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Measuring and Explaining Learning Inequality: School-Set Tests, Apartheid's Borders and Teacher Deployment in South Africa
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South Africa's students learn too little, and how much they learn depends on where they go to school. This thesis asks where that inequality comes from and what the state could do about it with the money it already spends. Its three essays use the national administrative records on every student, teacher and school. The first builds the measure of learning the other two need; the second asks how much of today's inequality is the work of the past; the third asks how much of what the state pays for today reaches the classroom.

The first essay, *Making School-Set Assessments Comparable: How School Assessments Hide Learning Inequality*, starts from a problem most school systems share: at most a quarter of countries test every primary student on a common instrument, and elsewhere each school sets and marks its own tests, so a mark of 60 at one school need not mean what it means at the next. I put these marks on one scale without a new test, the first method to do so. Each secondary school sets the same assessments for students arriving from many primary schools, which makes those schools' marks comparable; each primary school feeds several secondary schools, so the comparisons form a network that a two-way fixed-effects estimator chains across 1.2 million students into a common scale. Raw marks capture about a third of the learning gap between rich and poor schools, and a gap that halved on raw marks between 2018 and 2022 did not narrow at all. Five years on, the scale predicts the national school-leaving examination better than the marks do.

The second essay, *Invisible Borders, Living Institutions: How Apartheid's Bantustans Still Shape Schooling*, asks whether a border abolished in 1994 still causes educational disadvantage, and why. I follow each child who changes school across the former KwaZulu border and compare them with themselves, before and after the move, against children on the same path who changed school without crossing. Sorting explains one-half to two-thirds of the raw gap; what remains is causal and runs both ways: crossing into the former homeland raises a child's chance of repeating a grade by 0.94 percentage points, and crossing out lowers it by 1.19. Despite one national pay scale, schools inside the border pay 9.2 per cent less per teacher, because the more senior teachers leave: a single wage scale laid over unequal places reproduces, through who chooses to teach where, the inequality it was meant to end. Across 21 birth cohorts the gap has not closed.

The third essay, *Provision Not Deployment: What a Teacher Post Buys in South African Schools*, begins with a measurement problem. South Africa allocates teachers by formula and monitors staffing by the pupil–teacher ratio, not by class size. Rebuilding school timetables from national records for two-thirds of the country's students, I measure the class each child actually sits in. The pupil–teacher ratio averages 32.8, but the class the average child sits in holds 43.3. The gap is widest in the poorest schools, and a school's pupil–teacher ratio barely predicts it. To find out why, I exploit the formula that sets each school's teaching posts from last year's enrolment, which shifts staffing for reasons unrelated to how the school organises this year's classes. Using this exogenous variation in posts as an instrument, I find that only about half of a post reaches the classroom as smaller classes. The rest is absorbed, largely as free periods. With the teachers they already have, schools could cut the class the average child sits in by up to a fifth. Where the absorbed time is largest, I find no measurable return in learning.

The essays share one body of data and one measure of learning, the scale the first of them builds; each is written to stand alone.