VU VRIJE UNIVERSITEIT AMSTERDAM

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT

RESEP Research on Socioeconomic Policy

# Invisible Borders—Persisting Scars

## How The Apartheid Bantustans Define Contemporary South Africa

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VU Seminar

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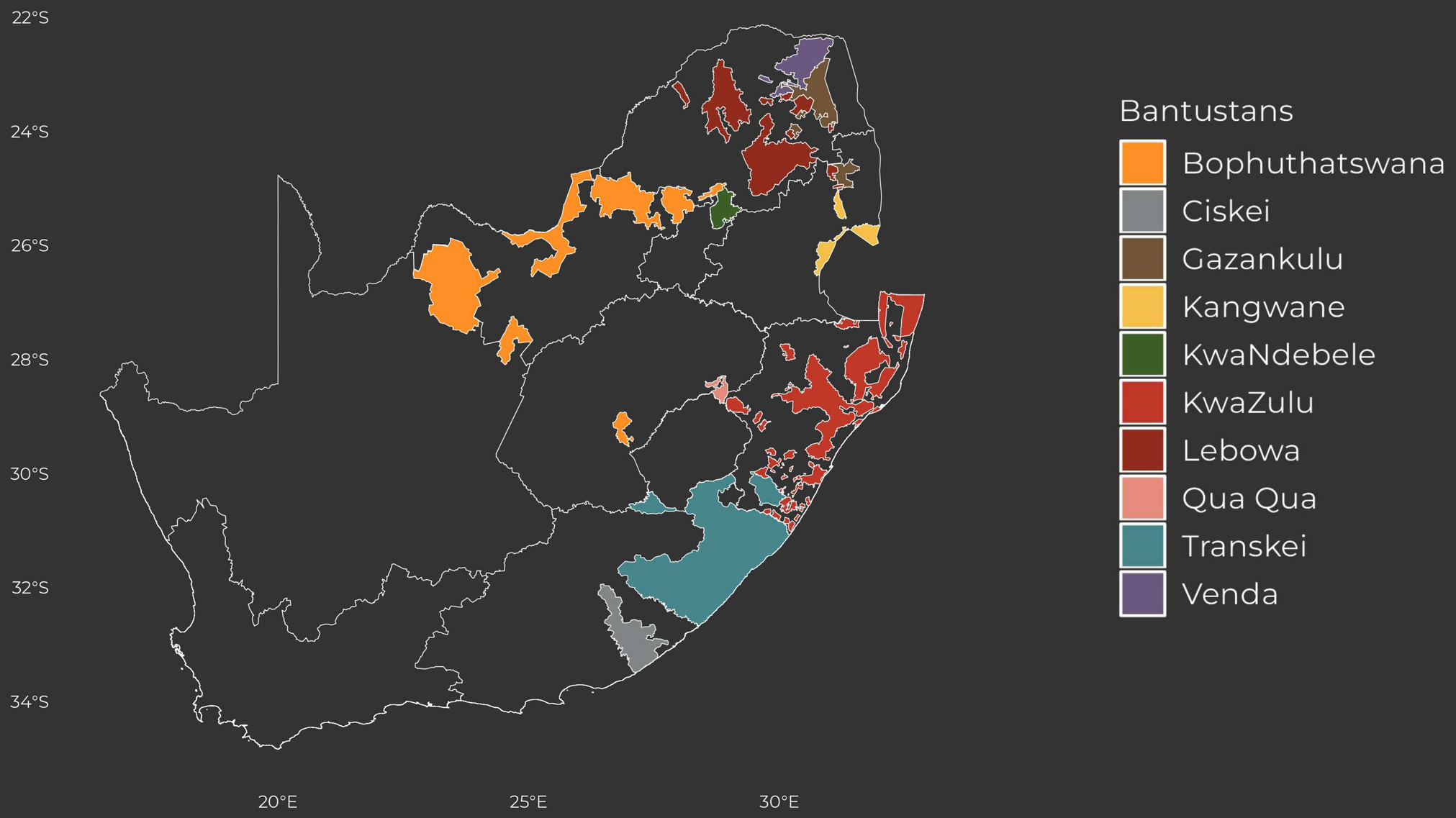
*It would be difficult or impossible to assign to the natives such locations of* ***an extent sufficient*** *for their support... I regard it on the contrary as desirable that* ***these people should be placed in circumstances in which they find regular industry necessary for their subsistence*** —

Earl Grey, 1849

# The 10 Former Bantustans




Data: Department of Agriculture, Land Reform & Rural Development

# Bantustans as “Nation States”

KwaNdebele

Ciskei

Lebowa

Bophuthatswana

Gazankulu

KwaZulu

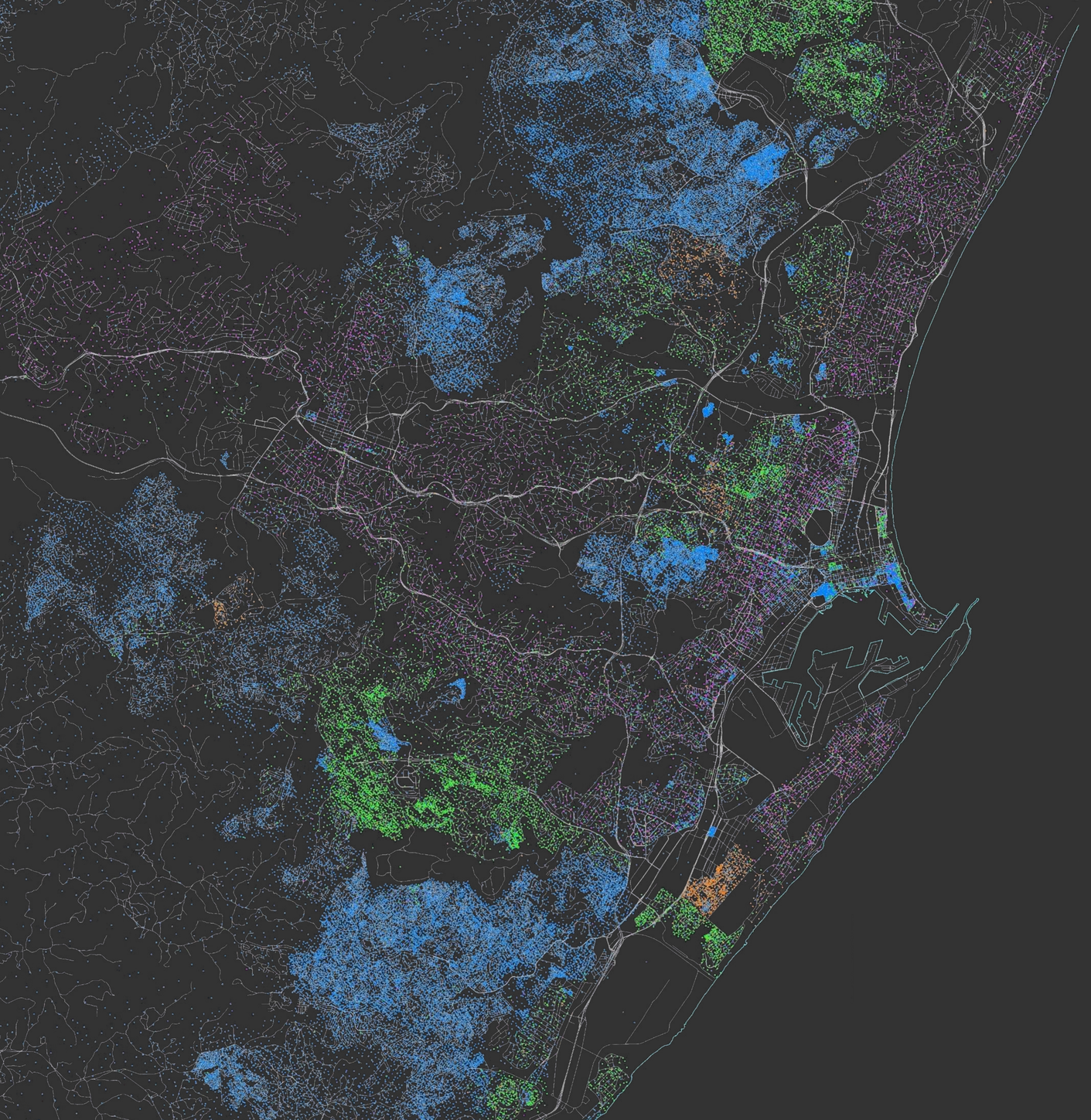
Transkei

Venda

Qwa Qwa

# Historical timeline:

- 1847 – Sir Shepstone creates the Locations System in Natal
  - Urban eviction of black people justified on the grounds of “hygiene & civility”
- 1913 – Native Land Act
  - 7% of the country is designated for black residence
- 1948 - Apartheid begins with the election of DF Malan
- 1951 – Bantu Authority Act
  - Final Bantustan designations – 13% of the country in total
- 1959 – Promotion of Bantu Self Government Act
  - Division by ethnolinguistic group
- 1970 – Bantu homeland Citizenship Act
  - Forced citizenship by ethnolinguistic designation
- 1994 – Democratic elections
- 1994 – Ingonyama Trust Act
  - The KwaZulu Land is vested in Trust under the sole trusteeship of King Zwelithini
- 1996 – Final Democratic Constitution
  - Chapter 12 establishes a separate but equal system of law, African Customary Law



# Spatial Apartheid Persists

Racial self-Identification
in Durban 2011

- Black African
- Coloured
- White
- Indian

Census, 2011

# Summary of findings

- What effect has the KwaZulu Bantustan had on the welfare of contemporary residents of the former Bantustan? (spatial estimand)
- 30 years post-Apartheid, the KwaZulu Bantustan has led to decreased human capital investment, inefficient education administration, and poorer learning outcomes for those continuing to reside within the former KwaZulu homelands

- LATE:
  - Learner-educator ratio: 27.6 → 29.3
  - Class size: 32.99 → 36.31
  - Maths Literacy leaving exam: 42.94% → 37.46%
  - Average years overage: 0.86 → 1.07

- KwaZulu was *not* selected for poor agricultural quality
- There is significant heterogeneity in the welfare implications of each Bantustan
- Continued regional human capital scarring is likely exacerbated by outmigration and the perpetuation of the Traditional Authority

# Relevance

Literature:

- These findings contribute to the literature on extractive institutions and historical persistence.
- The Bantustans were designed to extract labour rather than physical resources – parallels with slavery
- Ironically, this led to long-run consequences for labour absorption
- This may contribute something new on how colonial institutions can persist under the guise of postcolonial institutions (Chapter 12 Institutions)

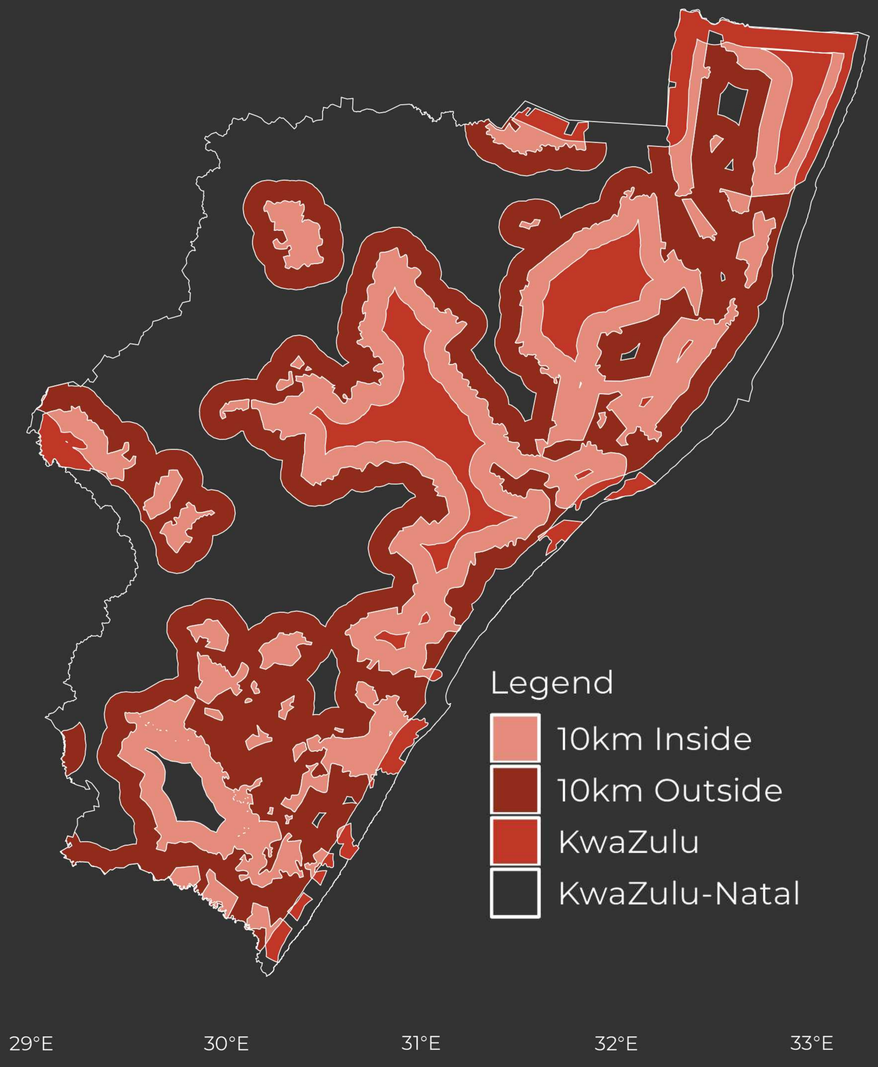
Policy

- Substantial implications for the administration of the Ingonyama Trust
- Identifying institutions as perpetuated colonial institutions may allow for the political will to dismantle them, such as multigrade schools
- Government planning more broadly
- Electoral politics and peacekeeping – IFP vs ANC

# Descriptive Statistics

| School Descriptive Statistics | | |
|---|---|---|
| Variable | Outside Bantustans | Bantustans |
| Class Size | 31.59 | 35.58 |
| NSC - Maths Literacy | 46.23 | 37.83 |
| NSC - isiZulu | 63.31 | 69.27 |
| NSC - Geography | 41.58 | 37.82 |
| Elevation | 960.70 | 830.98 |
| Learner-Educator Ratio | 27.96 | 29.81 |
| Learner-Educator Ratio 2001 | 54.55 | 33.25 |
| Rainfall | 89.34 | 108.26 |
| Public School Indicator | 0.87 | 0.98 |
| Time to City | 30.70 | 68.82 |
| Population Density | 1,122.42 | 221.88 |
| Proportion multigrade schools | 0.15 | 0.28 |
| Data: DBE (2021) | | |

# RD Identification Strategy




Second Stage:

$$\tilde{\tau}(h) = e_0'\tilde{\beta}_{Y_+,p}(h) - e_0'\tilde{\beta}_{Y_-,p}(h)$$

where $\tilde{\beta}_{Y_+,p}(h)$ and $\tilde{\beta}_{Y_-,p}(h)$ are defined through

$$\tilde{\beta}_{Y,p}(h) =_{\beta_-,\beta_+,\gamma} \sum_{i=1}^{n} \left\{ (Y_i - r_{-,p}(X_i - \bar{x})'\beta_- - r_{+,p}(X_i - \bar{x})'\beta_+ - Z_i'\gamma)^2 K_h(X_i - \bar{x}) \right\}$$

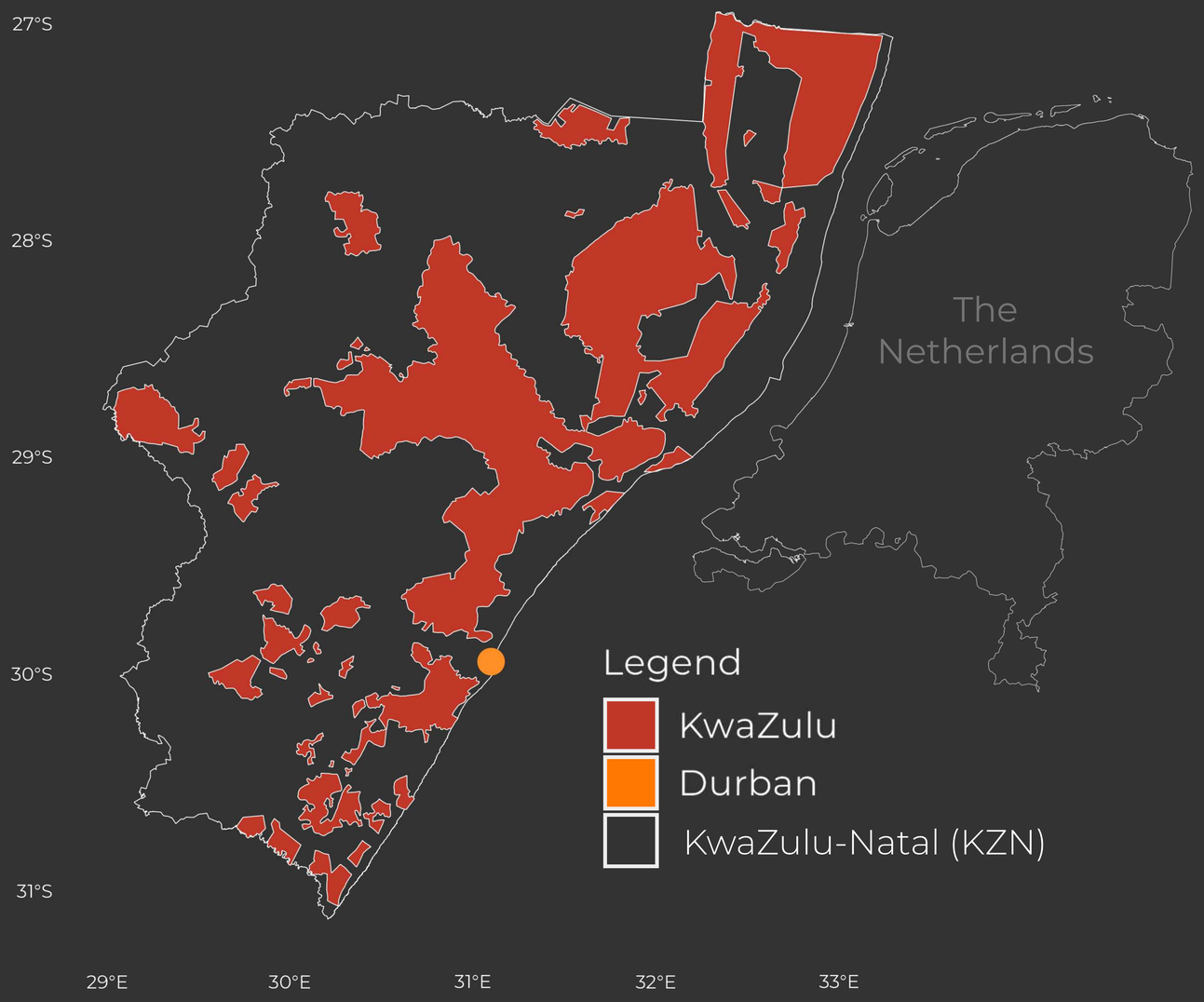
i. Local linear regression (Gelman & Imbens, 2018) weighted by school size
ii. Spatial autocorrelation robust confirmed by first stage spatial stationarity
iii. Quadratic bias correction (Calonico, et al., 2019)
iv. CER-optimal bandwidth selector (Calonico, et al., 2020)
v. First stage covariates: Longitude, Latitude, Rainfall, Rural dummy, public school dummy, tavel time to city, population density, slope, elevation, municipality
vi. Heteroscedasticity Consistent estimator type 1
vii. Robust non-parametric confidence intervals per Calonico, et al. (2014)
viii. Estimated using the rdrobust R package (Calonico, Cattaneo and Farrell, 2015, V2.2 updated 2023)

# Why select KwaZulu?

- Contemporary relevance: institutional perpetuation in the form of the Ingonyama Trust
- Substantial heterogeneity in Bantustan formation, administration, and Bantu Education
- Visual inspection of maps
- RD insignificance of other Bantustans (*multiple hypothesis testing correction?)*
- Strong persistence of effect over multiple domains in the former KwaZulu
- Intentional non-alignment with admin borders
- Less selection than other Bantustans – Zulu traditional lands – 32% of the province

| Bantustan RD Comparison Table<br>RD Coefficient (P-Value) | | | |
|---|---|---|---|
| | Maths Literacy | Geography | Class size |
| Bophutatswana | 1.68(0.11) | -0.46(0.64) | -0.67(0.63) |
| Ciskei | 0.67(0.79) | -0.83(0.75) | 2.96(0.23) |
| Gazankulu | 2.17(0.21) | 1.56(0.32) | 1.88(0.32) |
| Kangwane | 0.62(0.76) | -1.31(0.59) | 3.28(0.37) |
| KwaNdebele | 1.05(0.75) | 0.77(0.81) | 2.74(0.39) |
| KwaZulu | -5.48(0) | -4.39(0) | 3.32(0) |
| Lebowa | -3.54(0) | -1.91(0.07) | 1.81(0.21) |
| QuaQua | 8.65(0.16) | 2.53(0.76) | 26.14(0.11) |
| Transkei | -5.16(0.03) | -2.48(0.22) | 0.63(0.81) |
| Venda | -2.45(0.02) | -3.91(0) | -1.45(0.58) |

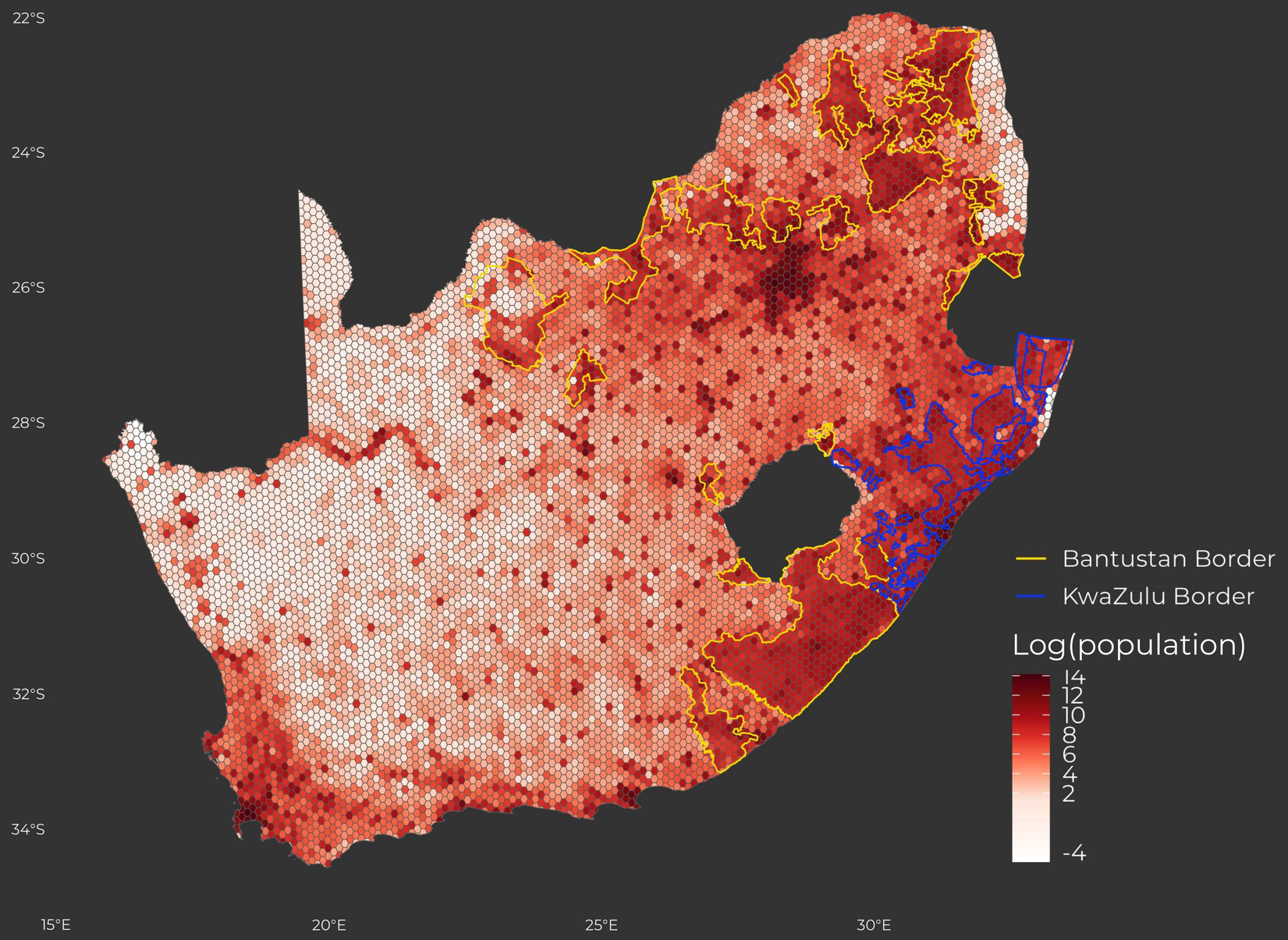
# The fragmented and pseudo-random formation of KwaZulu




| | KwaZulu | KZN | RD P-Value |
|---|---|---|---|
| Mean rainfall (2018) | 11.02 | 10.91 | 0.49 |
| Vegetation index | 5849.60 | 5759.00 | 0.90 |
| Land fertility index | 251.54 | 316.63 | 0.17 |
| Slope | 3.92 | 3.49 | 0.96 |

Data: Department of Agriculture, Land Reform & Rural Development

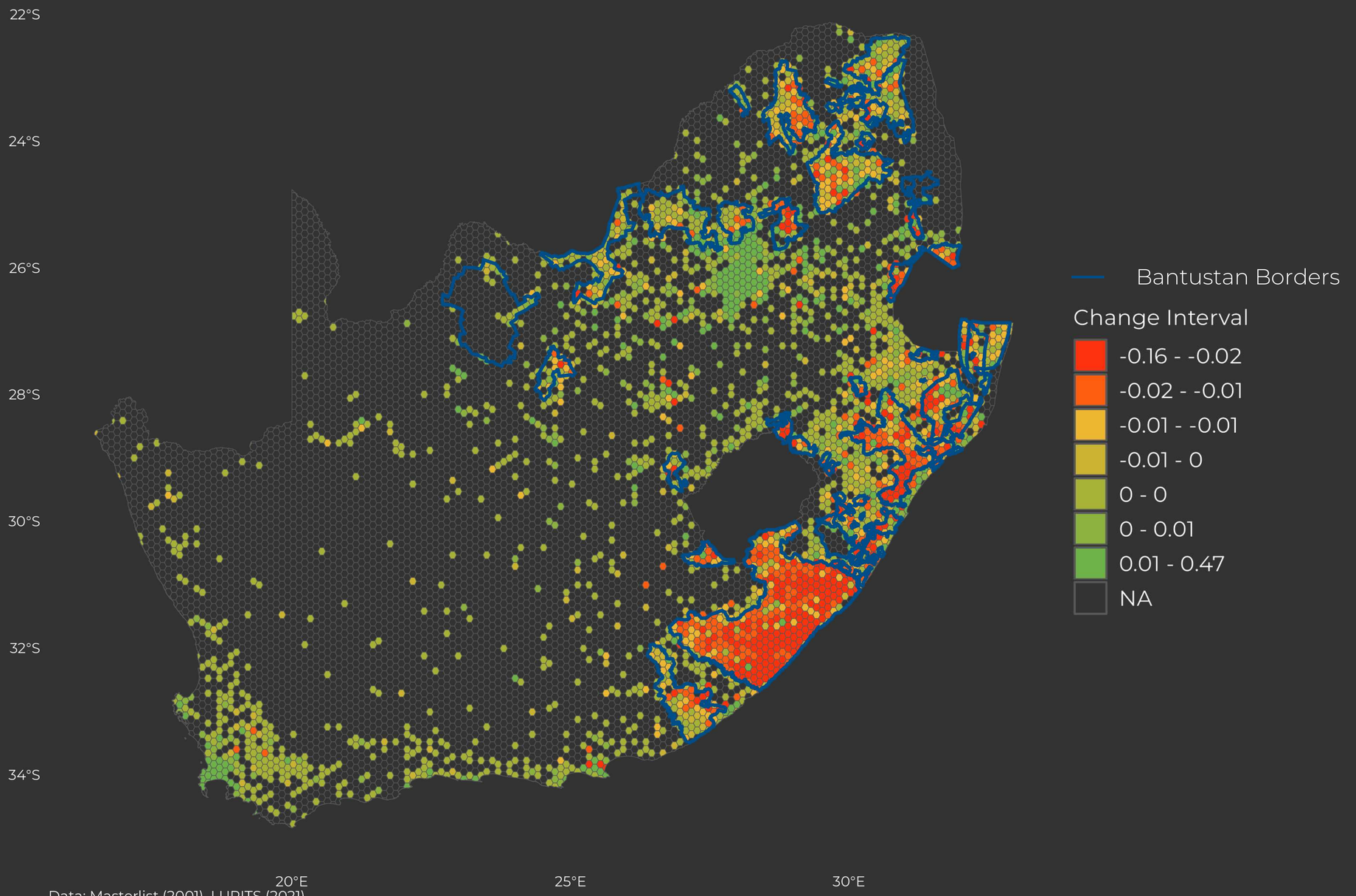
# Population




Data: UNPD: 2022

# Internal Migration

## Change in the percent of Grade 2 Learners: 2001 to 2021




Data: Masterlist (2001), LURITS (2021)

# Headline Results

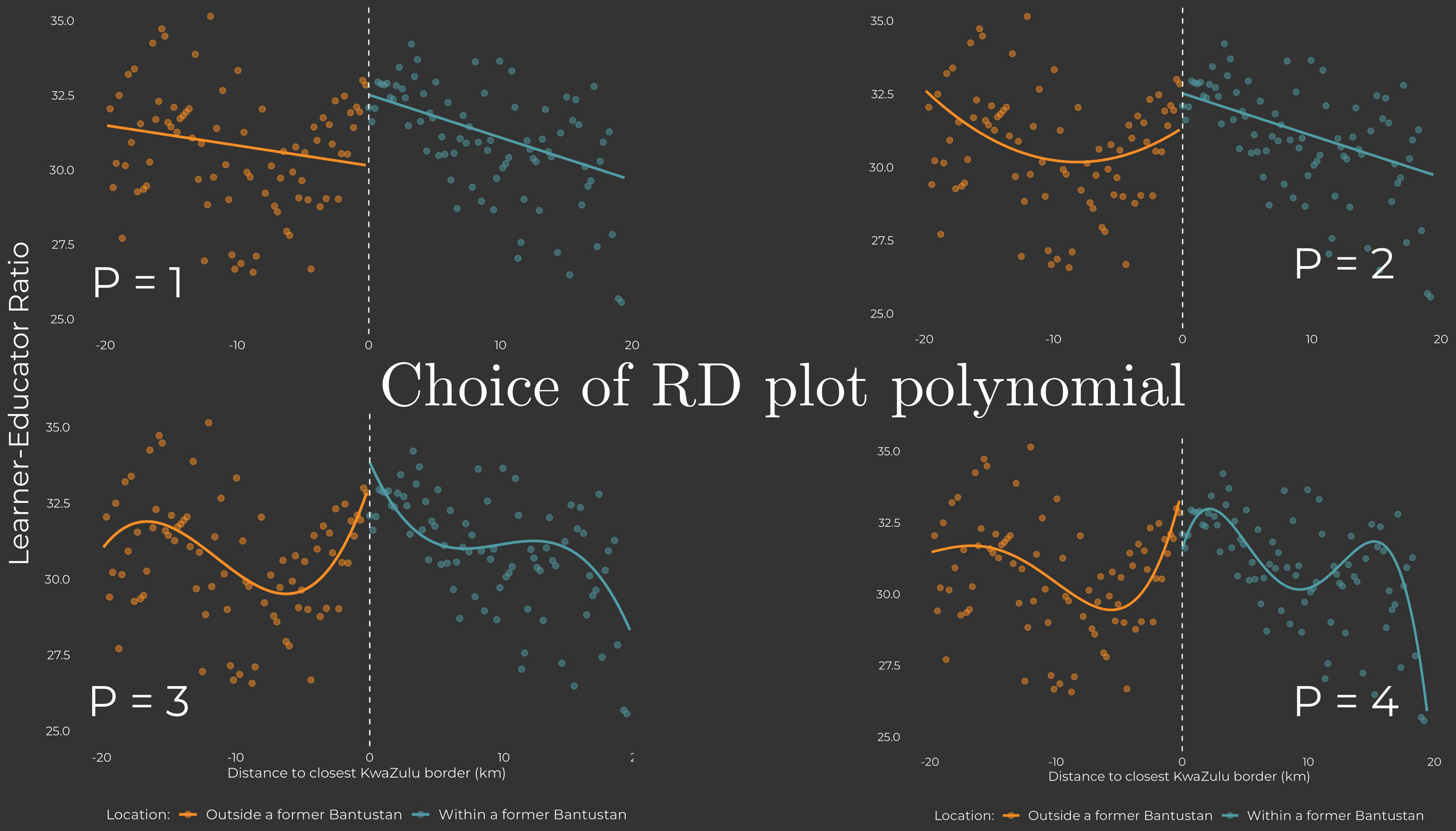
## KwaZulu Regression Discontinuities in 2021

Summary of the effects of the KwaZulu Bantustan and Ingonyama Trust

| | LER 2001 | Learner Educator Ratio | Class Size | Years Overage | Maths Literacy | Geography | Elev (placebo) | Placebo Cutoff (10km) |
|---|---|---|---|---|---|---|---|---|
| Constant | 17.77 | 27.59 | 32.99 | 0.86 | 42.94 | 42.61 | 598.43 | - |
| RD Coefficient | 3.07 | 1.44 | 3.32 | 0.21 | -5.48 | -4.39 | -0.72 | 0.62 |
| P Value | 0.062 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.756 | 0.748 |
| CI | -0.15 ; 6.29 | 0.72 ; 2.16 | 1.5 ; 5.13 | 0.14 ; 0.28 | -7.15 ; -3.81 | -5.92 ; -2.87 | -5.29 ; 3.84 | -3.14 ; 4.38 |
| Bandwidth (km) | 41.68 | 19.72 | 23.4 | 30.39 | 46.8 | 50.67 | 16.78 | 29.32 |
| Sample Size | 18101 | 24660 | 24667 | 24667 | 6101 | 5375 | 24083 | 6101 |

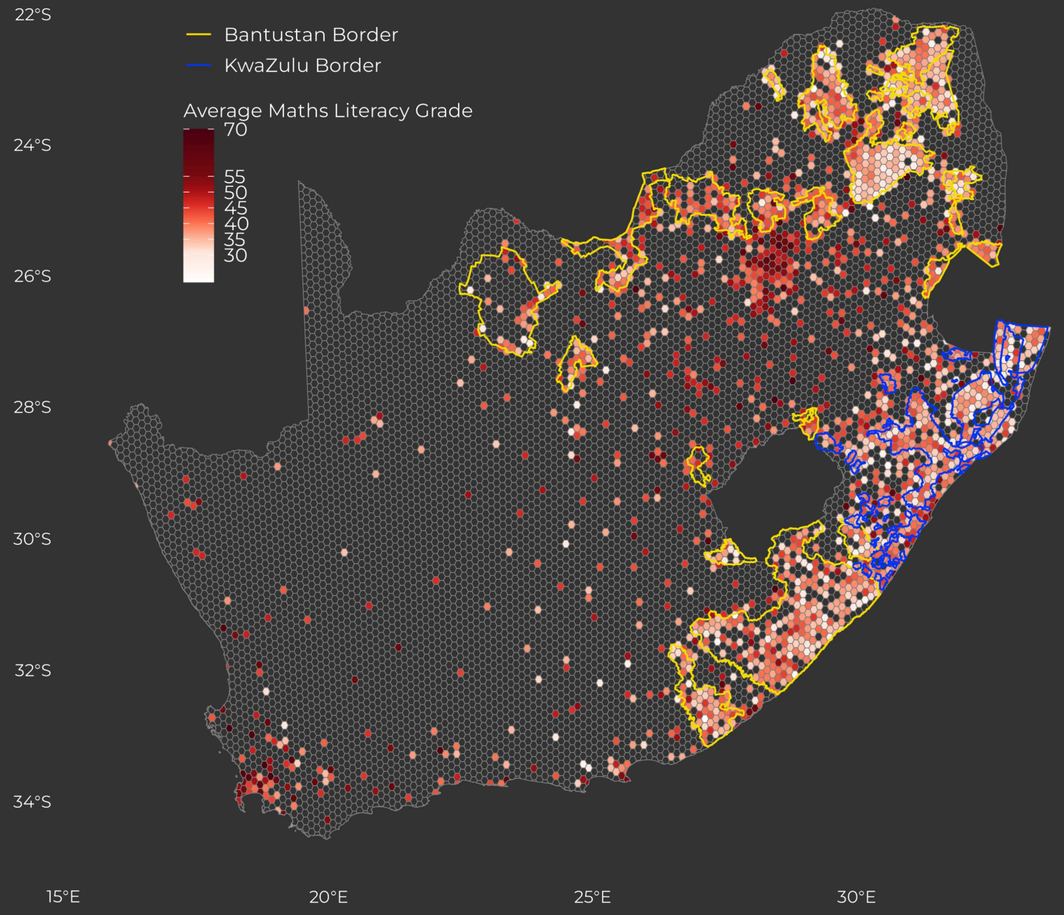
Data: LURITS 2021, Masterlist 2021, Masterlist 2001, National Senior Certificate 2021

# Choice of RD plot polynomial



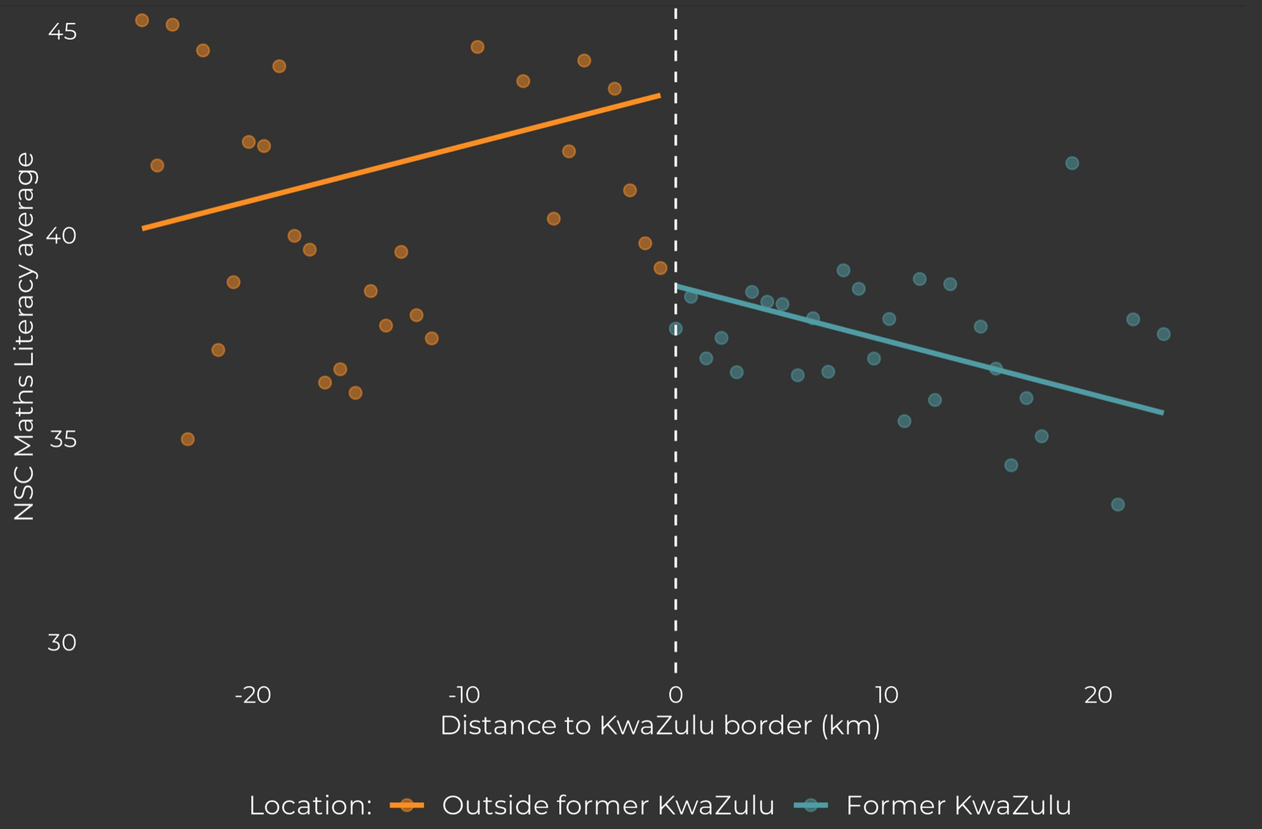
# National Senior Certificate: Maths Literacy

## National Distribution




Data: National Senior Certificate Examinations (DBE, 2022)

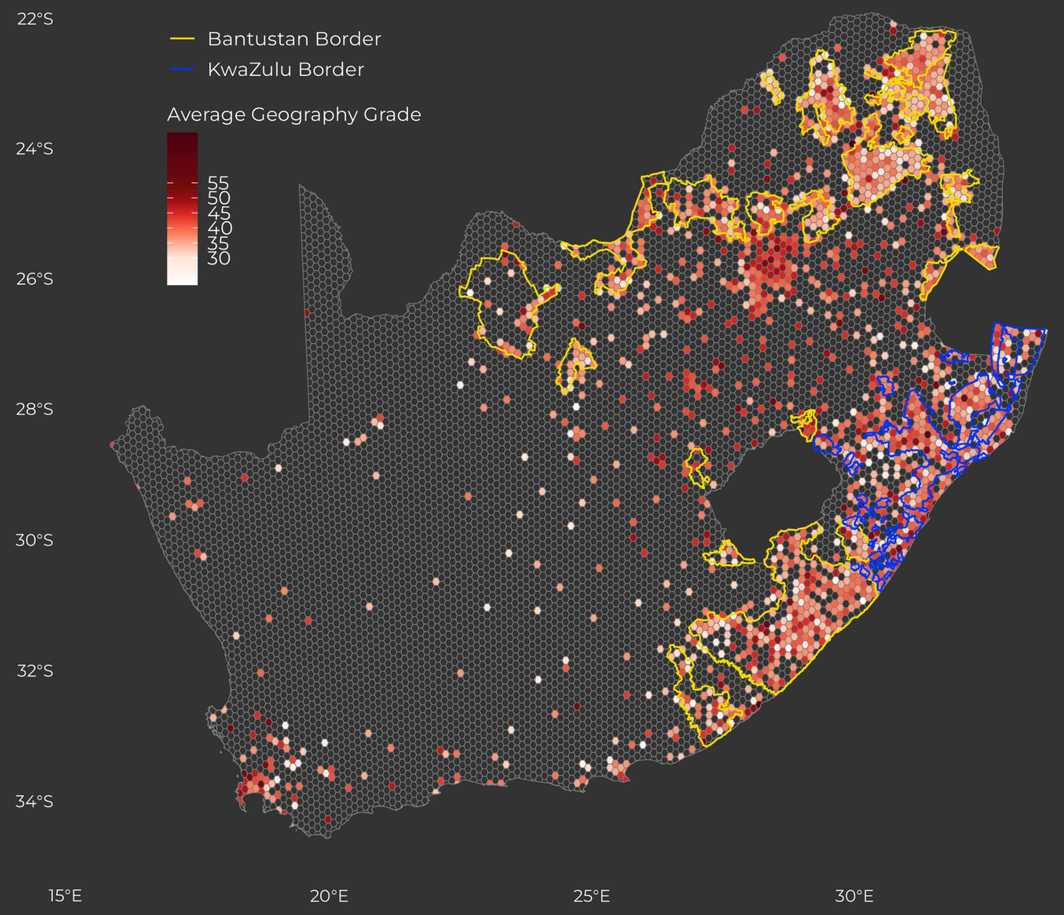
## KwaZulu Regression Discontinuity plot




Local linear regression (Gelman & Imbens, 2018), weighted by school size
CER-optimal bandwidth selector (Calonico, et al., 2020)
Mimicking variance evenly-spaced method using spacings estimators binwidth (Calonico, et al., 2(
Data: National Senior Certificate 2021

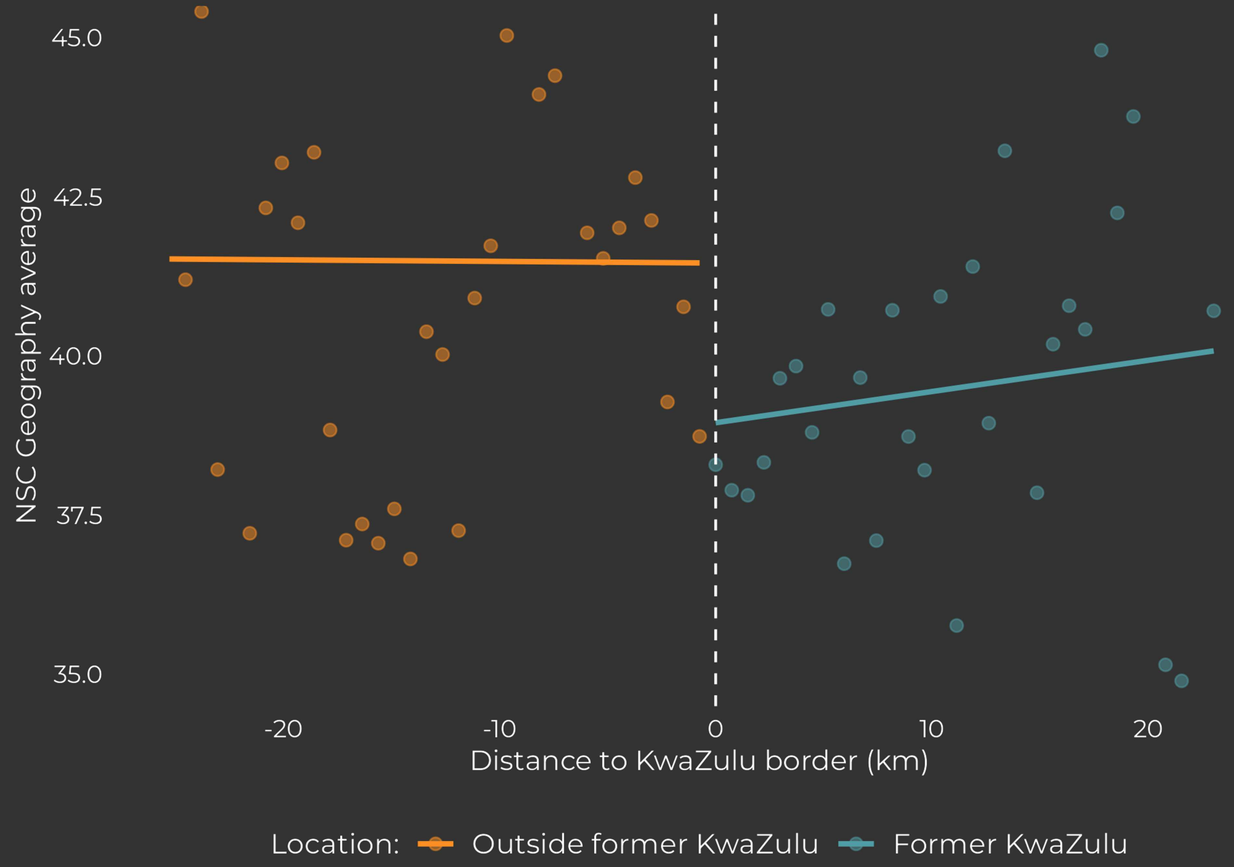
# National Senior Certificate: Geography

## National Distribution




Data: National Senior Certificate Examinations (DBE, 2022)

## KwaZulu Regression Discontinuity plot

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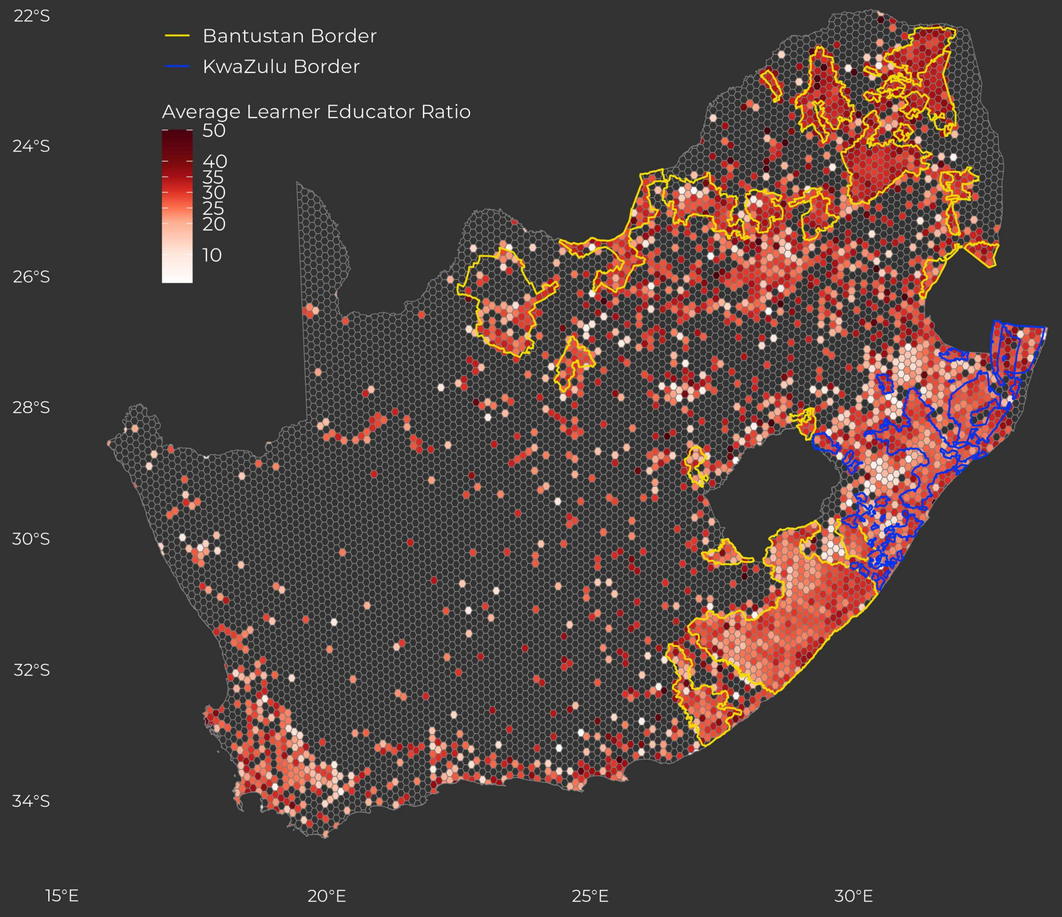
Mimicking variance evenly-spaced method using spacings estimators binwidth (Calonico, et al.,)
Data: National Senior Certificate 2021

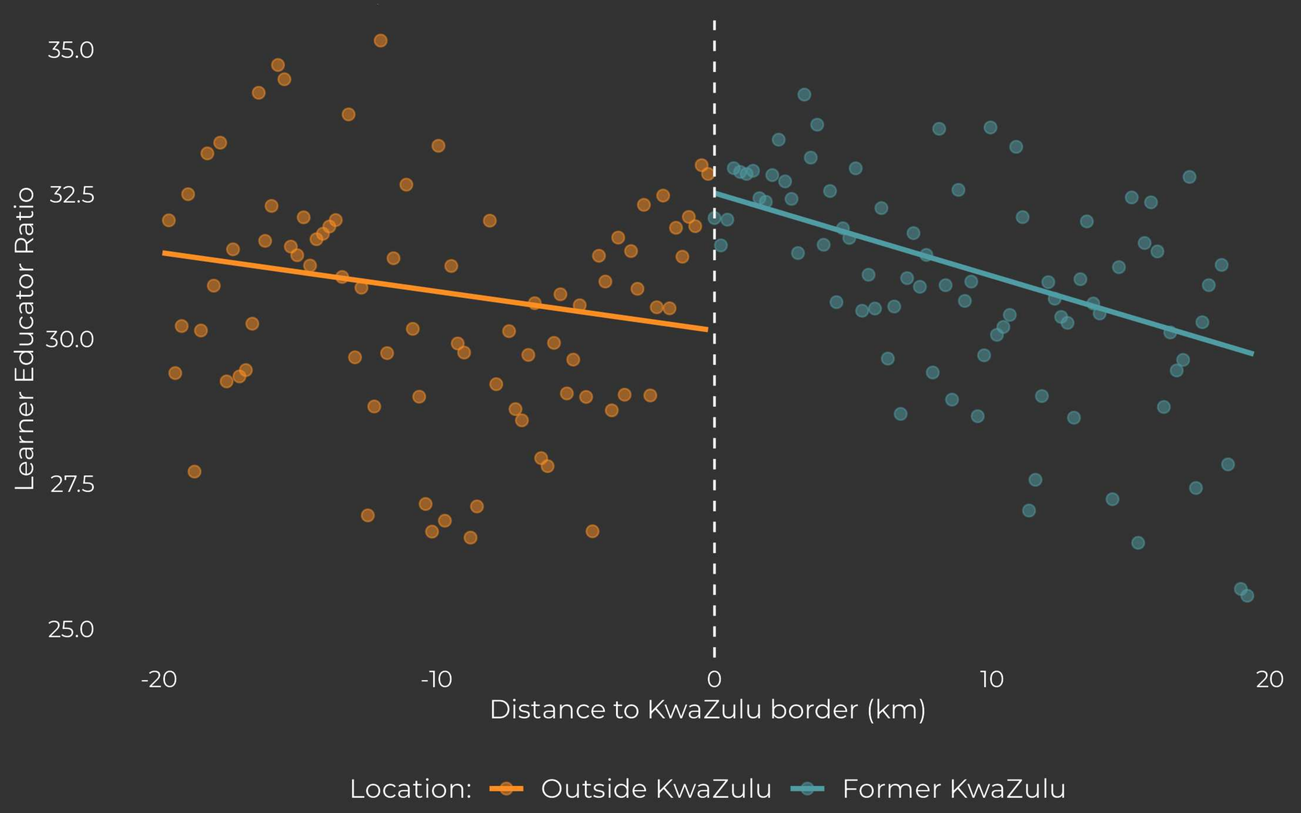
# Learner-Educator Ratio

## National Distribution




Data: LURITS (DBE, 2022)

## KwaZulu Regression Discontinuity plot

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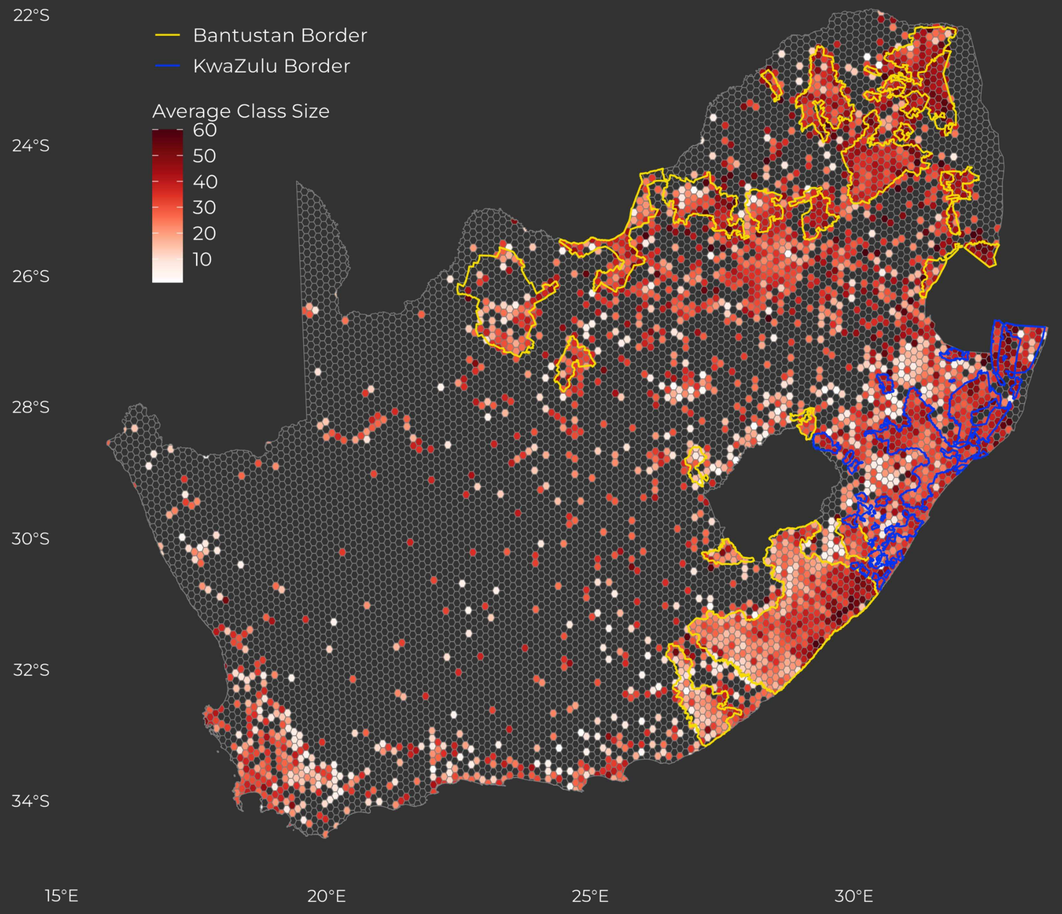
Mimicking variance evenly-spaced method using spacings estimators binwidth (Calonico, et al., 2020)
Data: LURITS 2021

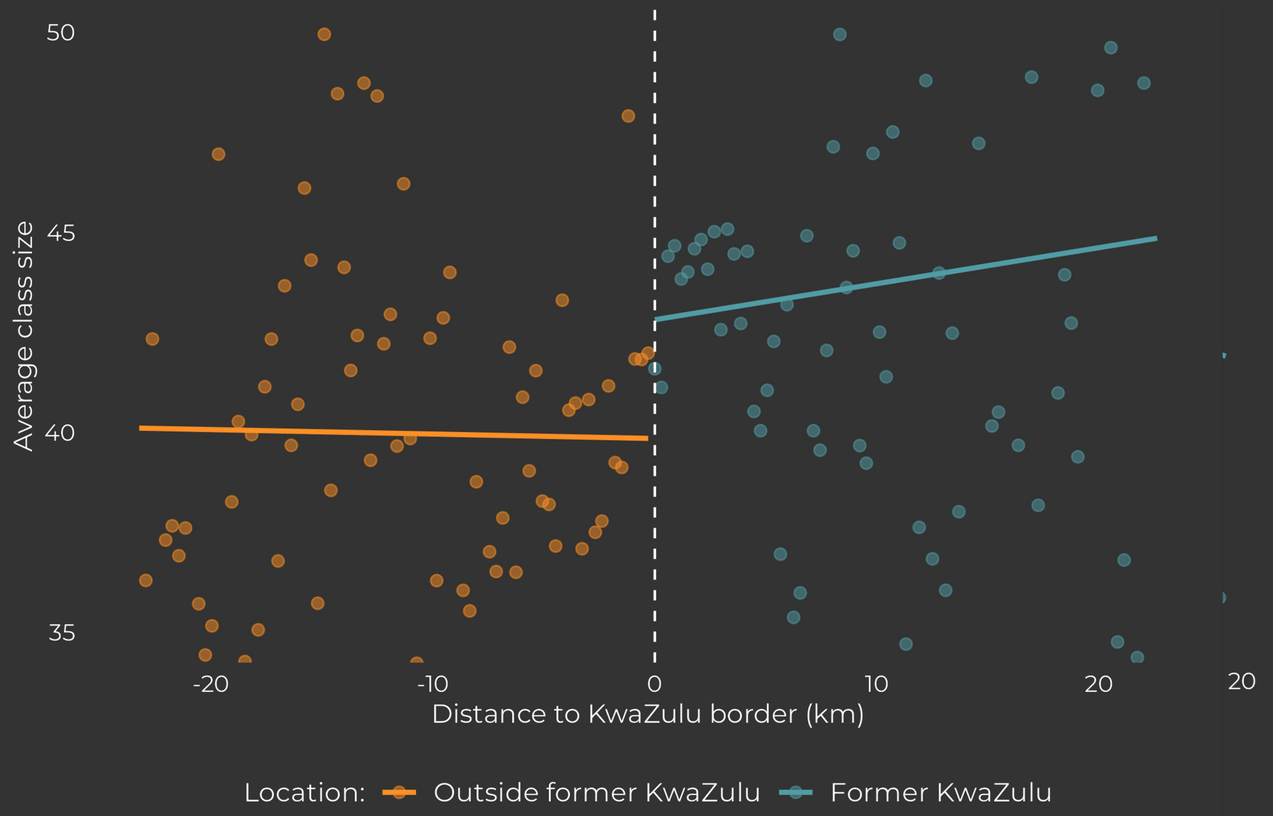
# Class size

## National Distribution




Data: National Senior Certificate Examinations (DBE, 2022)

## KwaZulu Regression Discontinuity plot

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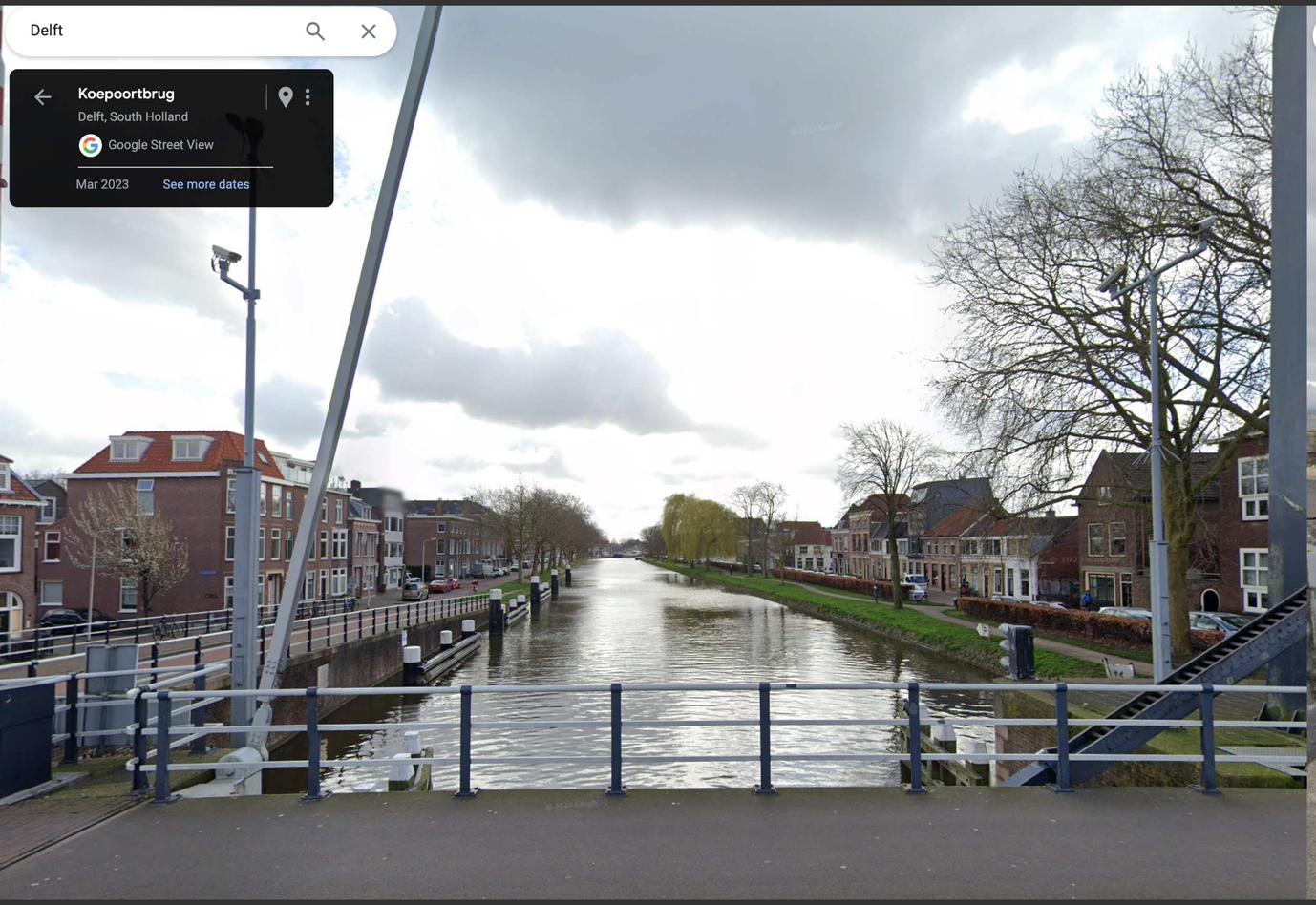
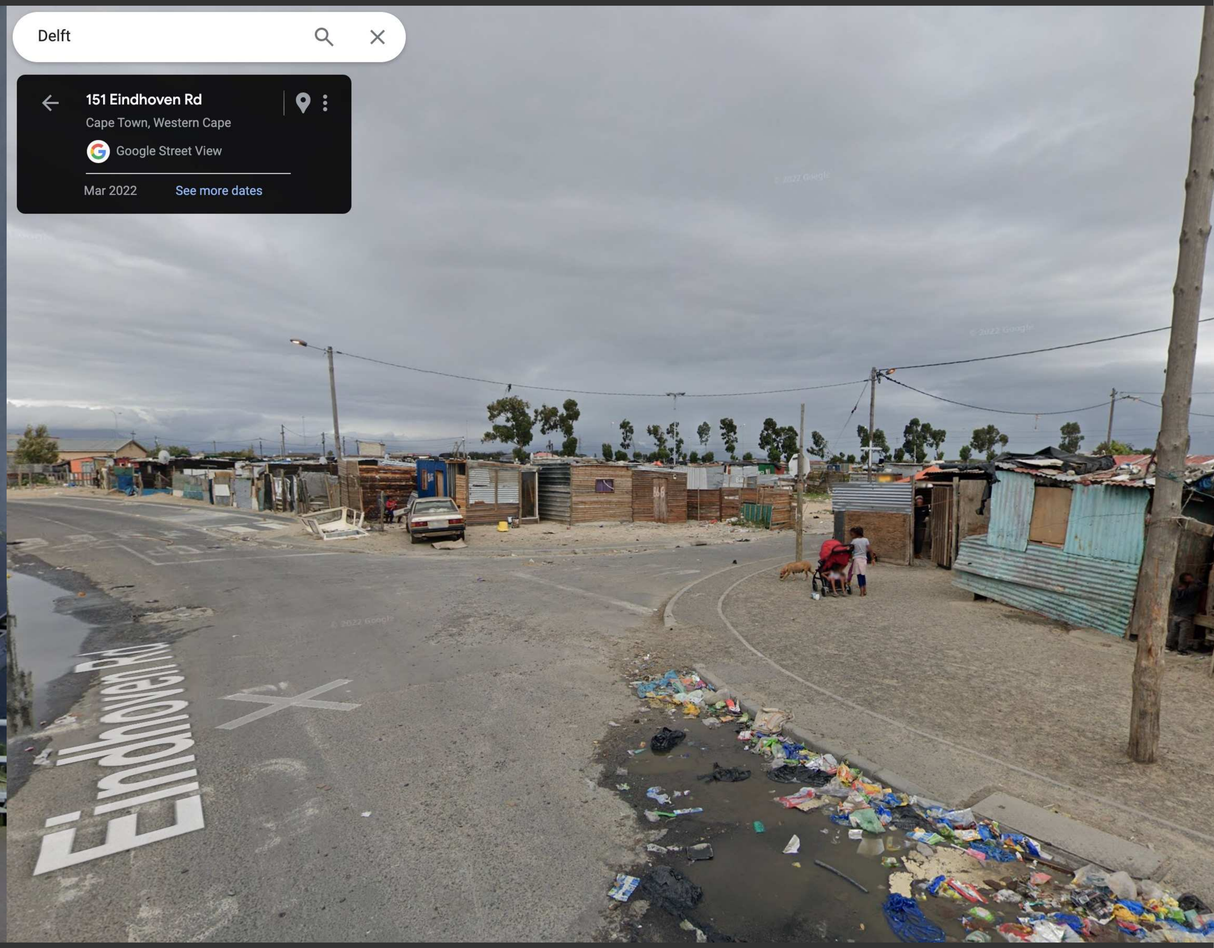
CER-optimal bandwidth selector (Calonico, et al., 2020)
Mimicking variance evenly-spaced method using spacings estimators binwidth (Calonico, et al., 2020)
Data: National Senior Certificate 2021

# What Determines Historical Persistence?

## geography vs extractive institutions




Delft Netherlands




Eindhoven Rd,
Delft,
South Africa

Thanks!
Any questions?

# References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- Calonico, S., Cattaneo, M. D., and Titiunik, R. 2014. Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs, *Econometrica*, vol. 82, no. 6, 2295–2326
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## Women in customary marriages now have equal rights to marital property

Elizabeth Mamacos

news24

Comments Bookmark

## Court dismissed Ingonyama Trust appeal, orders it to refund residents

Sizwe Sama Yende

City Press

Comments Bookmark


MAR 22 2023

## Ingonyama Trust's R41m 'is gone, next move is to drain its coffers'

By Custom Contested in News

JUN 11 2013

## "New" land tenure model brings back unconstitutional CLaRA

By Custom Contested in News

MAR 06 2023

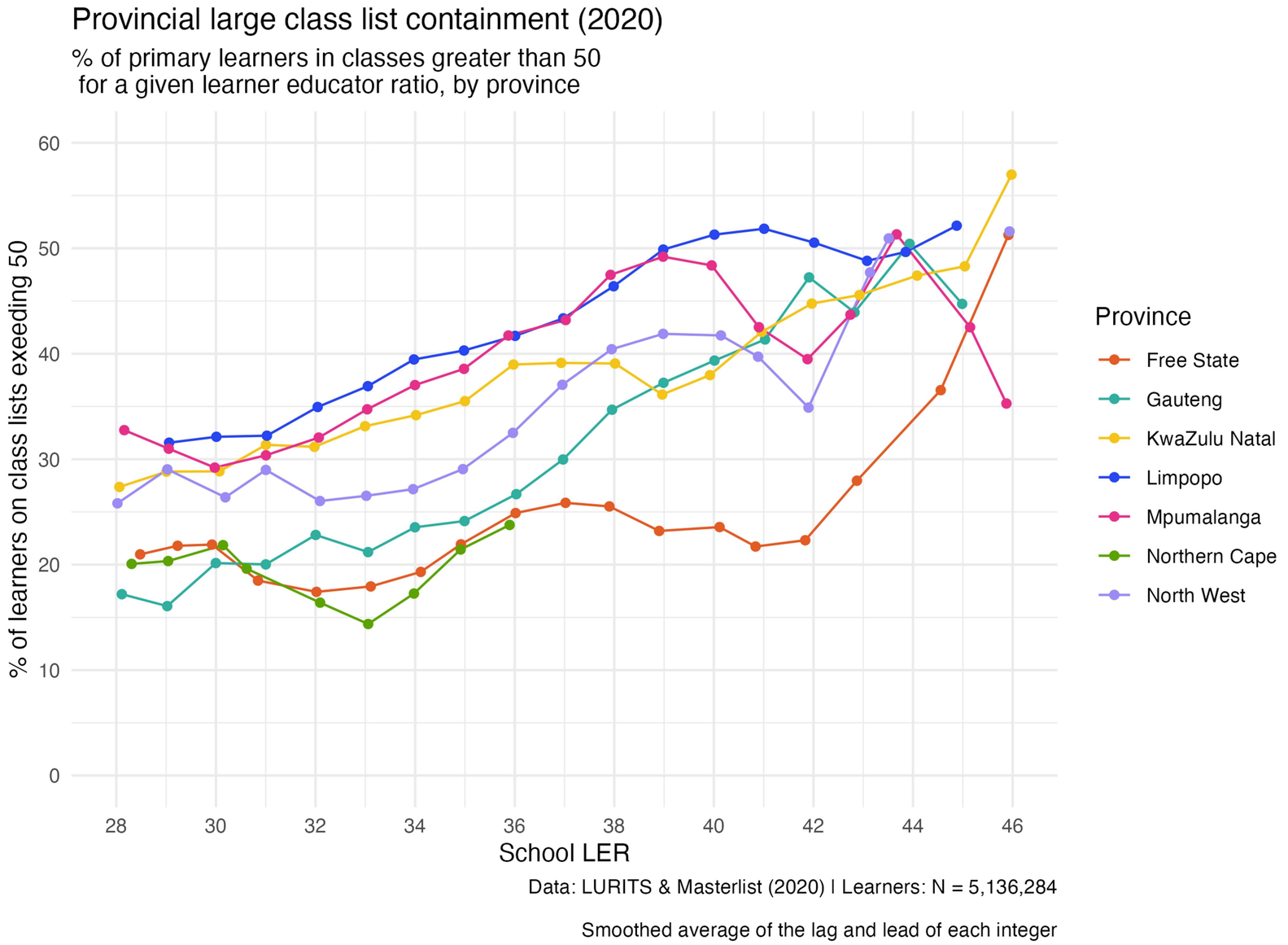
## Activists in ConCourt to declare Traditional & Khoi-San Leadership Act invalid

By Custom Contested in News

# Ingonyama Trust & Institutional Perpetuation

# a quick look at future work

# Why are some provinces able to contain large class lists at high Learner Educator Ratios?



# What variables determine class size?

2018 public primary schools, at the learner level
n = 1m learners
Excluding WC & EC
R^2 = 63.3

**Class size**

| Variable | Lindeman, Merenda and Gold (1980) |
|---|---|
| Total | 100.00% |
| Educator-class ratio | 29.97% |
| LER | 24.22% |
| school size | 13.89% |
| Grade-educator ratio | 9.28% |
| Class count | 8.81% |
| Wealth quintile | 4.85% |
| Province | 3.47% |
| latitude | 2.43% |
| Grade | 2.13% |
| longitude | 0.63% |
| Max - min class size within grade | 0.33% |
| Over age | 0.00% |

| Variable | Univariate | Multivariate |
|---|---|---|
| Educator-class ratio | 33.8124 | 25.0249 |
| Grade-educator ratio | -11.4985 | -3.2285 |
| LER | 1.0291 | 0.7165 |
| Province - Gauteng | 0.8303 | -0.9642 |
| Province - KwaZulu Natal | -1.7952 | -0.9750 |
| Province - Limpopo | 6.4891 | -0.9810 |
| Province - Mpumalanga | 3.3435 | -0.4455 |
| Province - Northern Cape | -4.9925 | 0.1715 |
| Province - North West | 0.9223 | -1.3664 |
| Wealth quintile 2 | 1.8368 | -0.1415 |
| Wealth quintile 3 | 1.3079 | -0.2970 |
| Wealth quintile 4 | -2.4556 | -0.7232 |
| Wealth quintile 5 | -7.5935 | -1.3368 |
| Grade | 0.7947 | 0.7375 |
| Grade max - min class size | 0.0592 | 0.1023 |
| Overage | 0.0006 | 0.0008 |
| School size | 0.0090 | 0.0148 |
| Longitude | 0.5360 | 0.1769 |
| Latitude | 1.3909 | 0.2993 |
| Class count | 0.0460 | -0.6606 |