End of Apartheid, Not of Inequality: The Slow Transition in a Segregated Economy

Kristina Manysheva[1] Martí Mestieri[2] Johanna Schauer[3]

[1]Columbia Business School

[2]IAE-CSIC and BSE

[3]International Monetary Fund[a]

[a]The views expressed here do not necessarily represent those of the IMF, its board or management.

Rising Inequality Despite 30 Years post Apartheid in South Africa

- Apartheid in SA (1948-'94): harsh, institutionalized system of racial segregation

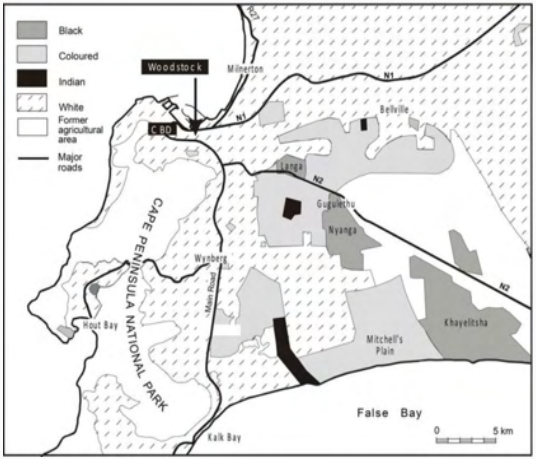
A racially segregated train station entrance during apartheid. Apartheid Museum

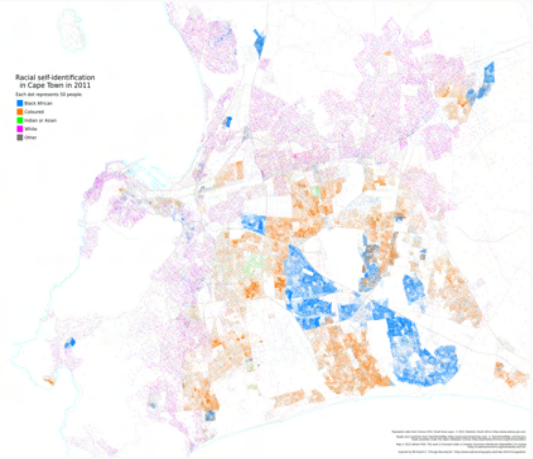
Details

Rising Inequality Despite 30 Years post Apartheid in South Africa

- Apartheid in SA (1948-'94): harsh, institutionalized system of racial segregation
- End of Apartheid era $=>$ "free" access to education, health, jobs, finance + extensive policies to address inequality:
  - Inequality and unemployment are very high, mostly for Black
  - The highest Gini worldwide both for earnings and wealth Plot
  - Inequality: $\Downarrow$ across racial groups, but $\Uparrow$ within Plot
  - Average wage income of $\approx 3/4$ of Black population in Metroareas $\Downarrow$ since '96 Plot
- What drives inequality increase and persistence?
  $\Rightarrow$ Special role of Townships – core spatial concept of Apartheid Details

Modern Cities Still Shaped by Apartheid Policies: Cape Town in 1990s vs 2011





This paper: Integrates Spatial Segregation into H.O.P.E. model

HOPE=Heterogeneous agent model with endogenous Occupations, Productivity and Education

Use Apartheid to study role of segregation (broadly!) on rise/persistence of inequality

- Integrate geographic segmentation of labor, residential and educational markets into a macro-development model of asset accumulation and occupational choice
- Use rich (historical) data
  - Stylized facts $\Rightarrow$ Model Setting (Buera-Kaboski-Shin '13+ Becker-Tomes '94)
  - Model Calibration + Model Validation
- Q: Can economic forces alone account for evolution of inequality?
  - Discriminatory policies/initial conditions $\Rightarrow$ current inequalities: transition to new SS
  - Economic forces behind persistent inequality across several dimensions
- Framework applicable to other settings: American cities, Favelas in Brazil,...

Preview of the Results: H.O.P.E. Brings Some Hope

We are STILL in the transition to a new *lower-inequality* steady state

- Model predicts patterns in inequality across most of dimensions (just economics!)
  1. Income/wealth inequality: overall, within & across races
  2. Inequality in access to higher education
  3. Inequality in enterpreneurship
- Except!: Higher Spatial Inequality, i.e. location choices
- Location-specific **"wedge"** & **amenity** to match the data:
  - Many factors: criminality, infrastructure, non-tradables...
  - Slower transition incl. transition to "top" for Black & larger gap
    - Removing persistent spatial distortions in Townships $\Rightarrow$ faster transition to a race-blind equilibrium (40%) and lower income inequality (10%)
  - Role for place-based policies

Plan of the Talk

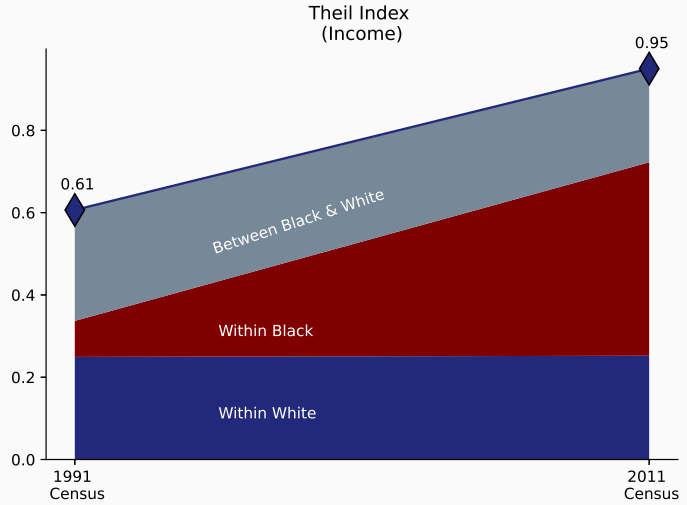
1. Data: Stylized Facts on Inequality in SA (Some)
2. Model Framework
3. Model Estimation & Model Mechanism
4. Post-Apartheid Transition: Model and Data

Various National and Local Data Sources

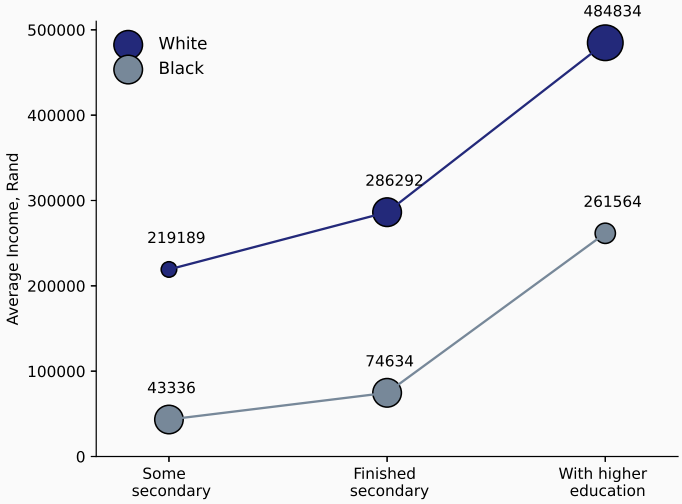
- Townships Geolocations (Available Online!)
  - AfricaScope ✓
  - Manual Historical Data Collection (575) ✓
- GeoData (Map Township, Focus on Metropolitan Areas)
  - Statistics SA: SAL/EA ✓
  - DYSTURB historical districts ✓
- Censuses: 1991 ✓(SA + Independent Bantustans) and 2011 ✓ + Labour Force Surveys ✓
  - Individual Level Data: Demographics, Education, Employment, Income
  - Compare dynamics across racial groups
- Censuses: 1996✓, 2001, 2011✓ + General Household Survey 2018 ✓
  - SAL/EA level: Demographics, Education, Employment, Income
  - Compare dynamics across Townships and Township vs City
- Commuting Survey Data (City of Cape Town, 2013) ✓
  - Individual data: Demographics, Education, Income, Employment
  - Commute: Home and Work/Study Location, Time, Cost
- Publicly Available Education Datasets ✓
- Historical Censuses + DYSTURB historical districts (1911, '21, '36, '51, '60, '70, '80) ✓
- Other Sources for Calibration (PSLSD '93, WB, etc) ✓

This paper: Urban (8 Metroareas) + Blacks/Whites

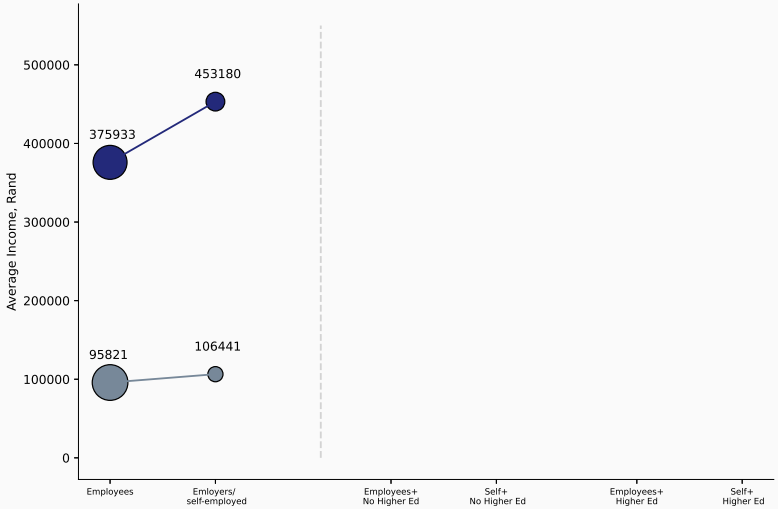
Inequality in SA Post-Apartheid Driven by Widening Within Black Gap



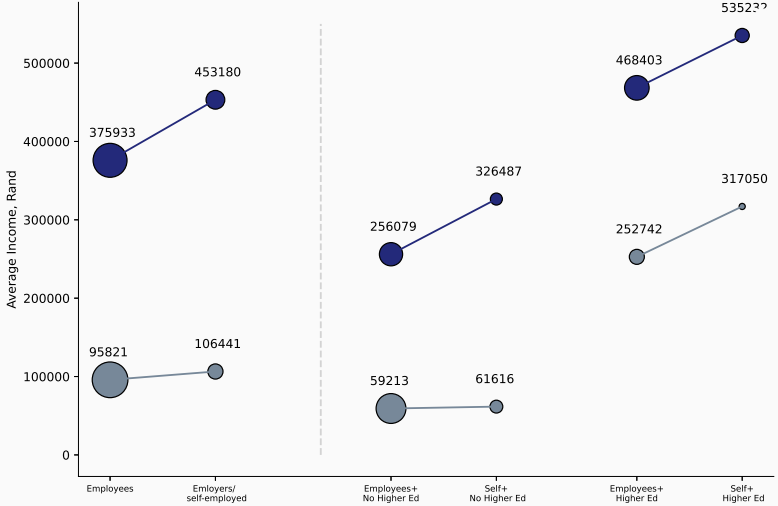
Returns to College are Very High – Particularly for Blacks



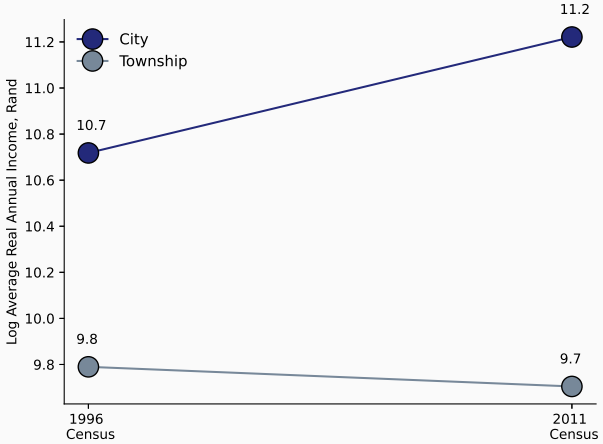
Returns to Entrepreneurship are High – Not for Blacks



Returns to Entrepreneurship are High – Not for ALL Blacks



Income Growth and Level of Education in Townships are Lagging Behind



All Population | Black Townships | Education

Townships are Not only Segmented Residential Markets

- Education: Lower Quality of Schools + No college
- Segmented Labor Markets

	Live in City		Live in Township	
	work	education	work	education
Work/School in City	93.2%	91.5%	72.9%	25.9%
Work/School in Township	6.8%	8.5%	27.1%	74.1%

Extremely high transportation cost – 10% (30-50%) of Income

By education level All facts

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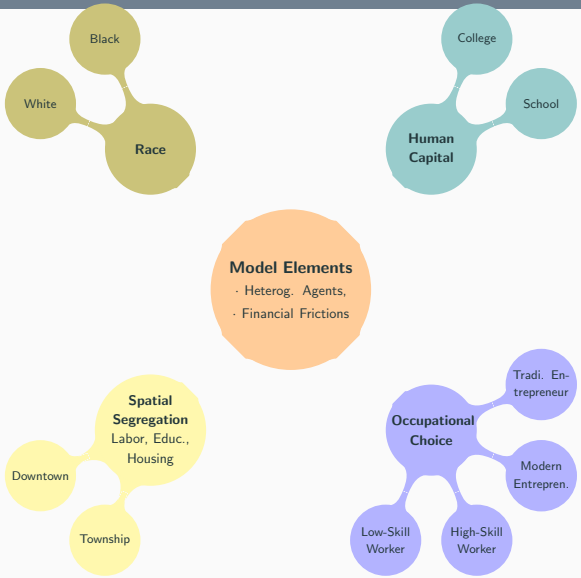
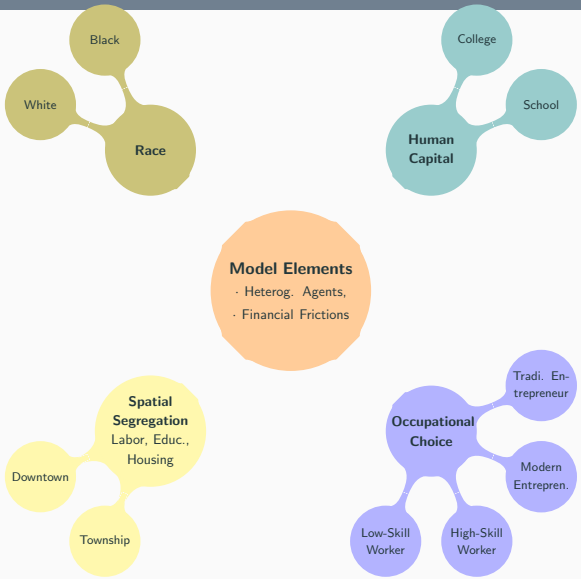
Model Incorporates Spatial, Educational and Occupational Regularities



Model Incorporates Spatial, Educational and Occupational Regularities



- Model features:
  - General Equilibrium (Comp.Eq.)
  - Forward-looking OLG dynasties
  - HH lives for 2 periods (25y: Y&O)
- Household's state:
  1. Race - Black & White Apartheid
  2. Innate talent parent & kid (AR1)
  3. Human capital parent: + education
  4. Assets, $a \geq \underline{a}$

Spatial Component: Two locations – Township, T, and City Downtown, D

- HH chooses EACH period location of a *house, work and kid's school*
- To work or study in location other than the house – transportation cost, τ
- Household consumes one unit of housing in either location at price P_H^l
  - Supply of housing is perfectly elastic in Township (normalize $P_H^T = 0$)
  - Supply of housing is isoelastic in housing price in Downtown, $HS_D = \alpha_H (P_H^D)^{\frac{1}{\gamma_H}}$
- Different school quality + college only in D Details
- Segmented labor markets {LS, HS, TE, ME}×{D, T} Details

HH Problem: Choose Consumption, Savings, Location, Occupation, Education

$$V^{HH}(a, z_p, z_k, h_p) = \max_{\{c_p, c_k, a', h_k, l^{e,o}, l_H, k\}} U^{HH}(c_p, c_k) + \chi \epsilon_{l_H} + \beta \mathbb{E}_{z'_k, \epsilon'_{l_H}} \left[V^{HH}(a', z_k, z'_k, h_k) \right]$$

subject to:

$$U^{HH} = \lambda \frac{c_p^{1-\sigma}}{1-\sigma} + (1-\lambda) \frac{c_k^{1-\sigma}}{1-\sigma}, \qquad \text{(Household utility)}$$

$$c_p + c_k + P_l^H + P_c \mathbb{1}_{e=col} + a' \leq a(1+r) + y_p + y_k - \tau \left(\mathbb{1}_{e \neq H} + \mathbb{1}_{w \neq H} \right), \quad \text{(Bdgt cstr.)}$$

$$k \mathbb{I}_{o=entrep.} + P_c \mathbb{I}_{college} \leq \lambda_k a, \qquad \text{(Collateral constraint Financial Markets)}$$

$$\epsilon_{l_H} \sim \text{Gumbel iid}$$

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Estimation Strategy

1. **Apartheid Steady State: total segregation by definition**
2. Counterfactual SS without Apartheid constraints (race-blind): sorting on assets and education
3. Transition to new SS: model and data
4. Model with distortions: business ''Tax" in Townships and City Amenities
   $\rightarrow$ Model validation: vary τ for diff. Township-City pairs

Estimate Model Starting with Steady State in Apartheid

- Blacks live in Townships, Whites in non-Townships — Location Distribution 1991
- Blacks can't go to college or city school — Education in 1991
- Blacks can't be entrepreneurs — Employment in 1991
- Blacks can't borrow
- Trans. costs $\tau = 0.103 w_L$ (PSLSD, SA '93) — Parameters Calibration

Estimation Strategy

1. Apartheid Steady State: total segregation by definition
2. **Counterfactual SS without Apartheid constraints (race-blind)**:
   sorting on assets and education + income opportunities
   Outcomes
3. Transition to new SS: model and data
4. Model with distortions: business ''Tax" in Townships and City Amenities
   $\rightarrow$ Model validation: vary τ for diff. Township-City pairs

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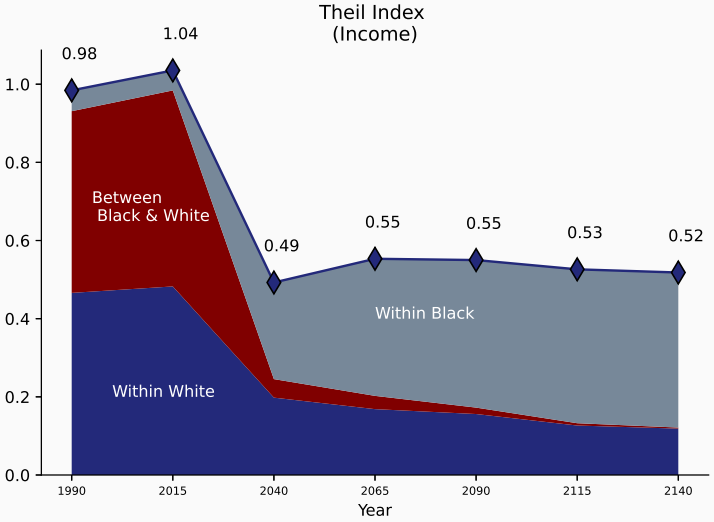
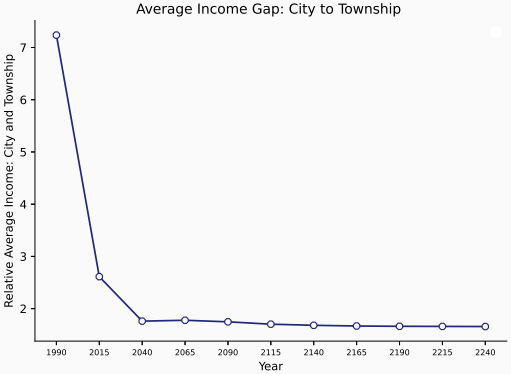
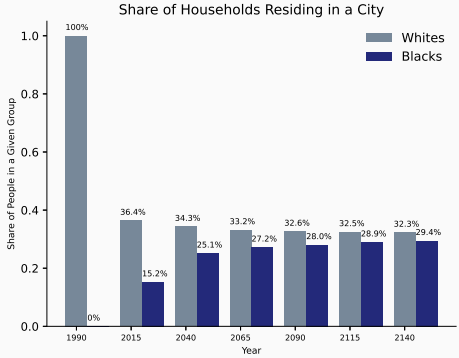
Initial Increase of Inequality => Decline over Transition



But...Model Predicts Higher Mixing and Lower Income Gap Across Locations





First Period Transition: Model and Data

- *Inequality and Race*:
  - Decline in income and wealth gap ✓
  - Higher inequality within Blacks ✓
- *Inequality and Education/Occupation*:
  - Large Income Gap for college and non-college + across races ✓
  - Returns to entrepreneurship ✓, particularly for Whites ✓
- *Inequality and Spatial Sorting*:
  - Decline in income and wealth gap ✗
  - Shrinking of income gap across races conditional on non-Township ✓

Estimation Strategy

1. Apartheid Steady State: total segregation by definition
2. Counterfactual SS without Apartheid constraints (race-blind)
3. Transition to new SS: model and data
4. **Model with location-specific distortions: business "Tax" in Townships and City Amenities**

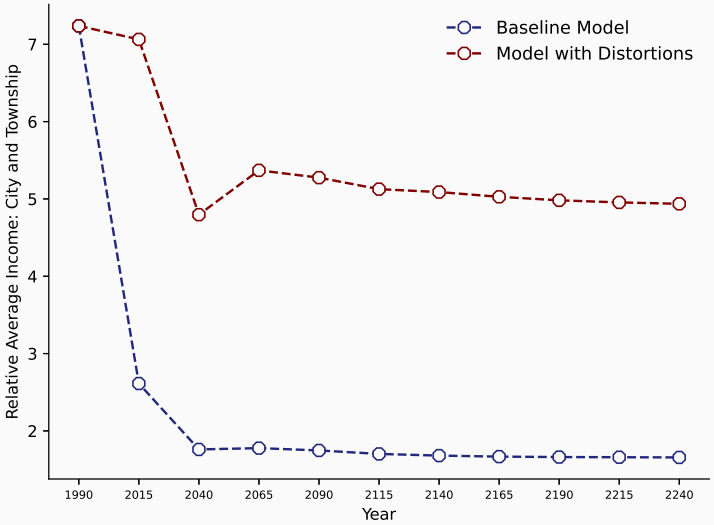
   $\rightarrow$ Model validation: vary τ for diff. Township-City pairs

Model Estimation to Match the Data

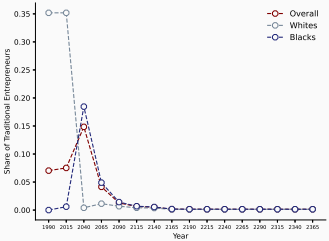
- Residential choices $\Rightarrow$ Amenity in the City (additive) 0.7
  - Match in period 1 share of city residents (35%) & Blacks the in City (25%)
- Business location $\Rightarrow$ Business ''Tax" in Township 14.35%
  - $\tilde{\pi}^T = (1 - \tau^T)\pi^T$
  - Can represent criminality, infrastructure, non-tradables...
  - Match share of commuters to the City for work (72.9%)

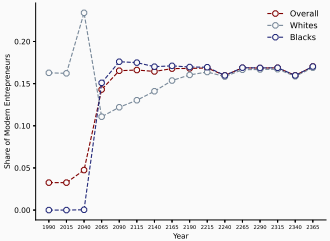
Model Validation

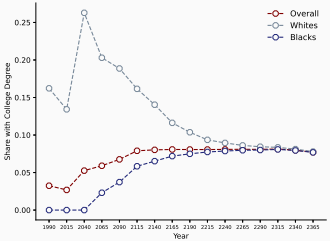
Slower Transition and Persistent Income Gap between Township & City



Path to Higher Income for Blacks is Slower







Typical path: Trad Entrep. $\Rightarrow$ College/Modern Entrep. $\Rightarrow$ HS Labor/Modern Entrep

Other Outcomes

Concluding Remarks: H.O.P.E. Brings Some Hope

We are STILL in the transition to a new *lower-inequality* steady state

- Baseline model predicts patterns in inequality across most of dimensions
  - Inequality and Race ✓
  - Inequality and Education ✓
  - Inequality and Occupation ✓
  - Inequality across Space ✗
- Extended model suggests slower transition (incl. Blacks) and more persistent gap

  Comparison
  - Place-based policies

South Africa: Context

- Starting from 1948 the system of legislation that enforced racial segregation, political and economic discrimination was implemented [Apartheid]
- Apartheid is the period of white supremacy:
  - More than 80 percent of the country's land for white minority
  - Black South Africans were forcibly reallocated to areas separated from white
  - Most social contracts between the races were forbidden
  - Separate educational standards, restrictions for each race to certain types of jobs and access to credit
- A new constitution that enfranchised blacks and other racial groups was adopted in 1993 and took effect in 1994

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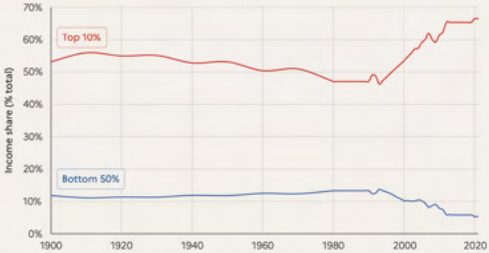
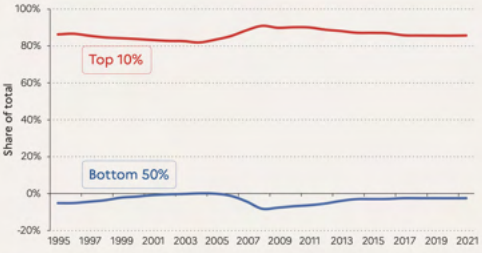
Income and Wealth Inequality in South Africa

Top 10% and bottom 50% Income Shares



Interpretation: *The Top 10% income share is equal to 67% in 2021. Income is measured after the operation of pensions and unemployment insurance systems and before income tax.*
Sources and series: *see wir2022.wid.world/methodology, and Chancel and Piketty (2021).*

Wealth Distribution



Interpretation: *In 2021, the wealthiest 10% of the population own 87% of total household wealth. Household wealth is the sum of all financial assets (e.g. stock, bonds) and non-financial assets (e.g. housing), net of debts.*
Sources and series: *wir2022.wid.world/methodology.*

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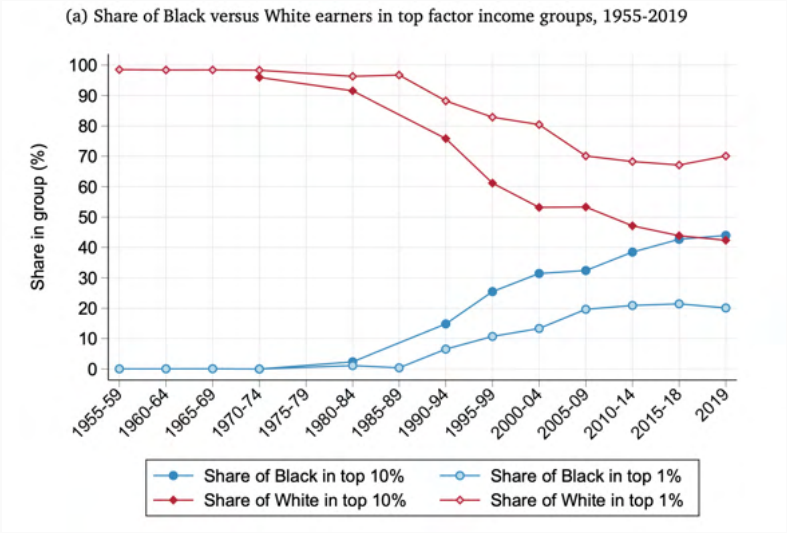
Inequality Across Racial Groups Declined



Source: Chatterjee et. al. ('23)

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Spatial Segregation: Townships

- Township – non-white neighborhoods, a core spatial concept of Apartheid
- Located on city peripheries, separated by natural/artificial buffer zone [26km]
- $\approx$ slums: slightly better amenities, more distant from urban economic centers
- Job search and other forms of economic integration very expensive
- Schools' quality is lower
- During Apartheid entrepreneurship was forbidden for most parts
- Banking sector mostly for transaction rather than for business expansion

Back

Contributions

- Spatial segregation, sorting and inequality
  - **Structural:** *Benabou ('93); Durlauf ('96); Fernandez and Rogerson ('98); Monte et al. ('18); Cavalcanti et al. ('18); Lee and Lin ('18); Monge-Naranjo et al. ('18); Rivera-Padilla ('21); Eckert and Kleineberg ('21); Bilal and Rossi-Hansberg ('21); Hsiao ('22); Fogli et al. ('25)*
  - **Empirical:** *Chetty et al. (16); Chetty and Hendren ('18); Chyn and Katz ('21)*
- Integrate spatial segmentation into a macro-developments model
  - *Becker and Tomes ('94); Buera et al. ('11); Buera et al. ('13); Moll ('14); Castro and Sevchik ('16); Mestieri et al. ('17), Hsieh et al. ('19)*
- Racial Inequality
  - *Gregory et al. ('23); Ashman and Neumuller('20); Derenoncourt ('22); Derenoncourt et al.('23); Boerma and Karabarbounis ('23)*
- Role of historical institution on modern outcomes
  - *Shertzer et al. ('16); Dell et al. ('18); Faber ('21); Heblich et al. ('21), Albright et al. ('21)*

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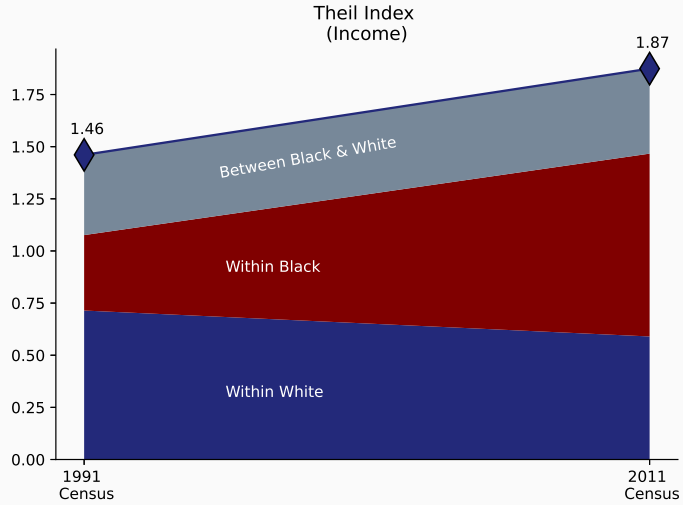
Theil Index: Average for all Population



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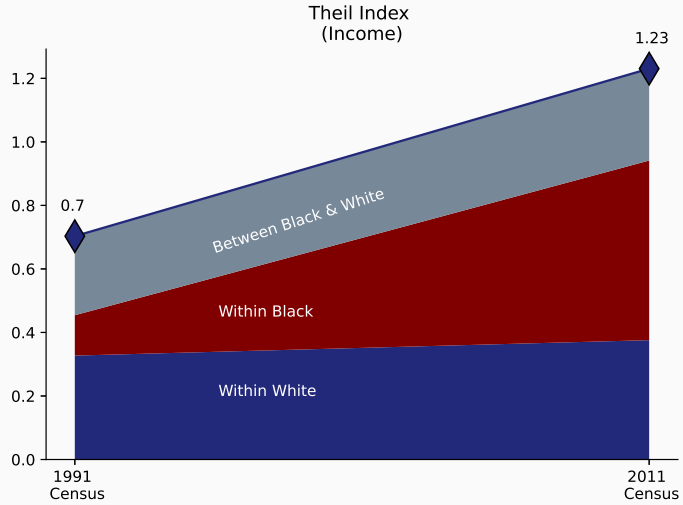
Theil Index: Only with Positive Income



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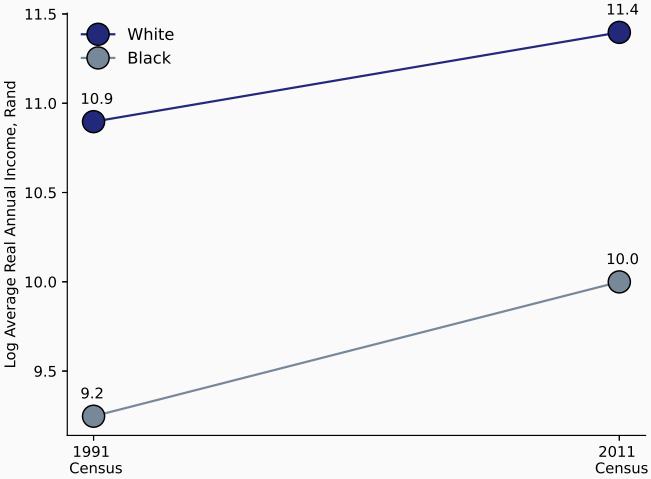
Narrowed Income Gap Between Employed Blacks and Whites



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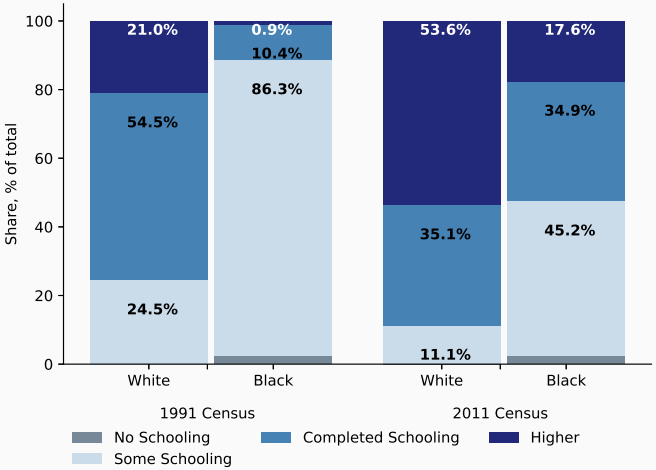
Narrowed Education Gap Between Blacks and Whites



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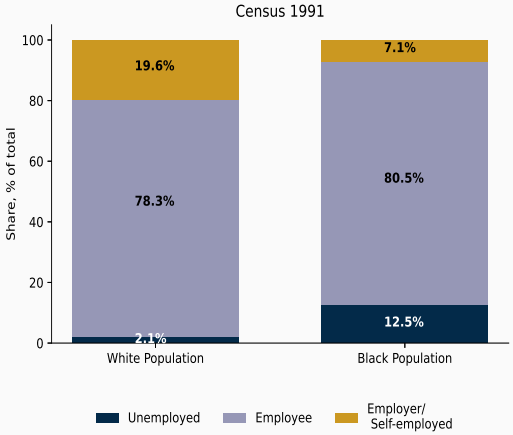
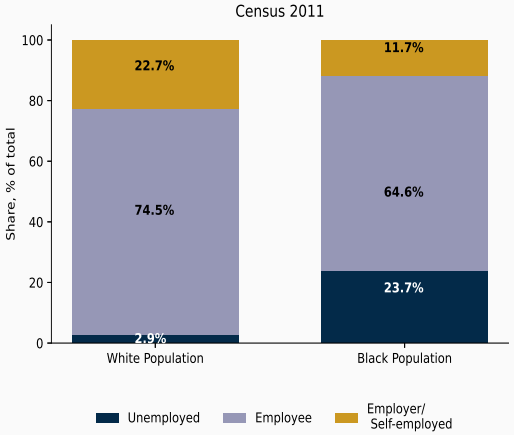
Growth of Entrepreneurship Among Blacks





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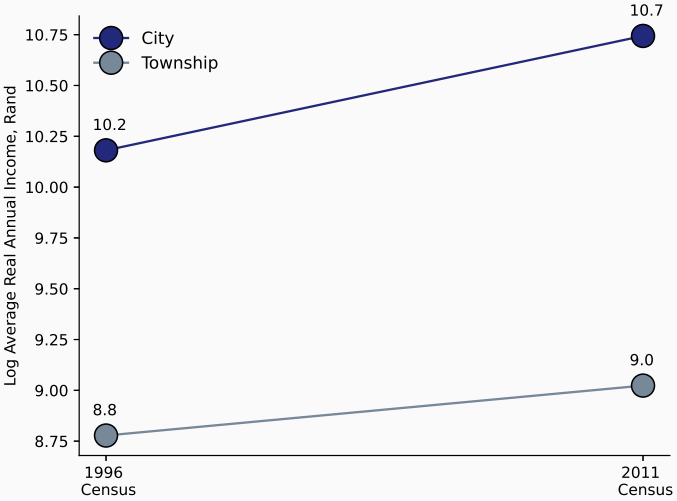
Income Growth is Lagging Behind in Townships



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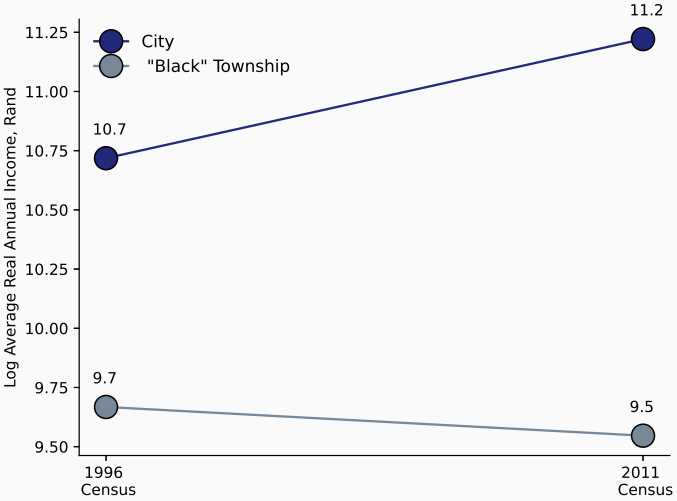
Income Growth is Lagging Behind in Townships...Especially in Black Ones



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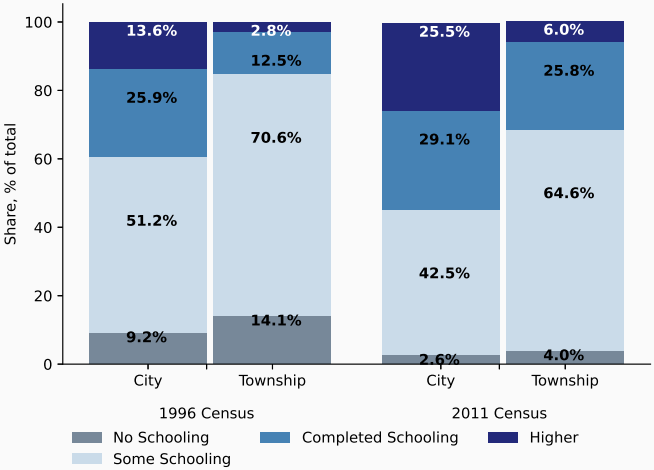
Townships: ⇑ School, Little Higher, Low Quality (stud/teach ⇒ 28.5 vs 34.3)



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Share of Individuals by Location of Home and Education Place

	Live in City		Live in Township	
	school	college	school	college
Education in City	89.9%	97.1%	18.2%	85.1%
Education in Township	10.1%	2.9%	81.8%	14.9%

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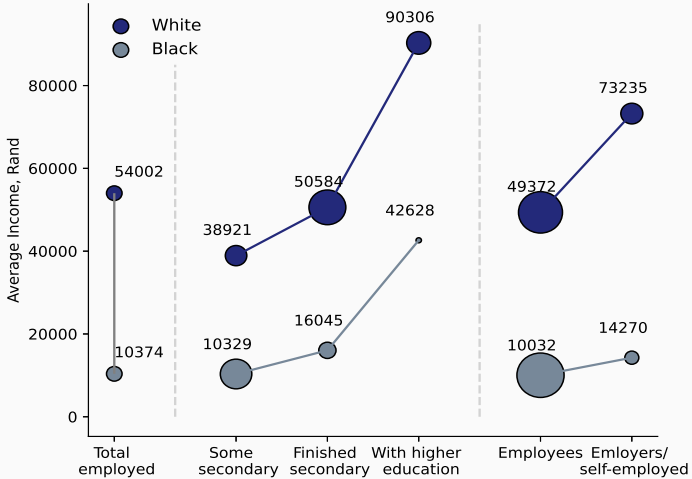
Inequality in South Africa: Stylized Facts

- *Race & Inequality:* Black-White Income and Education Gap ⇓ Income '91 Income '11
- *Education & Inequality:* Large College Premium ⇒ driver of Inequality
- *Occupation & Inequality:* Large Premium to Entrepreneurship, but NOT for low-skilled Blacks (other frictions) Income by category '11
- *Spatial Sorting & Inequality:* Segmented Labor (No jobs, low-skilled jobs) & Education Markets (low quality in Townships) Work/Home Location
  - Spatial segregation as a result of Apartheid policies Historical Allocation Historical Racial Distr.
  - Heterogeneity in distance from a Township to the City: longer distance ⇒ worse economic outcomes Results

back

Six-fold Black-White Income Gap in Apartheid South Africa (1991 Census)



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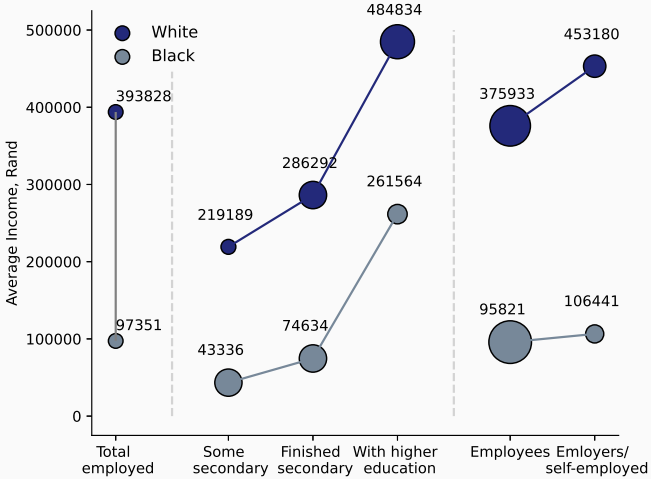
Average Individual Income: 2011 Census



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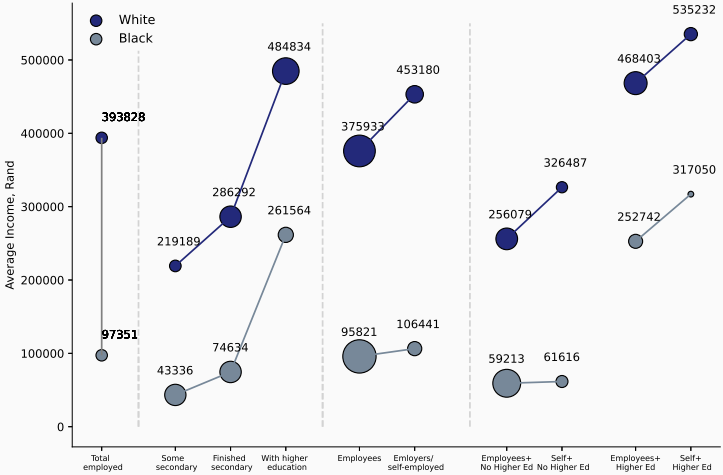
Average Individual Income by Employment and Education, 2011 Census



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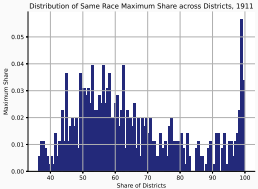
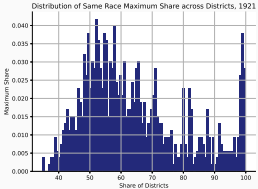
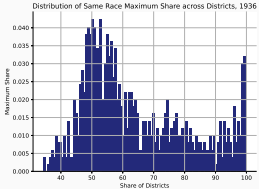
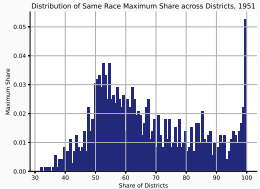
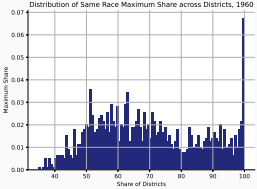
Historical Race Distribution Across Districts: 1911 – 1991

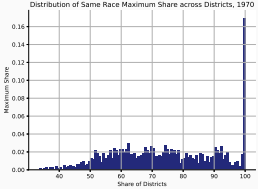


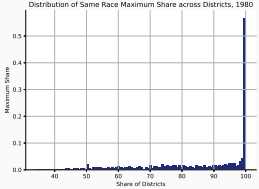


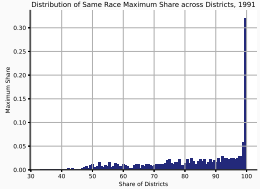












Same MD Districts back

Apartheid Allocated Blacks to Townships Based on Ethnolinguistic Groups

- Apartheid created townships to segregate blacks away from city centers
- Allocation of blacks to townships was based on ethnolinguistic groups
  - $\Rightarrow$ allocation is orthogonal to economic forces
  - 1991 Census: EA are mostly language homogenous
- Townships separated by natural/artificial buffer zone
- Allocation $\sim$ natural experiment to identify effect of distance to city center
  - In 2011 $>$ 50% of Townships have one predominant language (70%)
  - Movement across townships is limited: migration to city 2X migration to townships
  - Control by distance to closest city besides CBD $\sim$ control mov't across townships

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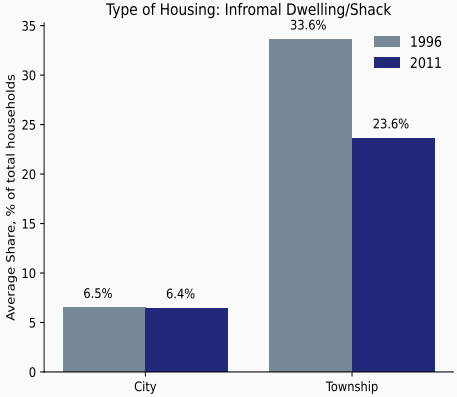
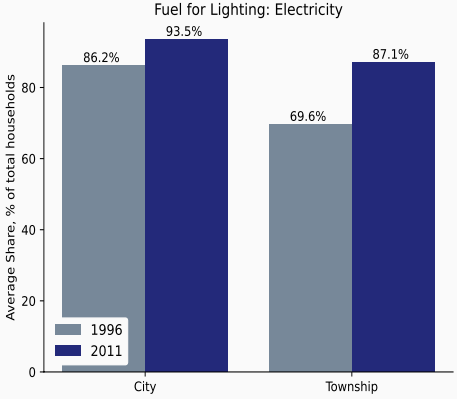
Township Outcomes Using Individual Data from Cape Town

	Education				HH Assets		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Distance to Cape Town	-0.19	-0.20	-0.14	-0.13	-0.15	-0.11	-0.09
	(0.03)	(0.03)	(0.03)	(0.02)	(0.04)	(0.04)	(0.03)
Individual Controls	–	✓	✓	✓	✓	✓	✓
Dist. Near City to CT	–	–	✓	✓	–	✓	✓
Black Dummy	–	–	–	✓	–	–	✓
Observations	7,725	7,649	7,649	7,649	7,706	7,706	7,706

Notes: Individual Controls are age, gender, household size, number of adults in the household, number of employed. Std. err. clustered at enumeration area. Variables have been standardized to mean zero and std. dev. of one. Unnormalized std. dev.: Dist. to CT 11.7 Km, Education, 1.14, Assets, 1.19.

Townships: Lower Cost of Housing & Worse Amenities





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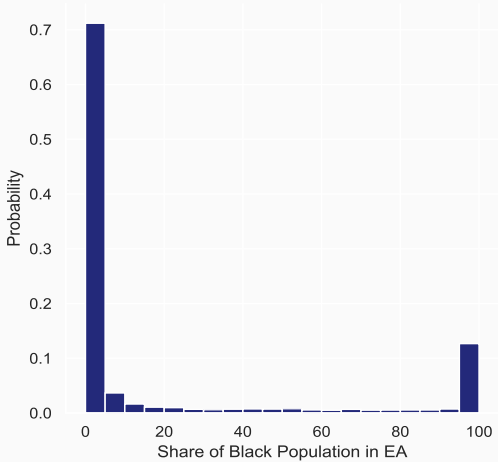
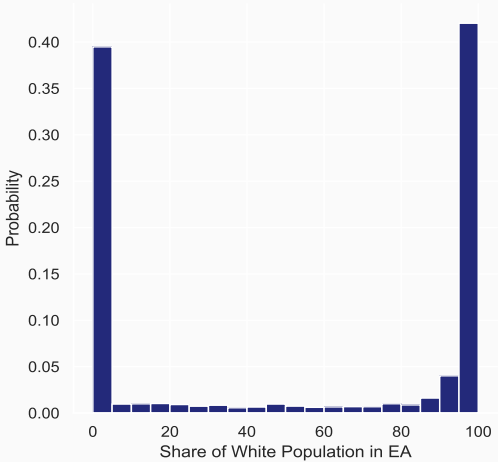
Distribution of Individuals Across EAs by Population Groups: 1991





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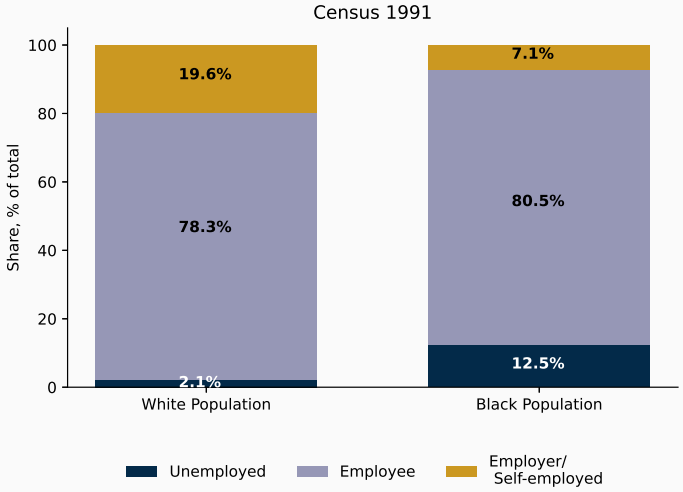
Adults by Employment Status: 1991



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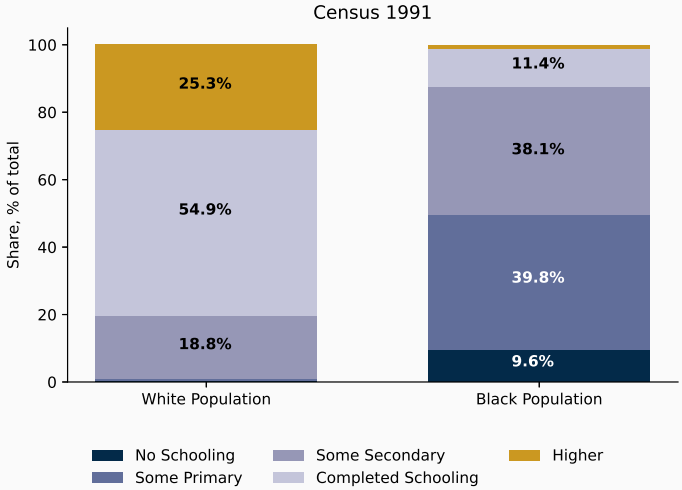
Adults by Highest Level of Education: 1991



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Educational Choice for the Kid: School and College

- Decide on the level (S, C) and location of school (T, D): $\{ST, CT, SC, CC\}$
- Human capital: talent + education

$$h_k = \begin{cases} z_k(\underline{h} + h_D \mathbb{1}_{\{l^s = D\}}), & \text{if school} \\ \eta h^{school}, & \text{if college} \end{cases}$$

- School free, ! opportunity cost $(y_k = n_k \cdot w_L^{l^h})$ + transportation cost, τ, $\mathbb{I}_{\{l^s \neq l^h\}}$
- College is only in the city + the fee P_c + transportation cost, τ, $\mathbb{I}_{\{l^h = T\}}$

back

Occupational Choice and Segmented Labor Markets

- There are four possible occupations in each location:
  1. Low-skilled Workers
  2. High-skilled Workers (requires college degree)
  3. Traditional Entrepreneurs, $y_T(\theta) = zA_e k(\theta)^{\alpha_T} l_L(\theta)^{\gamma_T}$
  4. Modern Entrepreneurs,
     $y_M(\theta) = hA_e k(\theta)^{\alpha_M} \left(l_H(\theta)^{\omega} l_L(\theta)^{1-\omega}\right)^{\gamma_M}$, with $\alpha_M > \alpha_T$
- Segmented labor markets for Township and non-Township areas
- Wage depends on the level of human capital and location ($w = h \cdot w_S^{l^w}$)
- Entrepreneurs choose technology and location

Data on Entrepreneurs

- Youth out of school is employed as Low-skilled workers where reside

Labour Force Survey, Q2 2011

- 1/3 of Black Adults Employed in Informal Sector (only 6.5% among Whites)
- 13% of Black are self-employed or own a business (vs. 18% for Whites)
- Black entrepreneurs: 71.5% are self-employed, 3.9% own a firm with > 10 empl.
- White entrepreneurs: 34.3% are self-employed, 20.9% own a firm with > 10 empl.
- Most owners of larger firms are highly educated

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Financial Markets

- No state contingent bonds (kid productivity) and financial wealth is non-negative.
- Financial intermediary receives deposits and makes within-period loans to finance capital/education,
  - r lending rate for schooling,
  - $r(1+\delta)$ lending rate in the production market where δ is the depreciation rate.
- Collateral constraint,

$$k\mathbb{I}_{o=entrep.} + P_c\mathbb{I}_{college} \leq \lambda_k a.$$

Back

Model's Calibration Combines estimates from HH data and Target Moments

Moments			Model Parameters		
Description	Target	Model	Var.	Value	Description
Ratio Income College/School	1.9	1.9	η	1.035	Return to College
Share of College Educated	4.8%	3.3%	P_c	0.69	Price of College
Ratio Income Entr./Worker	1.5	1.9	A_e	2.01	Entrep. productivity
Share of Low-Skilled Entrepreneurs	3.1%	7.2%	σ_ε	0.32	Variance of a Talent
Share of High-skilled Entrepreneurs	1.5%	3.2%	$\underline{h}$	1.42	Returns to Talent
Ratio Income School White/Black	5.1	6.0	h^{NT}	0.61	School quality diff.

Notes: Statistics computed from household heads in 1991 South Africa Census (Whites Only!)

- Estimated outside of the model:
  - Trans. costs $\tau = 0.103 w_L$ (PSLSD, SA '93); $\lambda_k = 1.87$, $r = 2.5\%$ (WB)
  - Production function Parameter Values

+ Off-the-shelf from lit.: $\sigma = 1.5,\ \lambda = 0.7,\ \rho = 0.47,\ \delta = 6\%,\ \beta = 0.96,\ \gamma_h = 0.5,\ \kappa = 0.12$

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Externally Calibrated Parameters

Param.	Value	Description	Source
σ	1.5	Coeff. Relative Risk Av.	[?]
λ	0.7	Household Pareto Weight	[?]
ρ	0.47	Talent Persistence	[?]
δ	0.06	Yearly Depreciation	[?]
γ_h	0.5	Housing supply inverse elasticity	[?]
γ_T	0.41	Labor Share Trad Tech	[?]
α_T	0.20	Capital Share Trad Tech	[?]
γ_M	0.41	Labor Share Modern Tech	[?]
α_M	0.30	Capital Share Modern Tech	US estimates
ω	0.65	Low-skill Share in Mod. Wage Bill	[?]

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Race-Blind Equilibrium: Poor & Less Educated Live in Township

- Sorting on education and wealth + income opportunities
  - Average income, wealth, education in City is *higher*

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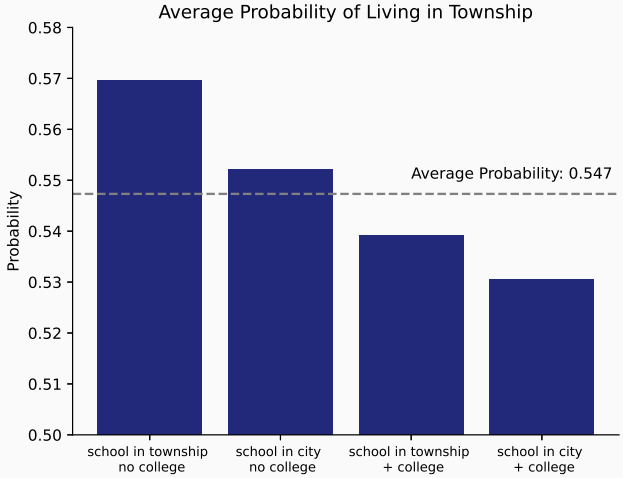
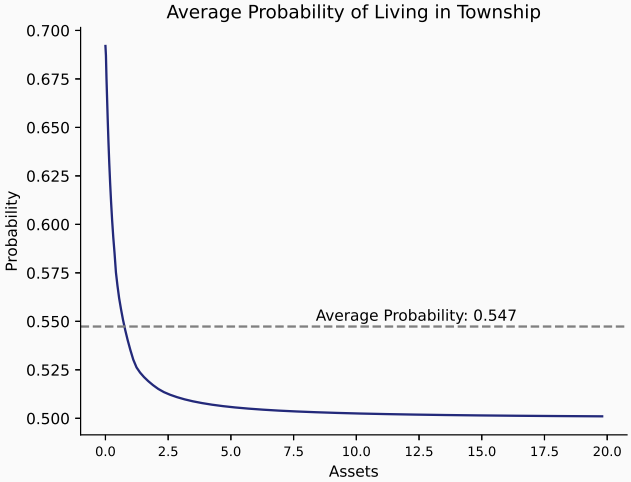
Location Choice Based on Education



Location Choice Based on Wealth



Race-Blind Equilibrium: Poor & Less Educated Live in Township

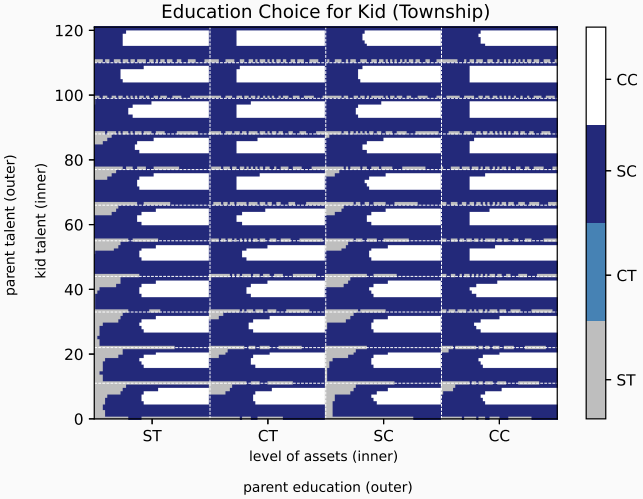
- Sorting on education and wealth + income opportunities
  - Average income, wealth, education in City is *higher*
- SS $\simeq$ two *disintegrated & similar* locations
- More traditional entrepreneurship in Township (advantage of cheap LS labor)
- More productive traditional entrepreneurs in Township
- More productive modern entrepreneurs in City (advantage of HS labor)
- As $\tau \Uparrow$ both locations are worse off in terms of wealth and human capital

All Outcomes

Model Predictions: Household's Choices

- **Kid's Education**: Rich, college educated, productive => college/city school (income + opportunity cost + financial constraint + τ + human/physical capital)
- **Work/School Location:** Home location => school location (τ) + availability of jobs & income + wealth + talent => work loc.
- **Location:** Rich & Educated => city + in GE labor opportunities/income (salary/profit) vs transportation cost/ housing price
- **Occupation:**
  - School only: LS labor or entrepreneurship (wealth, productivity/human capital)
  - College: HS labor or *modern entrepreneurship* (in GE some trad. entrep.)
- Plots: Kid's Education, Occupational Choice, Home Location, Assets

Household Policy Function: Education of Kid for Township Residents



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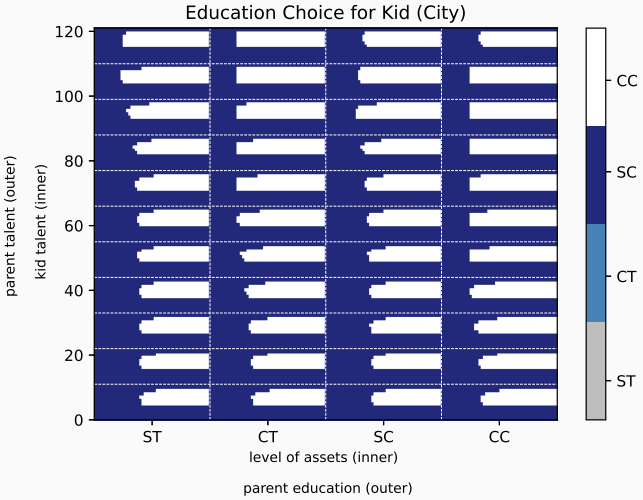
Household Policy Function: Education of Kid for City Residents



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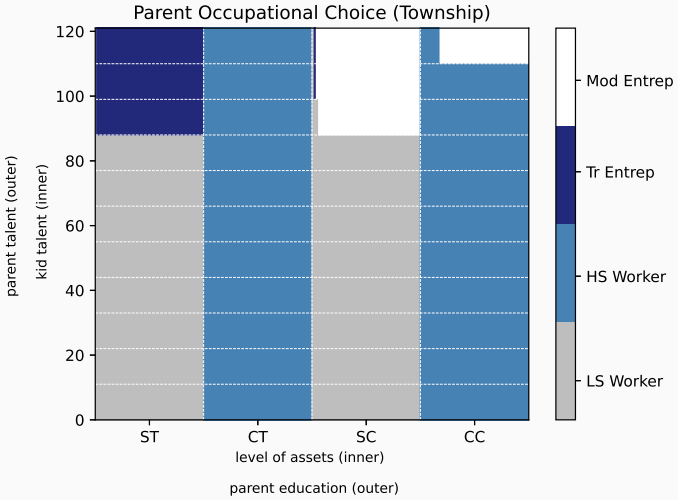
Household Policy Function: Occupational Choice



Note: Policy function for City residents is similar

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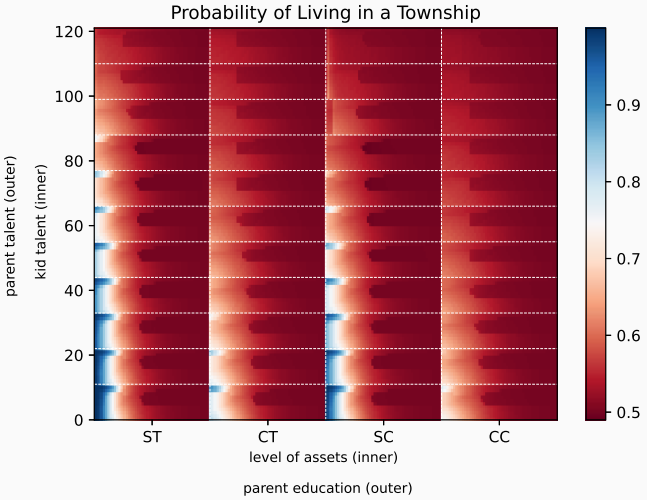
Household Policy Function: Home Location



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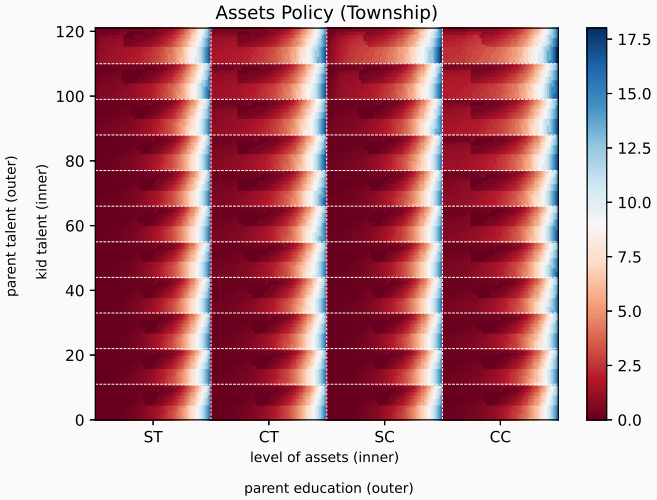
Household Policy Function: Assets



Note: Policy function for City residents is similar

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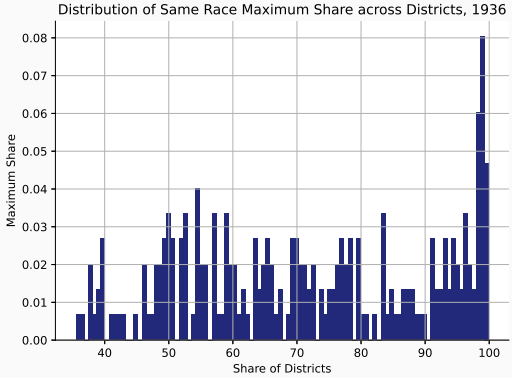
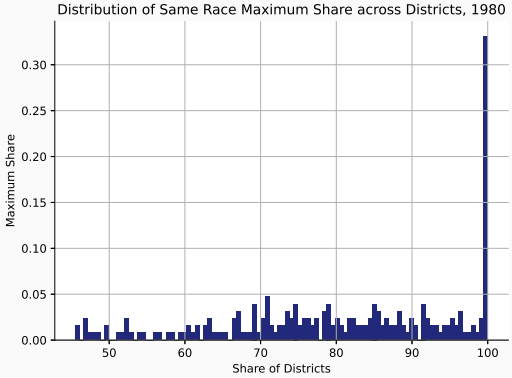
Historical Race Distribution Across Districts: Same Districts 1936 & 1980





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Model Predictions and Data: Household's Choices

- **Location:** Rich & Educated => city + in GE labor opportunities/income (salary/profit) vs transportation cost/ housing price
- **Work/School Location:** Home location => school location (τ) + availability of jobs & income + wealth + talent => work loc.

	Live in City		Live in Township	
	school	college	school	college
Commute to City	89.9%	97.1%	18.2%	85.1%
Commute to Township	10.1%	2.9%	81.8%	14.9%

Model Predictions and Data: Household's Choices

- **Kid's Education**: Rich, college educated, productive => college/city school (income + opportunity cost + financial constraint + τ + human/physical capital)

	(1)	(2)	(3)	(4)
Distance Cape Town	-0.75	-0.59	-0.29	-0.36
	(0.12)	(0.11)	(0.08)	(0.011)
Dist. Cape Town $\times$ $\mathbb{1}_{\text{Township}}$	-0.053	-0.069	-0.071	-0.058
	(0.022)	(0.020)	(0.016)	(0.018)
Household Assets			0.31	0.33
			(0.010)	(0.014)
Household Income				0.018
				(0.011)
Individual Controls	–	✓	✓	✓
Observations	28,815	24,065	24,065	15,366

Notes: Individual Controls are age, gender, household size, number of adults in the household, number of employed. Std. err. clustered at enumeration area. Variables have been standardized to mean zero and std. dev. one.

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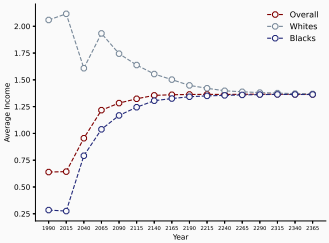
Model Validation: Varying Transportation Costs

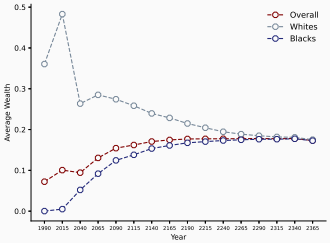
	Education		HH Income	
	(1)	(2)	(3)	(4)
Distance to City	-2.722	-2.109	-0.131	-0.124
	(1.047)	(0.931)	(0.052)	(0.066)
Major City FE		✓		✓
Observations	148	148	148	148

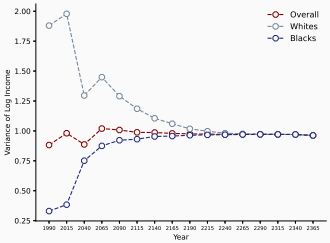
Notes: Columns (1), (2) use the change in share of individuals with completed secondary and higher education. Columns (3), (4) use the change in average HH income and control for change in average education level.Distance to city is a dummy for townships with higher than median distance to the city (similar for absolute distance). St. errors (in parenthesis) are clustered at MN level.

Same for individuals residing in closer Townships: assets/income, education Results back

Path to Higher Income for Blacks is Slower







Typical path: Trad Entrep. $\Rightarrow$ College/Modern Entrep. $\Rightarrow$ HS Labor/Modern Entrep

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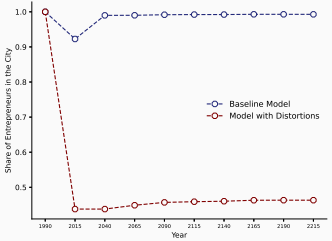
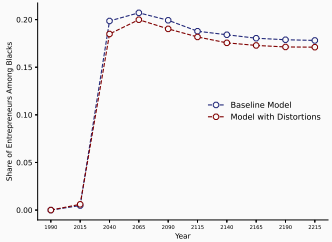
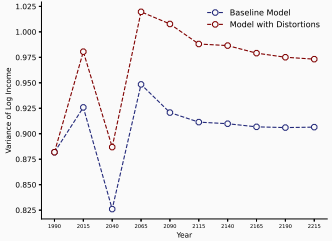
Path to Higher Income for Blacks is Slower







Typical path: Trad Entrep. $\Rightarrow$ College/Modern Entrep. $\Rightarrow$ HS Labor/Modern Entrep

back