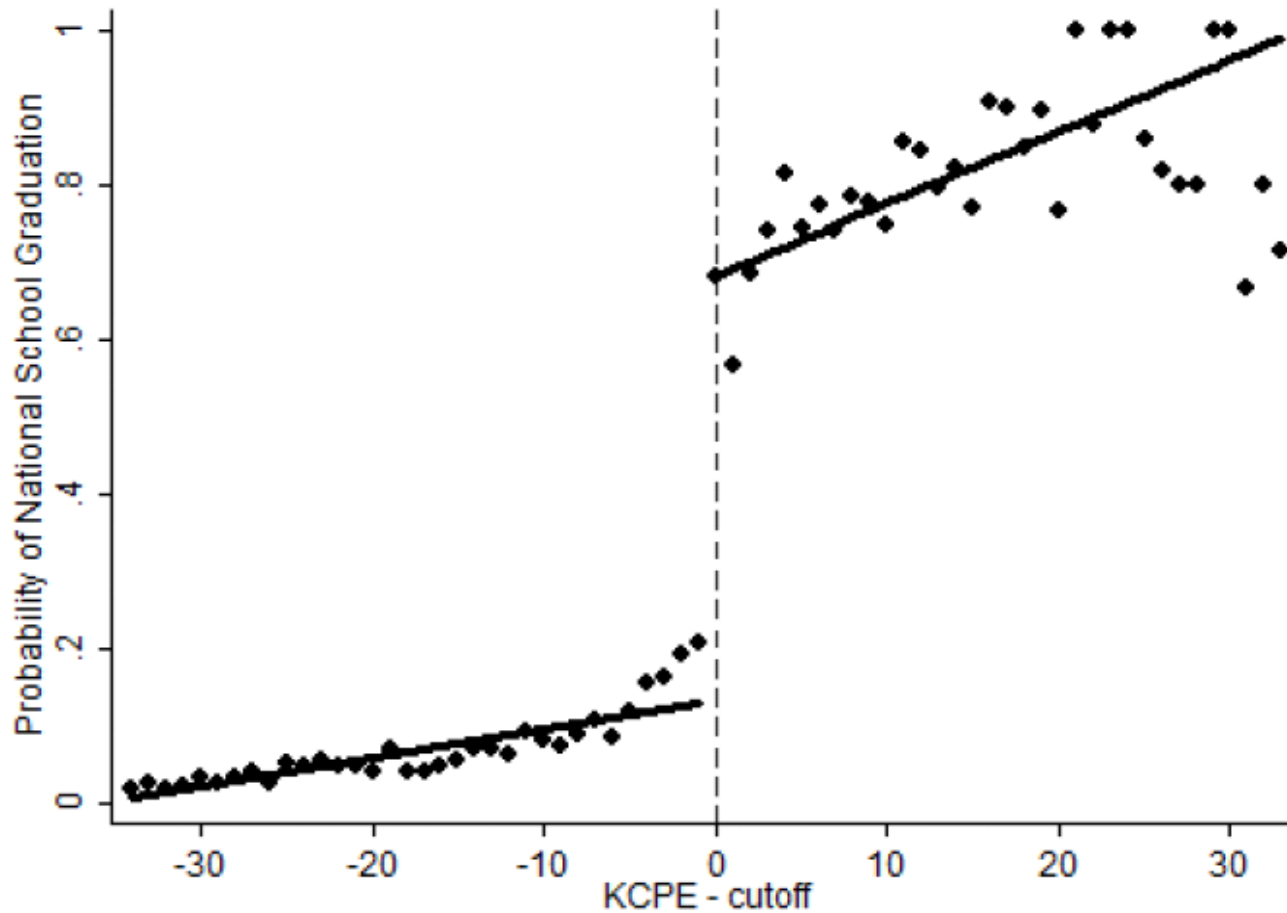
$$gradN_i = \lambda_0 + \lambda_1 1[KCPE_i \geq c_{sj}] + f(KCPE_i - c_{sj}) + X_{isj}'\Gamma + \nu_i$$

$c_{sj}$  is cutoff (by school x district), gradN = graduate from Nat School

X are controls : sex, district, public primary school, school choice dummies and school choice x district dummies

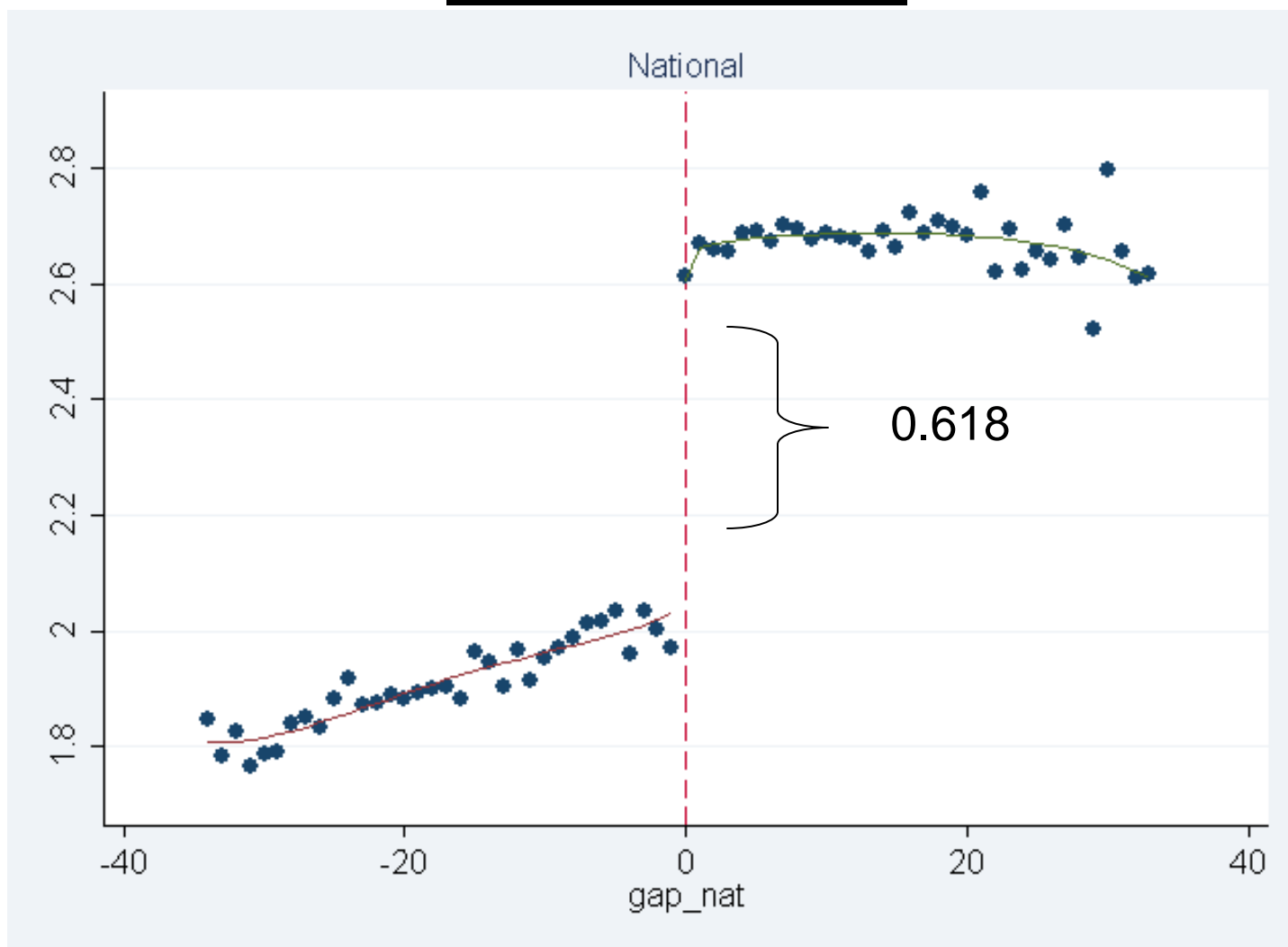
# First Stage: National Schools

Figure 2: Probability of National School Graduation

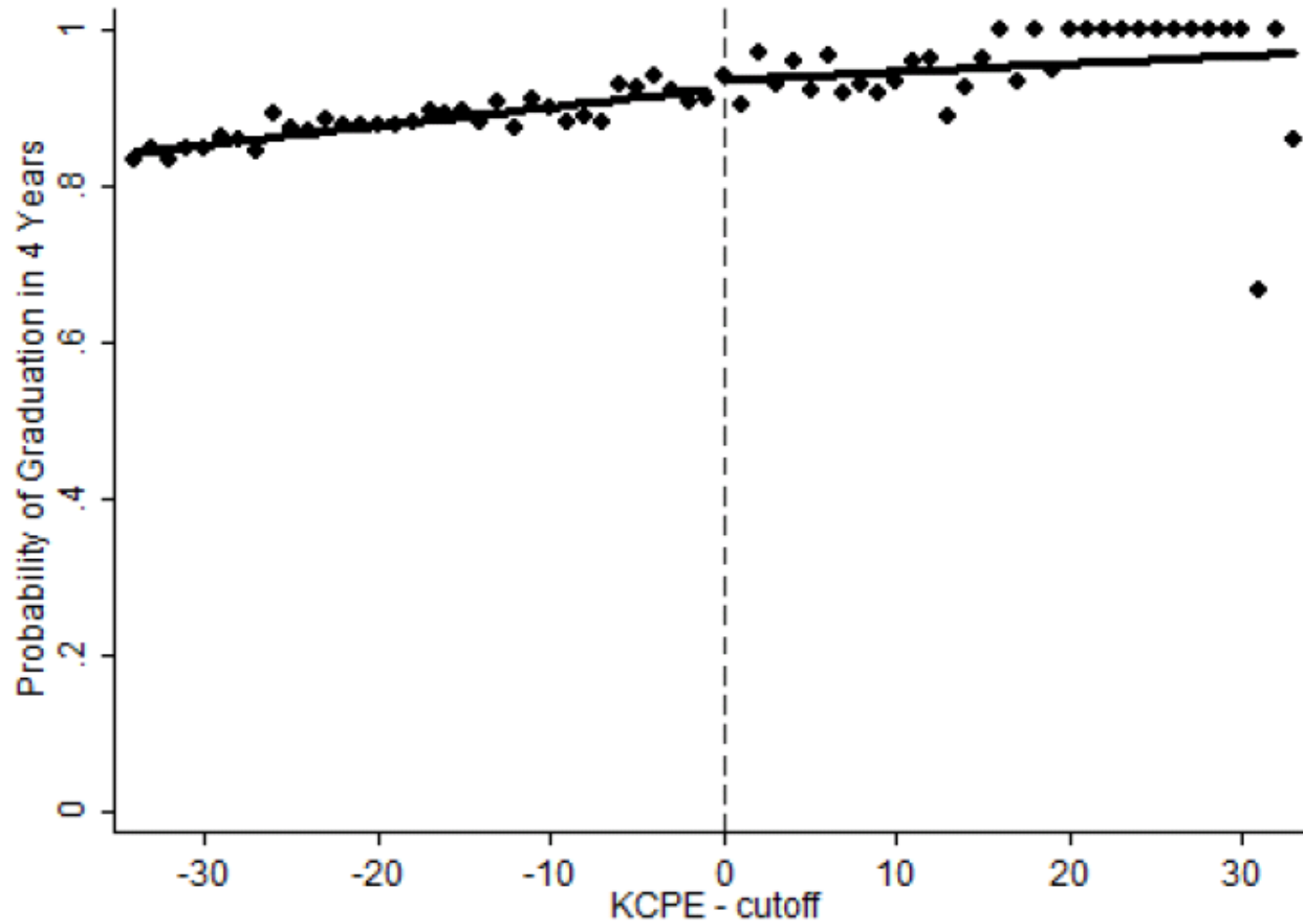




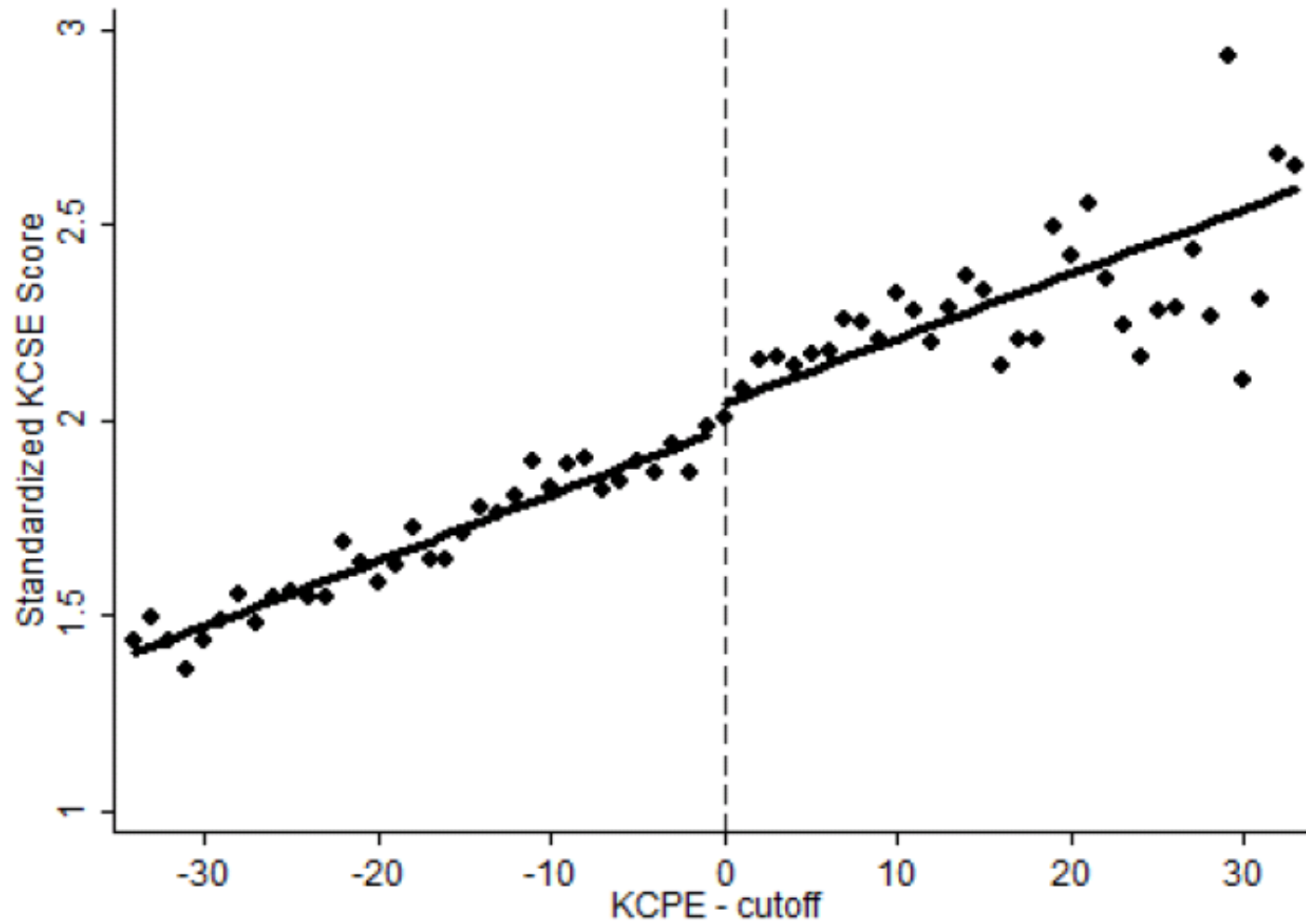
# Change in Peer Quality Around The National School Cutoff



# Selection into Test Taking?



# Effect of Attending National school



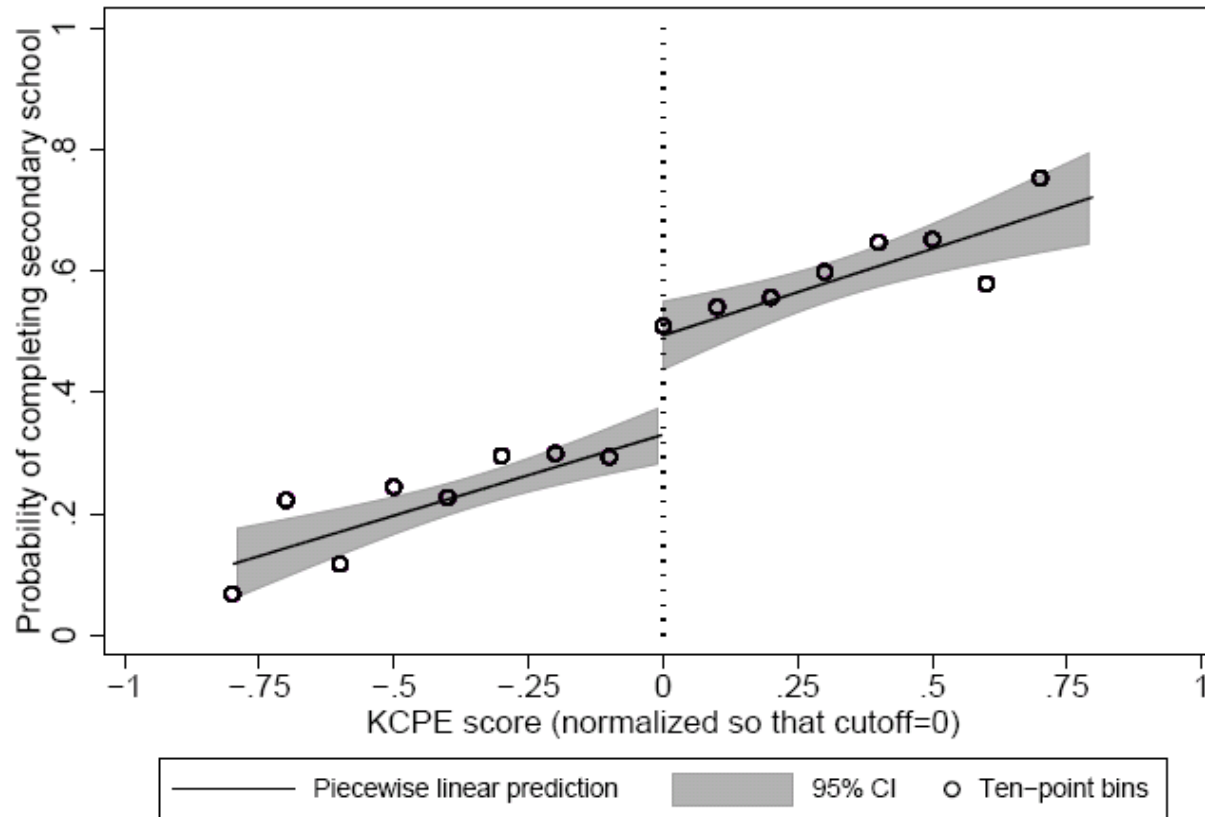
# Effect of Attending National school

Table 3: Achievement

Dependent Variable:	Standardized KCSE Score			
	OLS		Reduced Form	IV Estimation
	(1)	(2)	(3)	(4)
Graduate From National School	0.294*** (0.0261)	0.046* (0.0270)		0.015 (0.053)
Admitted to a National School			0.008 (0.028)	
Window	all	+/- 34	+/- 34	+/- 34
Observations	211,937	12,467	12,467	12,467
Rsquared	0.64	0.36	0.36	0.36

# Expanding Access at the “Bottom-End”

(Ozier, 2011)



KLPS2 data

# Expanding Access at the “Bottom-End”

(Ozier, 2011)

	(1) OLS	(2) OLS	(3) IVP	(4) IVP
P[Formally employed]	-0.036 (0.055)	0.036 (0.058)	0.263 (0.253)	0.427** (0.216)
P[Self-employed]	-0.104*** (0.040)	-0.12** (0.049)	-0.459*** (0.092)	-0.516*** (0.103)
Controls	No (1) OLS	Yes (2) OLS	No (3) IVP	Yes (4) IVP
P[Pregnant by 18]	-0.119*** (0.020)	-0.138*** (0.022)	-0.454 (0.300)	-0.583*** (0.191)
Controls	No	Yes	No	Yes
Discontinuity F-statistic	.	.	6.993	5.589
Observations	853	853	853	853



## Does Going to the Top Kenyan Schools Matter?

- Despite the large difference in quality there is NO discernable difference in the test score performance of students who just qualified for these top schools compared to those who just missed a place.
- Given that there is a lot of evidence of the large benefits of secondary school this suggests that expanding access of “regular” secondary schools should be prioritized



## Does Going to the Top Kenyan Schools Matter?

- Improvements in observable school quality is also not sufficient to improve test scores and learning
- Overall our findings point to the need for complementary programs designed to
  - Strengthen accountability and incentives
  - Ensure that the level of instruction is targeted at the right level





## Effect of Attending National school

### Puzzles?:

- Why such great demand for these schools among parents?
- Why is the government expanding these schools?
- Why are politicians lobbying to get new elite schools established in their constituencies?



## Discussion

- Although there were not learning gains, there could be **labor market** impacts of Elite school attendance (e.g. through network effects or signaling)
- Mangu High school Alumni (wikipedia):
  - Former President Kibaki, former VPs Saitoti and Awori
- Alliance High School Alumni (wikipedia):
  - Former AGs Amos Wako, Njonjo, former Chief Justice Gichuru, former VP Oginga Odinga, Ngugi wa Thiongo
- A critical need for data that will allow us to track longer term outcomes



# Discussion