The Private and Public Returns of University Merit Scholarships

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Motivation

- **College generates large private and social returns**
    - Economic mobility (Zimmerman, 2019)
    - Private returns (Hoekstra, 2009; Zimmerman, 2014; Ost et al., 2018)
    - Social and fiscal returns (Moretti, 2004; Hsieh et al., 2019; Trostel, 2010)

- These perceived returns motivate public investment in the form of Government Scholarships
    - Governments heavily subsidize elite higher education in low-income countries
    - Scholarships reward academic achievement, and may expand access
    - Justified by:
        - **Efficiency:** human capital accumulation
        - **Equity:** access for high-ability, low-income students

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Motivation

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A Core Tension in Merit-Based Scholarships

Where low state capacity makes it difficult to assess need, scholarships are often merit-based and **income-blind**.

- Some recipients may be **marginal**: they enroll only because of the scholarship
- Others may be **infra-marginal**: they would enroll anyway, using private resources

Implication: Scholarships may expand access *and/or* reallocate who pays.

Research Questions

Do merit scholarships in Uganda expand enrollment, or mainly shift students across financing channels?

- **Policy focus: Government Merit Scholarship Scheme**
    - National merit scholarships based on exam scores
    - District quota scholarships (also exam-score based)

What are the private and public returns to merit scholarships?

- **Private and Public Returns**
    - Private returns: Employment, earnings, wage growth
    - Public returns: Tax revenue

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Focus for today: context, data, preliminary results of the first question.

Why Uganda is an Attractive Setting

- **Low but Rapidly Growing College Degree Attainment:**
  - 4.4% of adults held a college degree in 2021
  - Up from 1.7% in 2012 (World Bank, 2021)

- **Government Scholarships and Causal Identification:**
  - The government allocates merit-based scholarships, enabling causal identification of their marginal effects using a regression discontinuity design

- **Collaboration with Uganda Revenue Authority:**
  - The URA has an infrastructure for research collaboration, enhancing productivity and research partnerships (e.g., Manwaring and Regan (2024), Cohen (2024))

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Should education subsidies target the university level?

Efficient allocation of education budgets depends on the returns by level.

- Educated individuals play a significant role in fostering economic growth and structural transformation (Romer, 1986; Hanushek and Woessmann, 2008).

Early Childhood Education vs. Higher Education:

- Some point to high returns for **Early Childhood Education** (Heckman et al., 2006).
    - Though other evidence suggests smaller-than-expected benefits (Durkin et al., 2022).
- **Tertiary education** is associated with high returns in Uganda (Kavuma et al., 2015)
- **Both** types of investments can have high (even infinite) MVPF if fiscal externalities from increased earnings recoup costs (Hendren and Sprung-Keyser, 2020)

Contribution

Existing work shows that need-based financial aid increases access in the US

- Dynarski et al. (2023); Dynarski (2003); Bettinger et al. (2019)

- But can adversely affect quality (Cohodes and Goodman, 2014)

And college access improves labor market outcomes in middle-income countries

- Barrios-Fernandez et al. (2023); Sekhri (2020); Londoño-Vélez et al. (2024)

Our contribution:

- Identify causal effects of **merit-based scholarships** in a **low-income country**
  - In low-capacity states, merit is easier to measure than need
- Use tax data to measure MVPF of such scholarships
  - Common in the developing world despite perception as regressive
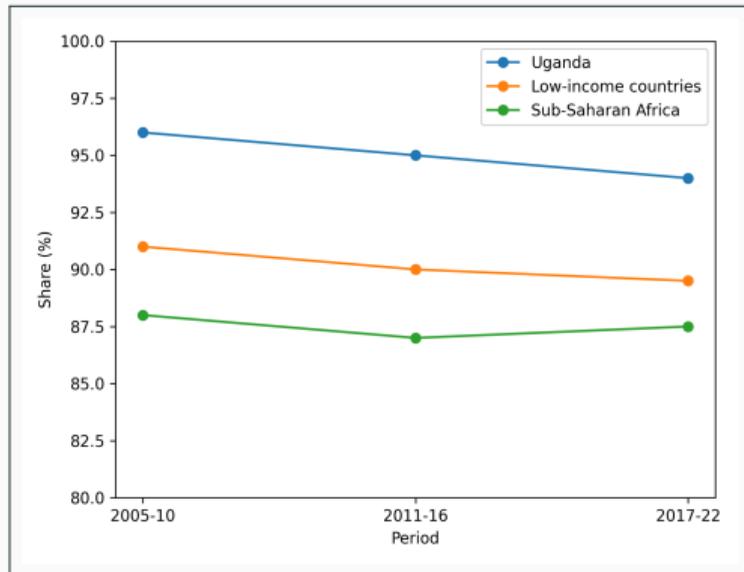
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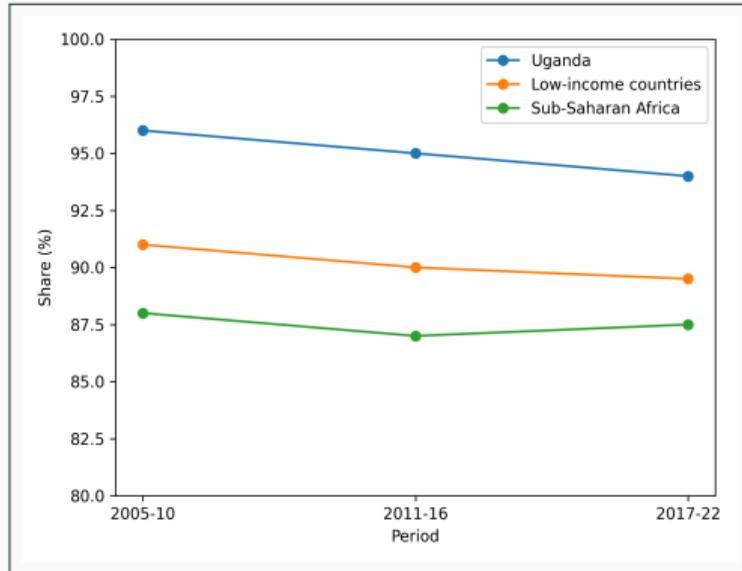# Context: Formal vs. Informal Employment

Informal Sector Employment

- Employment is highly informal (International Monetary Fund, 2024).

- Wages are low (median $\sim \$50$/month)

- About 50% of workers are employed in MSMEs (UBOS, 2020)

- College-educated workers face low unemployment

Implication: Higher education is a key pathway into the formal sector and the tax base.

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Higher Education in Uganda

- **Transition rates**
    - ~100K students sit for A-level exams each year; ≤60% apply to universities and ≤40% apply for scholarships.

- **Institutions**
    - 9 public universities account for 54% of university enrollment
    - 44 private universities; 227 total HEIs (2019–2020)

- **Enrollment (access is low)**
    - Only 5.3% of college-age youth are enrolled in higher education as of 2015, below Sub-Saharan Africa (9.4%) and the global average (38%). (UNCHE, 2023)

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Admission to Ugandan Public Universities

- **Admission channels**
  - Students are admitted either on full-ride scholarships or through private entry.
  - Scholarship admissions occur first and are centrally administered.

- Merit-based scholarships

  - Allocated based exclusively on performance on national A-level exams

  - Direct merit awards: need-blind, covering full tuition, room, and board for ~3,000 students annually

  - District quota (place-based): test-score-based cutoffs applied within districts (700–800 awards) to broaden geographic representation

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Implication: This system generates rich administrative admissions data with test-score–based eligibility rules, allowing us to observe scholarship assignment, admission outcomes, and private reapplication at the program–year level.

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Application Process for Public Merit Scholarships

- Applicants submit an ordered list of up to six program–university choices.
    - E.g., "Economics at University X" is one choice.

- Admissions use a deferred-acceptance–style algorithm with program-specific capacities and test-score rankings.

    - This process generates program-year-specific test score cutoffs.

- Application process for district quota scholarships is parallel and similar.

- Students submit applications **before** exam results and cutoffs are known.

    - Unsuccessful applicants may still reapply under private entry.

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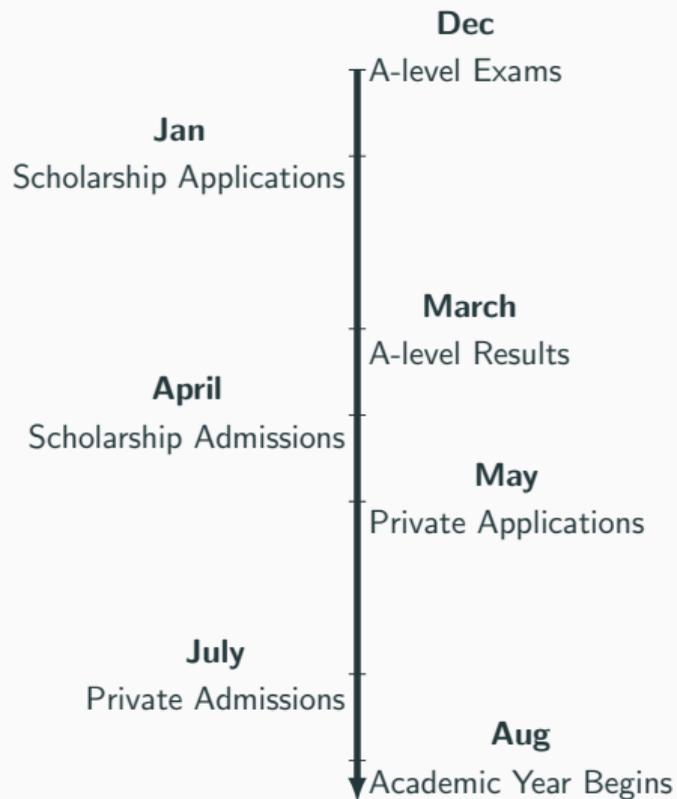## Application Process for Public Merit Scholarships

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- Application process for district quota scholarships is parallel and similar.
- Students submit applications **before** exam results and cutoffs are known.
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Implication: These features create program-specific cutoffs which we exploit in a regression discontinuity design.

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Application Timeline

Dec
A-level Exams

Jan
Scholarship Applications

March
A-level Results

April
Scholarship Admissions

May
Private Applications

July
Private Admissions

Aug
Academic Year Begins

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Data: Student Applications

- **Applicants:** All public university applicants, 2014/15–2018/19
    - ~38,000 applications per year through the centralized platform
    - ~75% also submit district-quota preferences
- **Information observed:**
    - Test scores and demographics
    - Ranked program-university choices
    - Program-year cutoffs and admission outcomes

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Enrollment and Graduation Outcomes

- **Enrollment (Makerere University)**
    - Administrative transcript / results data
        - Only available for flagship Makerere University (so far)
    - We classify a student as enrolled if they appear in the results database at least once

- Graduation (All Public Universities)

    - Publicly available graduation lists covering all public universities

    - Lists include: name, gender, degree awarded

    - Graduation records are linked using names, majors, and expected grad year

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Data: Labor Market Outcomes

- **URA administrative tax data**
  - Universe of formal-sector income records
  - Monthly earnings, employment spells, and tax payments
- **LinkedIn profiles (complementary)**
  - Employment history and skill composition

URA administrative tax records and LinkedIn will provide our main source of labor-market outcomes (2nd question).

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Summary Stats

Descriptive Statistics for the 2016/2017 cohort

	count	mean	sd	min	max
Female	36,585	0.45	0.50	0	1
Age	32,675	19.37	1.43	16	37
# of choices ranked	36,585	5.52	0.94	0	6
# of distinct universities listed	36,585	2.80	0.92	1	6
Lists Makerere at least once	36,585	0.89	0.31	0	1
A-level Science track	36,445	0.60	0.49	0	1
First choice is STEM	36,264	0.52	0.50	0	1
Admitted on Merit	36,585	0.07	0.25	0	1
Admitted on District Quota	36,585	0.02	0.15	0	1
Admitted on Private	36,585	0.35	0.48	0	1

Digression: Papers and Proceedings

In related work we study application transitions and mistakes, including both application and behavioral errors.

- Although the system is quite complex and students do make mistakes, we do not find these mistakes to be particularly consequential in this context.
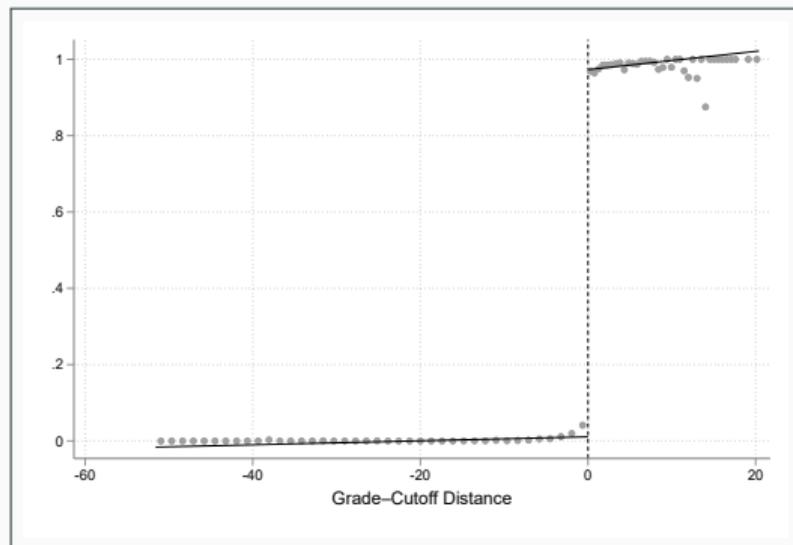
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Admissions to Public University via Scholarship Programs

Direct Merit Admission

RD estimate = 0.910

District Quota Admission

RD estimate = 0.046

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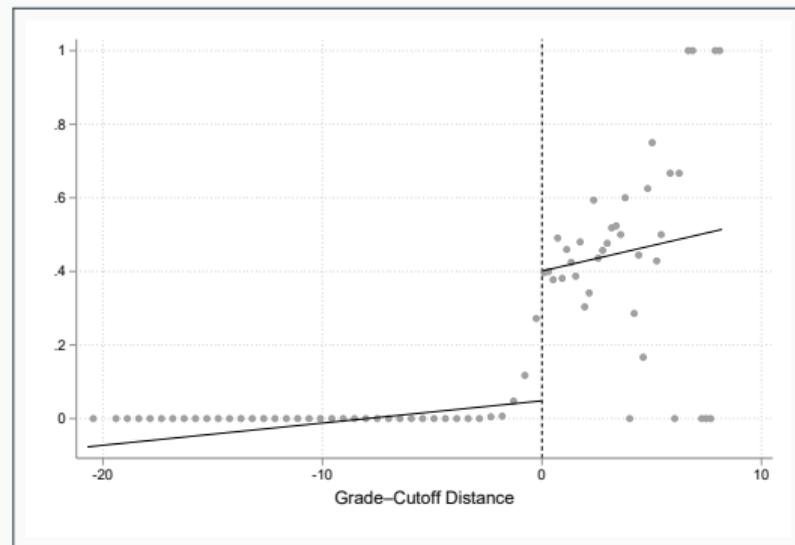
Any Admission: Reapplication and Substitution

Any Admission: Direct Merit Cutoff
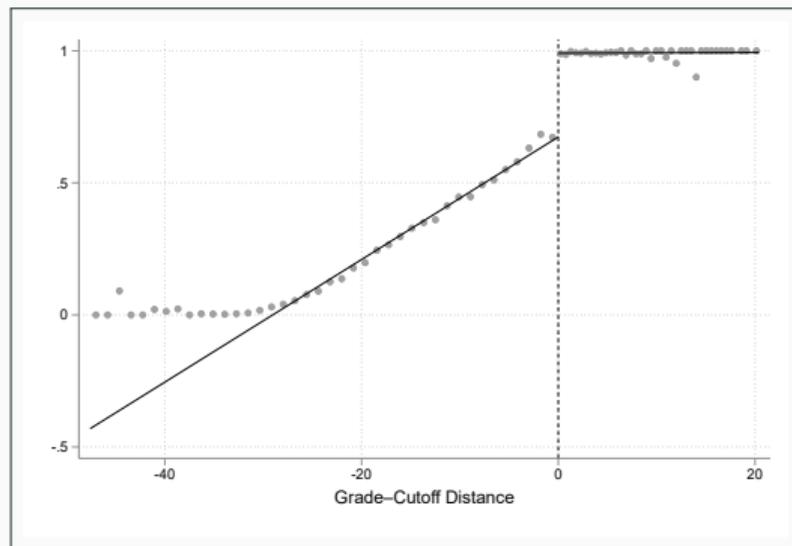
RD estimate = 0.277

**Any Admission: District Quota Cutoff**

RD estimate = 0.051

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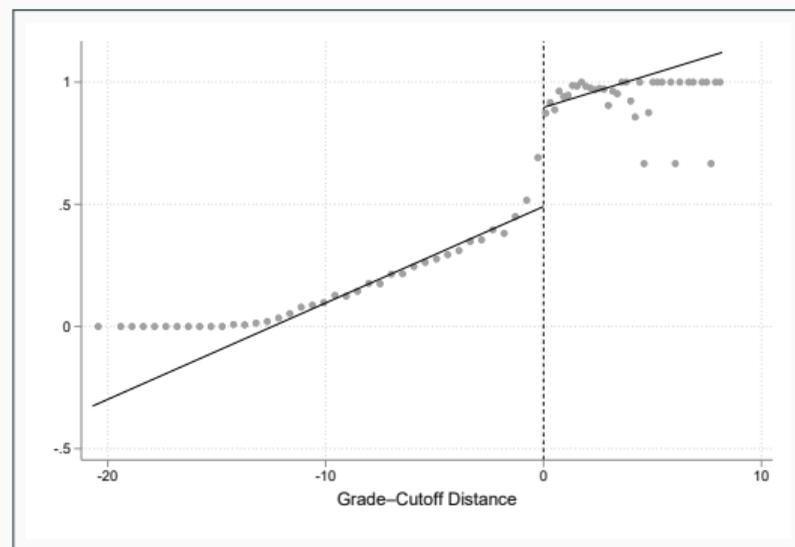
Enrollment (Makerere)

Enrollment via Merit Scholarship
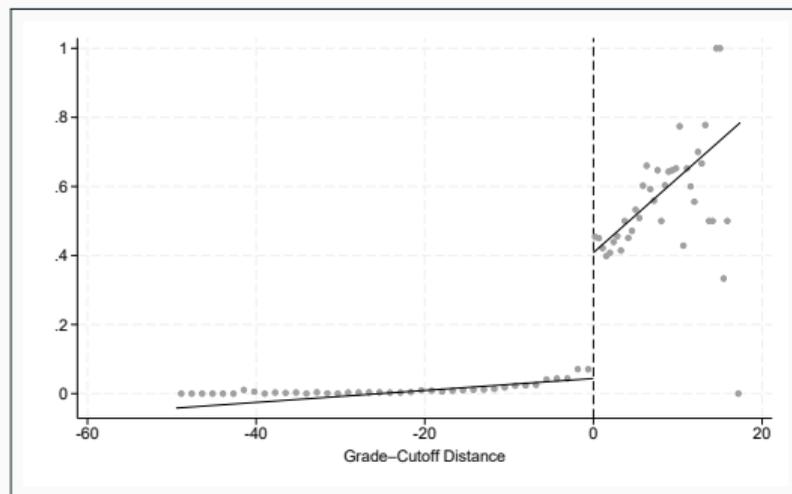
RD estimate = 0.387

Any Enrollment

RD estimate = 0.015

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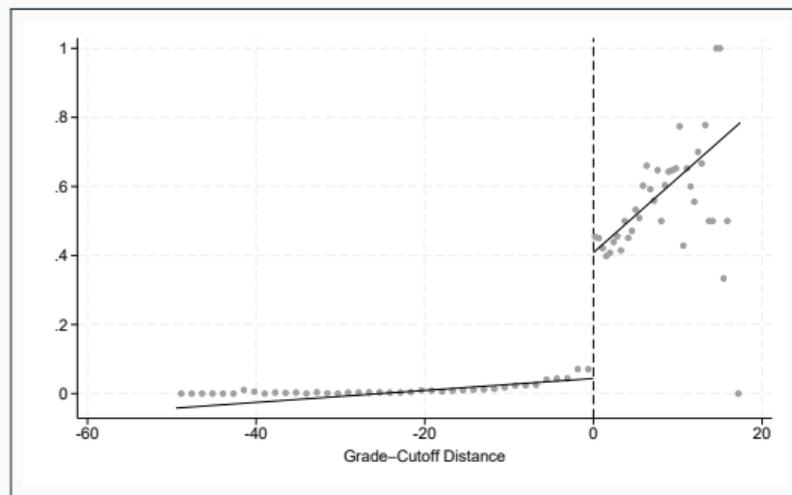000000

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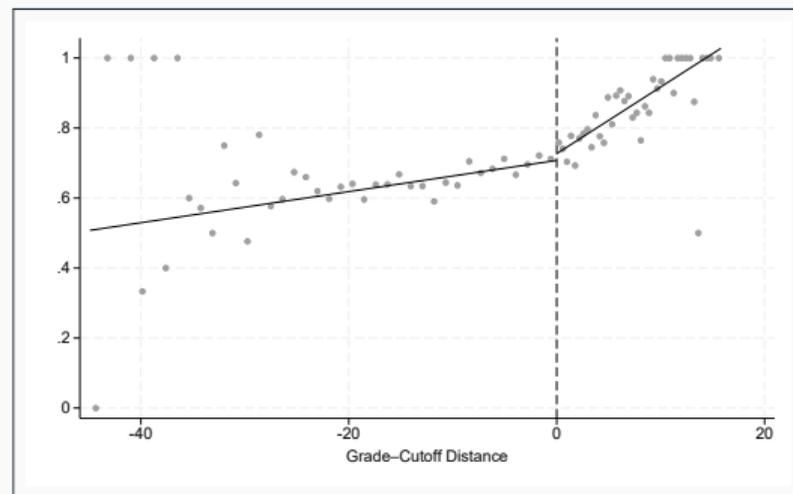
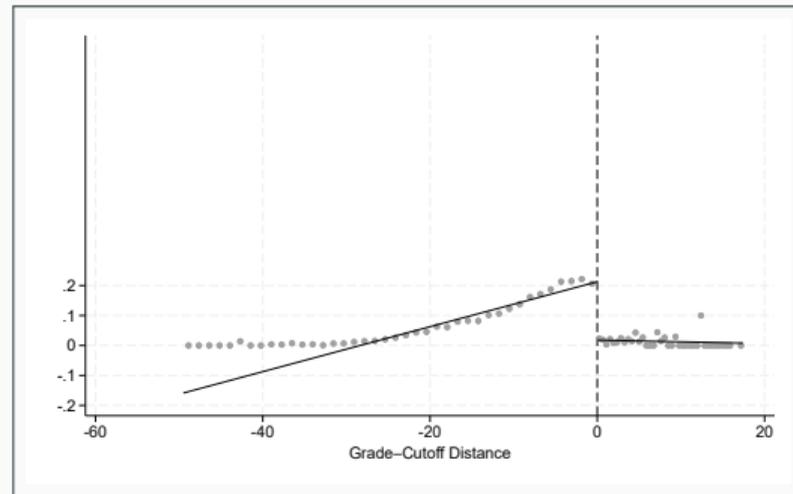## Enrollment (Merit vs Private: Makerere)

Enrollment via Merit Scholarship
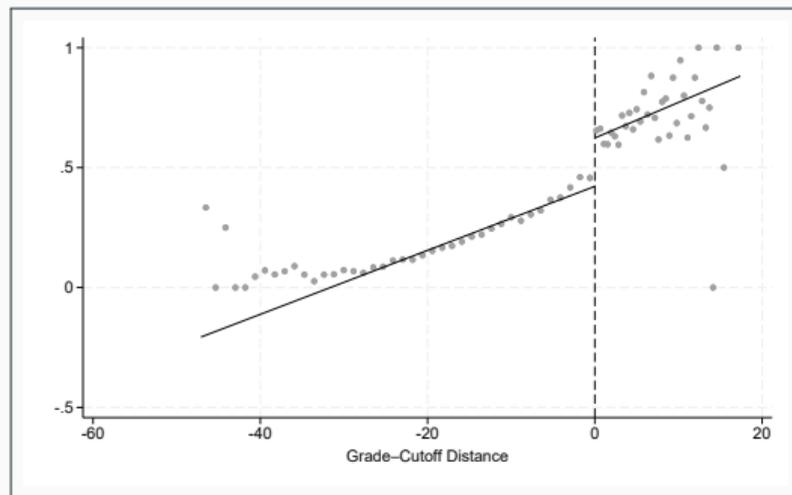

RD estimate = 0.387

Private Enrollment
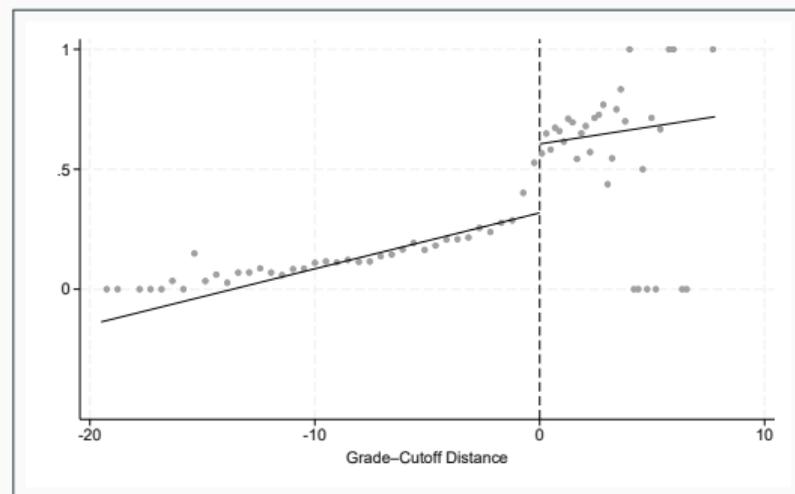

RD estimate = -0.175

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Graduation from any public university

Graduation: Direct Merit Cutoff

RD estimate = 0.206

Graduation: District Quota Cutoff

RD estimate = 0.208

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Outline

Transfer vs. Access at the Scholarship Cutoff

Two margins of response to scholarships:

- **Transfer margin (financing shift at entry):**
  - Students who would enroll regardless of scholarship eligibility
  - Shift from private payment to public subsidy upon admission
  - *Empirically:* large discontinuities in admission and merit enrollment, with no meaningful jump in total enrollment at entry

- **Access margin (persistence and completion):**
  - Students whose enrollment is stabilized or extended by the scholarship
  - Increased persistence and likelihood of graduation
  - *Empirically:* substantial discontinuities in persistence and graduation

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Interpretation: The scholarship primarily operates through a **transfer margin at entry**, but generates **moderate access through persistence and completion**.

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Next Steps

- **Link to URA administrative tax data**
  - Link applicants/admissions to the URA universe of formal-sector earnings records

- Estimate long-run labor-market impacts
  - RD/IV effects on employment, earnings dynamics, and formal-sector participation

- Compute the MVPF and interpret through access vs. transfer
  - Decompose policy into access (new human capital) vs. transfer (financing shift)
  - Translate labor-market estimates into fiscal externalities (tax revenue / transfers) and WTP (in the spirit of Hendren and Sprung-Keyser (2020))
  - Key link: The relative importance of access vs. transfer determines whether MVPF is driven by new human capital or by redistribution.

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The end

Thanks!

Isaac_Ahimbisibwe@baylor.edu

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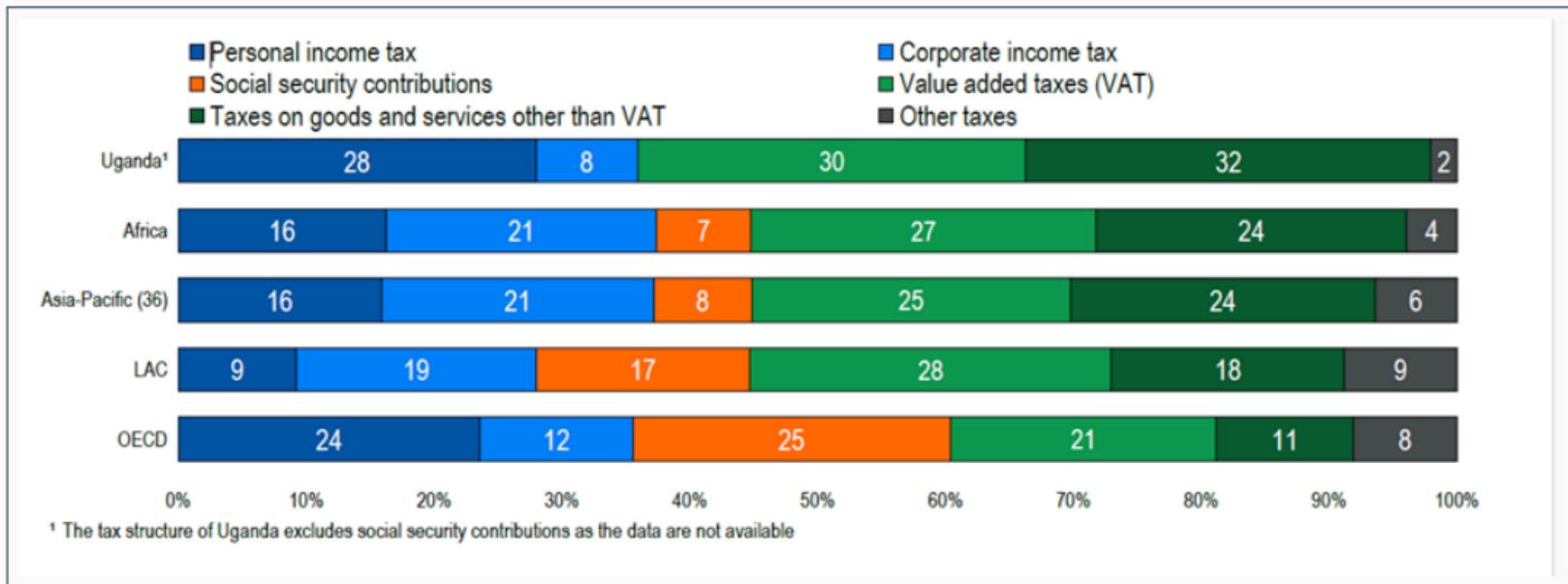
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Legend:
- Personal income tax
- Corporate income tax
- Social security contributions
- Value added taxes (VAT)
- Taxes on goods and services other than VAT
- Other taxes

	Personal income tax	Corporate income tax	Social security contributions	Value added taxes (VAT)	Taxes on goods and services other than VAT	Other taxes
Uganda¹	28	8		30	32	2
Africa	16	21	7	27	24	4
Asia-Pacific (36)	16	21	8	25	24	6
LAC	9	19	17	28	18	9
OECD	24	12	25	21	11	8

¹ The tax structure of Uganda excludes social security contributions as the data are not available

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