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Occupational Segregation by Race in South Africa after the Apartheid

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Summary

- **Aim:**

To investigate if any substantial progress was achieved after the end of the apartheid in the high level of racial stratification of occupations in South Africa, the legacy of a political and social regime constructed on the basis of racial inequality.

- **Empirical analysis:**

Using census microdata and labor force surveys.

- **Main result:**

No strong evidence of a sustained or significant de-segregation or de-stratification of occupations.

Occupational segregation

(Jahn, Schmid and Schrag, 1947; Duncan and Duncan, 1955)

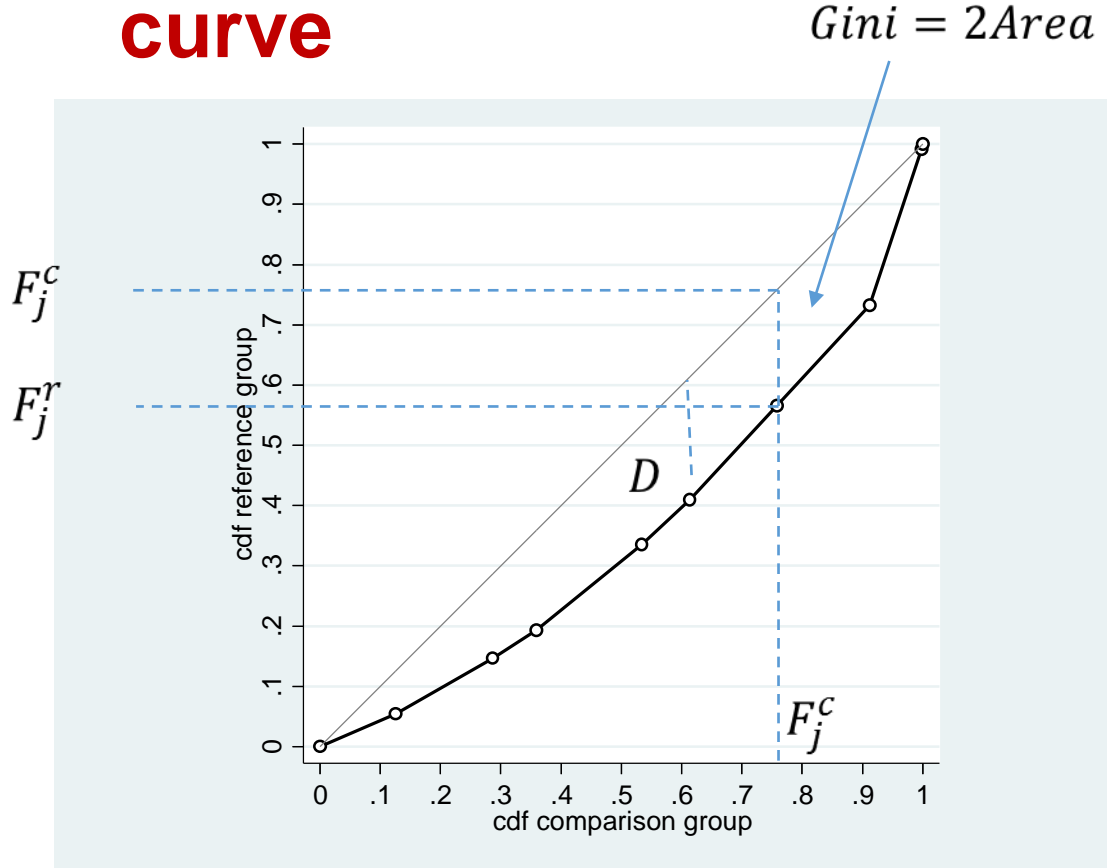
- **Population** of N **workers** from two groups: the **comparison (Africans)** and the **reference (whites)**, each with total size N^i , ($i = c, r$).
- Distributed across J **occupations**: n_j^i workers of group i in occupation j , occupations sorted in ascending values of the groups' ratio n_j^r/n_j^c $n^i = n_1^i, \dots, n_j^i$

$f_j^i = n_j^i/N^i$ is the proportion of group i in occupation j .

$F_j^i = \sum_{s=1}^j f_s^i$ is the cdf of group i in occupation j .

- Extent to which the employment distributions of these two groups differ from each other.
 - i.e. each group tends to be concentrated in a different subset of occupations.

Segregation curve



Segregation indices $S(f^c, f^r)$

Dissimilarity:

$$D(f^c, f^r) = \frac{1}{2} \sum_{j=1}^T |f_j^c - f_j^r| = \max_{j \in [1, T]} \{F_j^c - F_j^r\}.$$

Gini:

$$Gini(f^c, f^r) = 2 \sum_{j=1}^T (\hat{F}_j^c - \hat{F}_j^r) f_j^c;$$

$$\text{where } \hat{F}_j^i = \frac{1}{2}(F_{j-1}^i + F_j^i) = F_{j-1}^i + \frac{1}{2}f_j^i$$

Segregation into low-paying occupations

(Gradín, 2016)

- Extent to which one population group is systematically confined into low-paying, low-skilled, or less prestigious occupations.
- **Re-rank occupations** by increasing w_j (average or median wage).
 - Relative frequency g_j^i and cdf G_j^i .
- Group c is **segregated into low-paying occupations** compared with group r if
 - For any low-wage threshold z , there is a larger proportion of workers from c working in low-paying occupations: $G^c(z) \geq G^r(z), \forall z \in [0, \bar{z}]$.

By replacing F and f by G and g

Low-paying segregation curve (concentration curve)

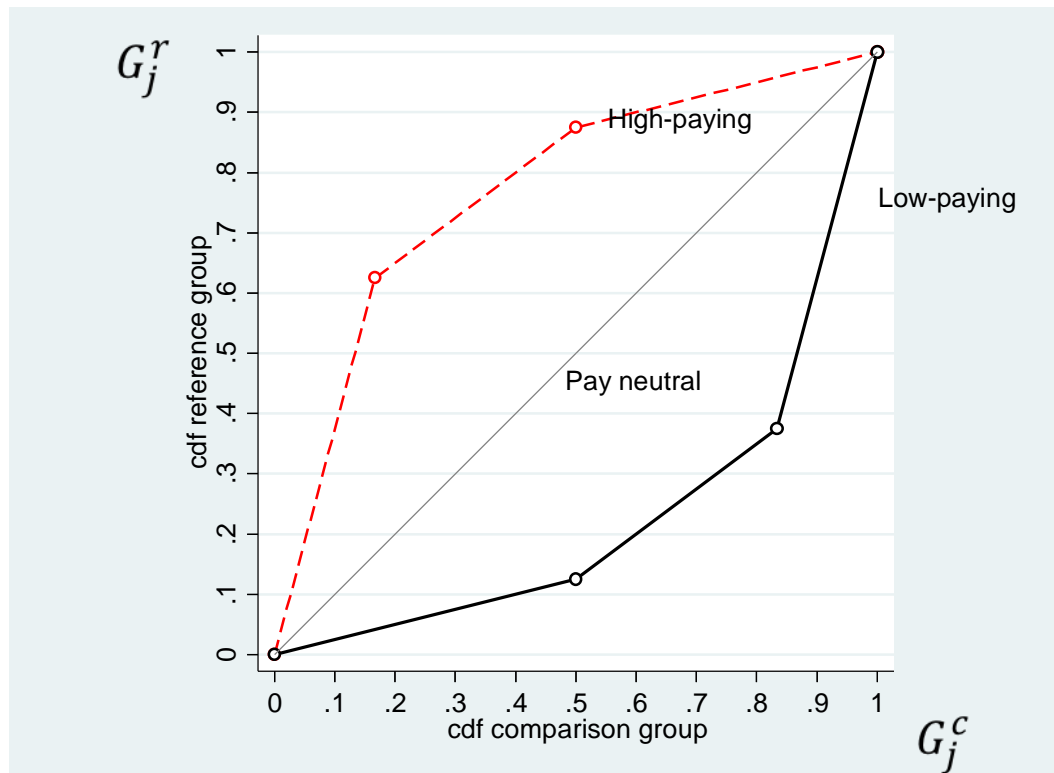
Low-paying segregation indices, $S(g^c, g^r)$

Dissimilarity and Gini

$$-S(f^c, f^r) \leq S(g^c, g^r) \leq S(f^c, f^r)$$

Ratio

$$r_S = \frac{S(g^c, g^r)}{S(f^c, f^r)}, \quad 0 \leq r_S \leq 1$$



Segregation conditional on workers' characteristics

- **Aggregate decomposition** of (low-pay) Segregation into explained and unexplained terms (based on DiNardo et al., 1996 and Gradín, 2014).

$$S(f^c, f^r) = \underbrace{[S(f^c, f^r) - S(f^{\gamma c}, f^r)]}_{\text{Explained } S^E} + \underbrace{S(f^{\gamma c}, f^r)}_{\text{Unexplained } S^U}.$$

- $f^{\gamma c}$: **Counterfactual** with observations of c reweighted (propensity score) so as to have the same distribution of characteristics (X) of r .
- **Detailed decomposition (explained term)** using Shapley.

Segregation in South Africa

Previous literature

- Extent and decomposition (explained/unexplained) of racial differentials in **labor market outcomes**:
 - **Employment**: eg. Kingdon and Knight (2004), Rospabé (2002), Brookes and Hinks (2004).
 - **Occupations**:
 - Some research on **occupational attainment**: e.g. Treiman et al. (1996), Rospabé (2002), Treiman (2007), Keswell et al. (2013).
 - But not on **occupational segregation**: Exceptions are Campbell (1987) and Parashar (2008).
 - **Earnings**: e.g. Allanson et al. (2000, 2002), Keswell (2010), Rospabé (2002).

Data

- **Census:** 1996 and 2001 Census, and 2007 Community Survey from **IPUMS-I** (MPC, U. Minnesota)
 - The 1996 Census was the first one covering the entire country and treating all populations groups equally (e.g. StatsSA, 2007).
 - The 2011 Census did not code the information about occupation.
 - **Sample:** white and black African workers (16-65) employed (not in the Armed Forces).
 - **Occupations:** 1, 2 and 3-digit IPUMS-I modified version of ISCO-1988.
 - **Average income:** midpoint of original income intervals
 - **Other workers' characteristics:** province, area of residence, marital status, sex, age, household head/spouse status, disability, attained education, immigration.
- **Labor force surveys:** South Africa - Post Apartheid Labour Market Series (**PALMS**, DataFirst-UCT) 1994-2012, combining different StatsSA surveys.

Figure 2. White-African segregation indices

Figure 1. White-African segregation curves

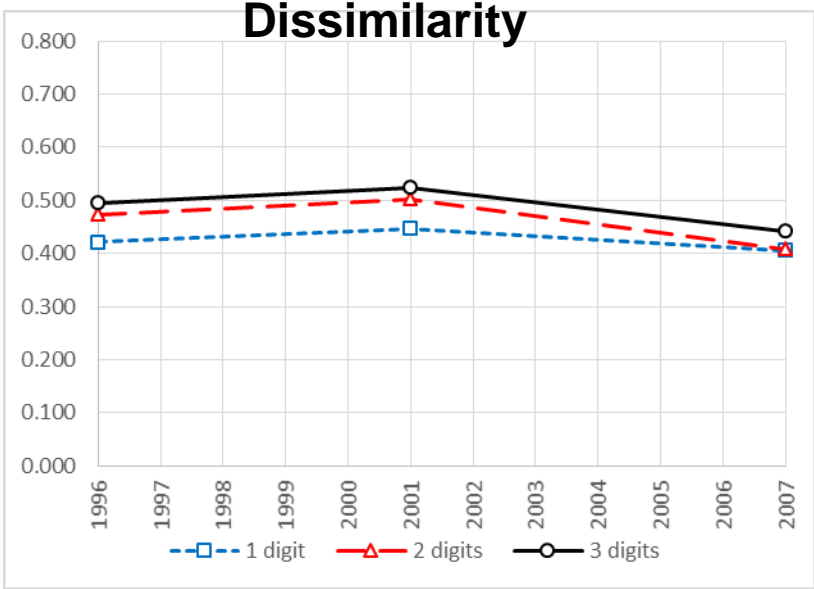
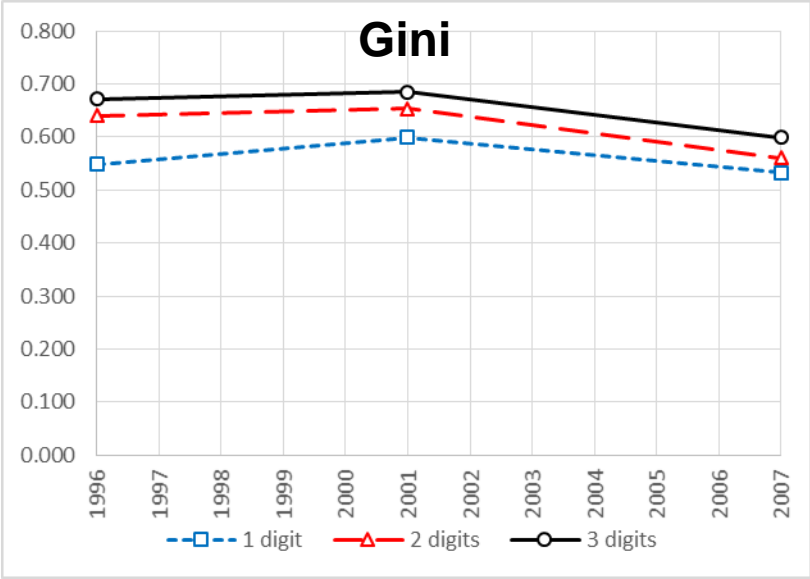
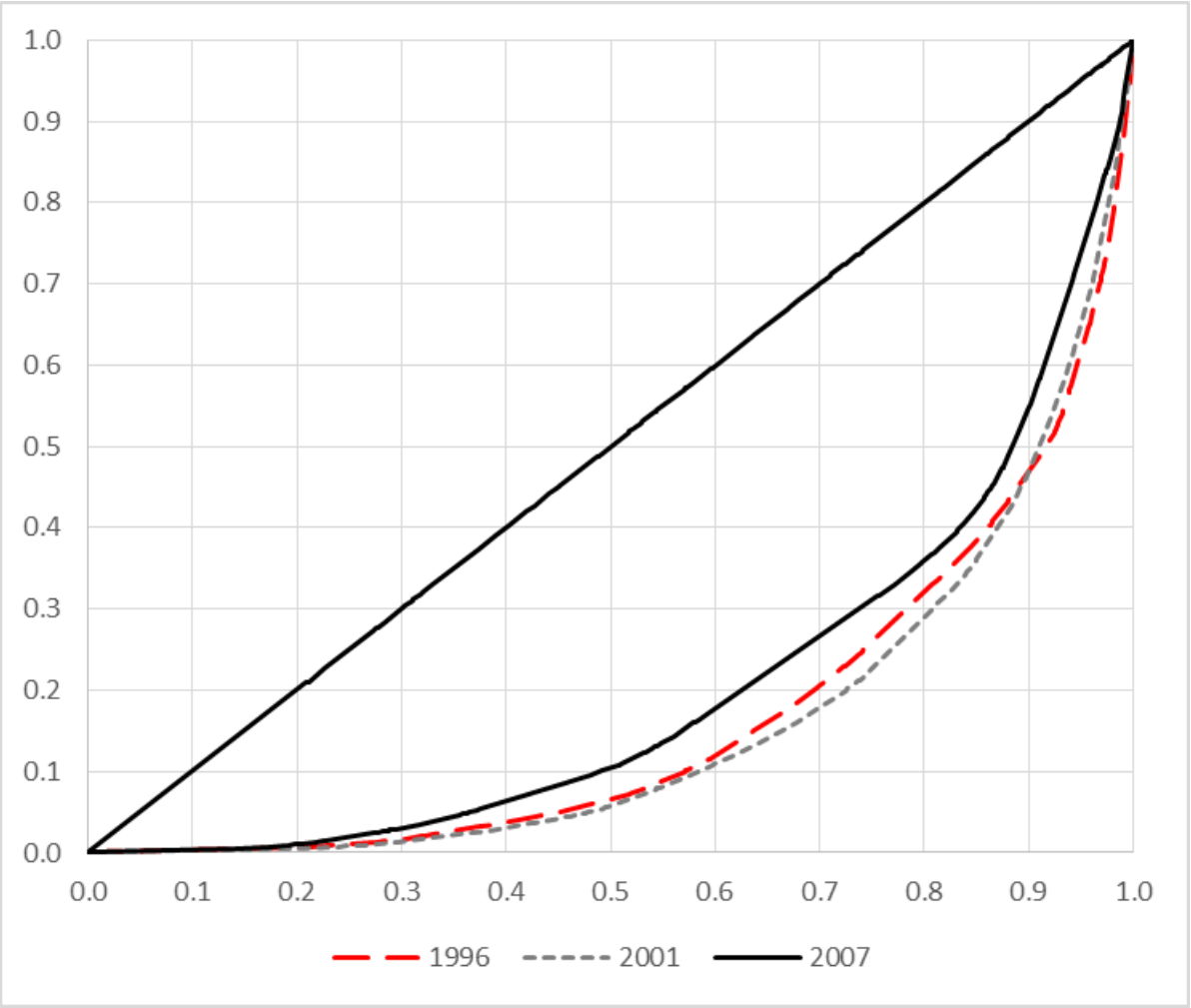
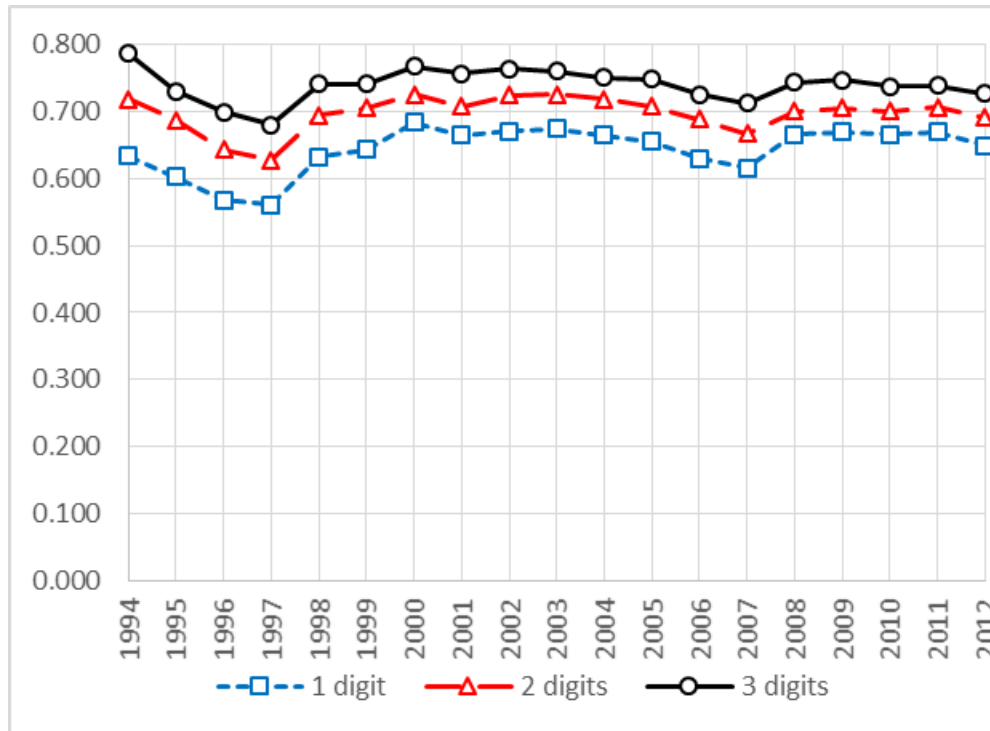


Figure 2. White-African segregation indices

c. LFS: Gini



d. LFS: Dissimilarity

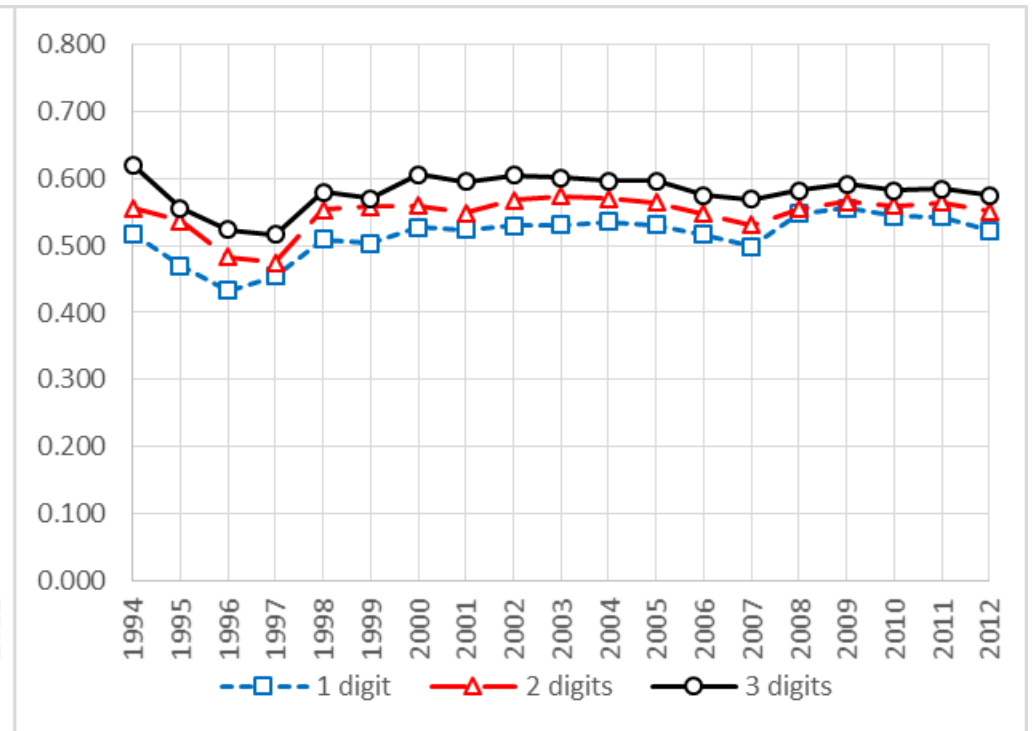


Figure 3. White-African concentration curves

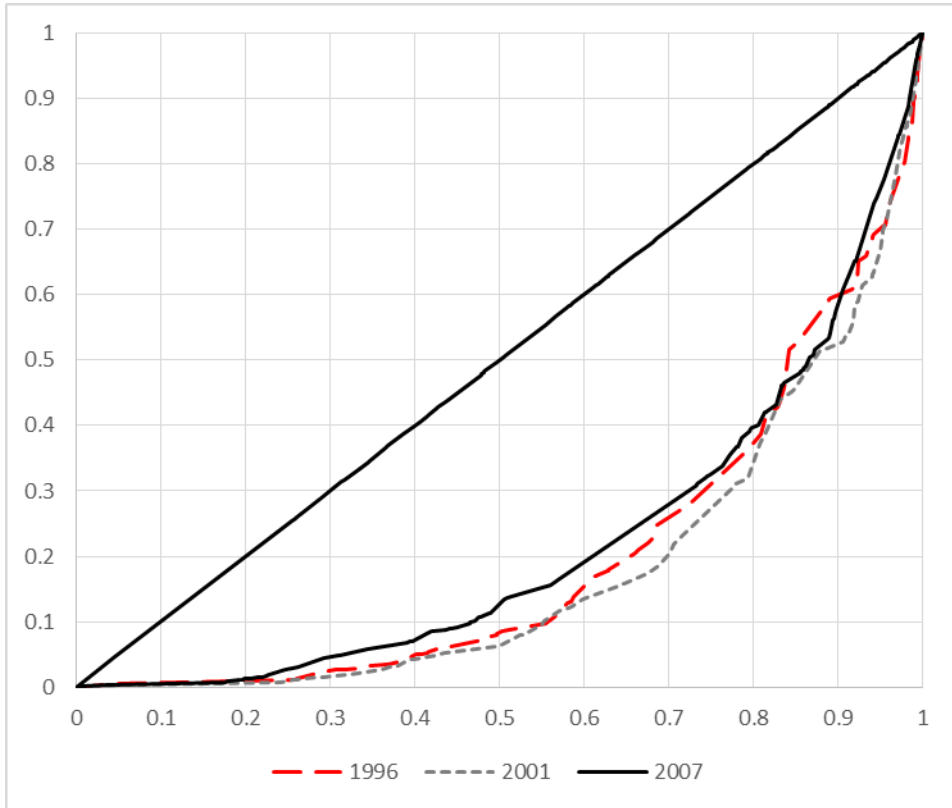


Figure 4. White-African segregation and concentration curves

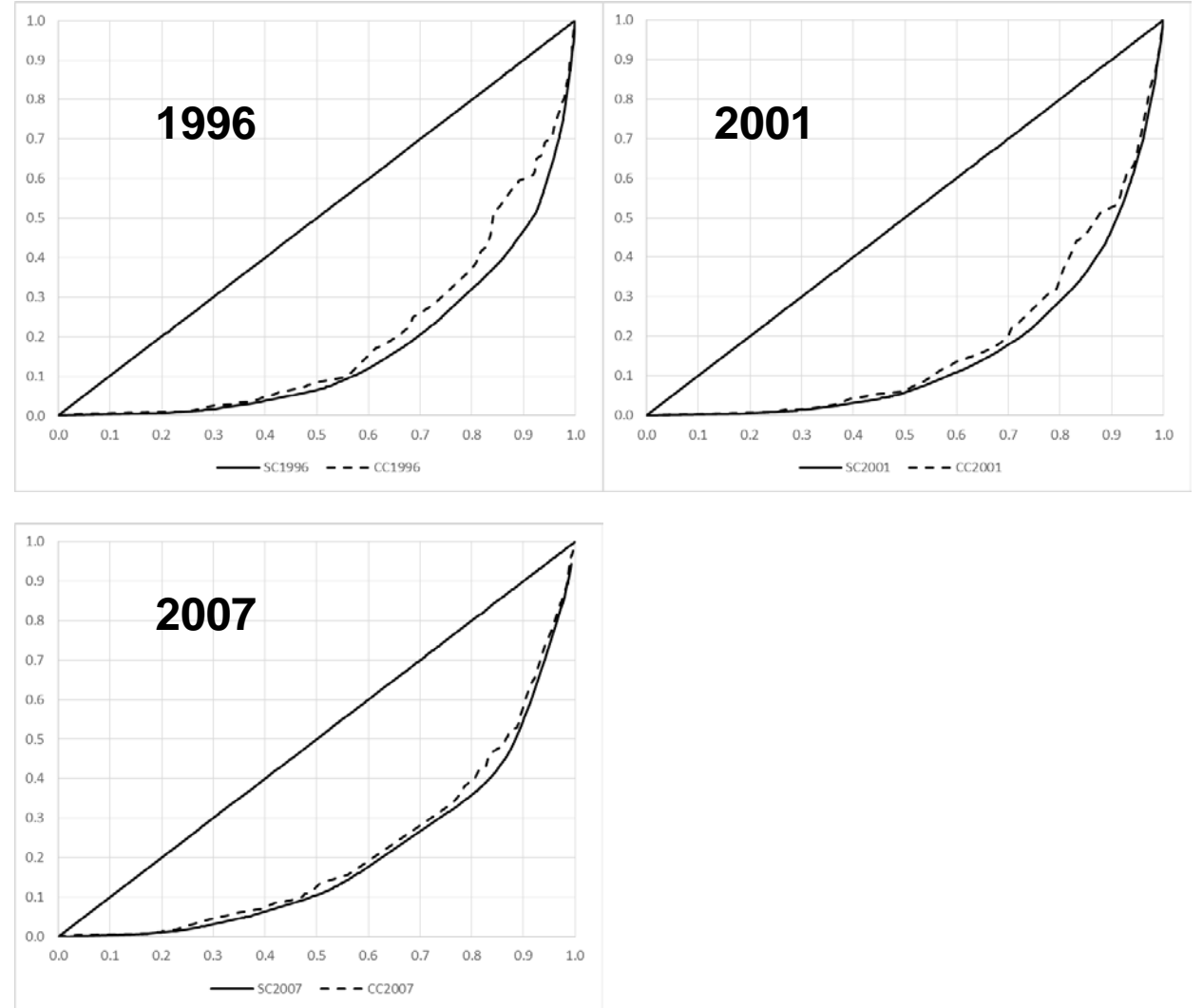


Figure 5. White-African segregation into low-paying occupations

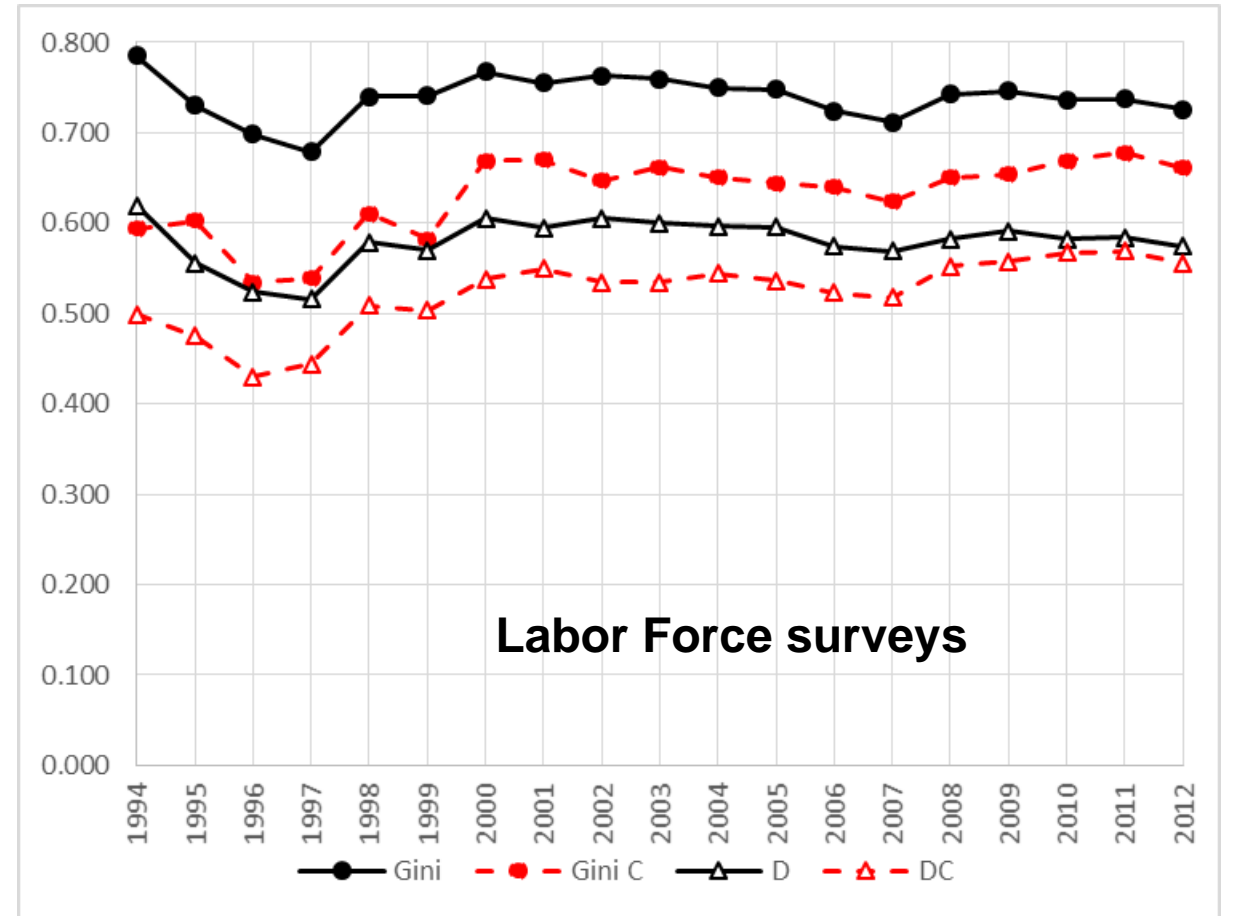
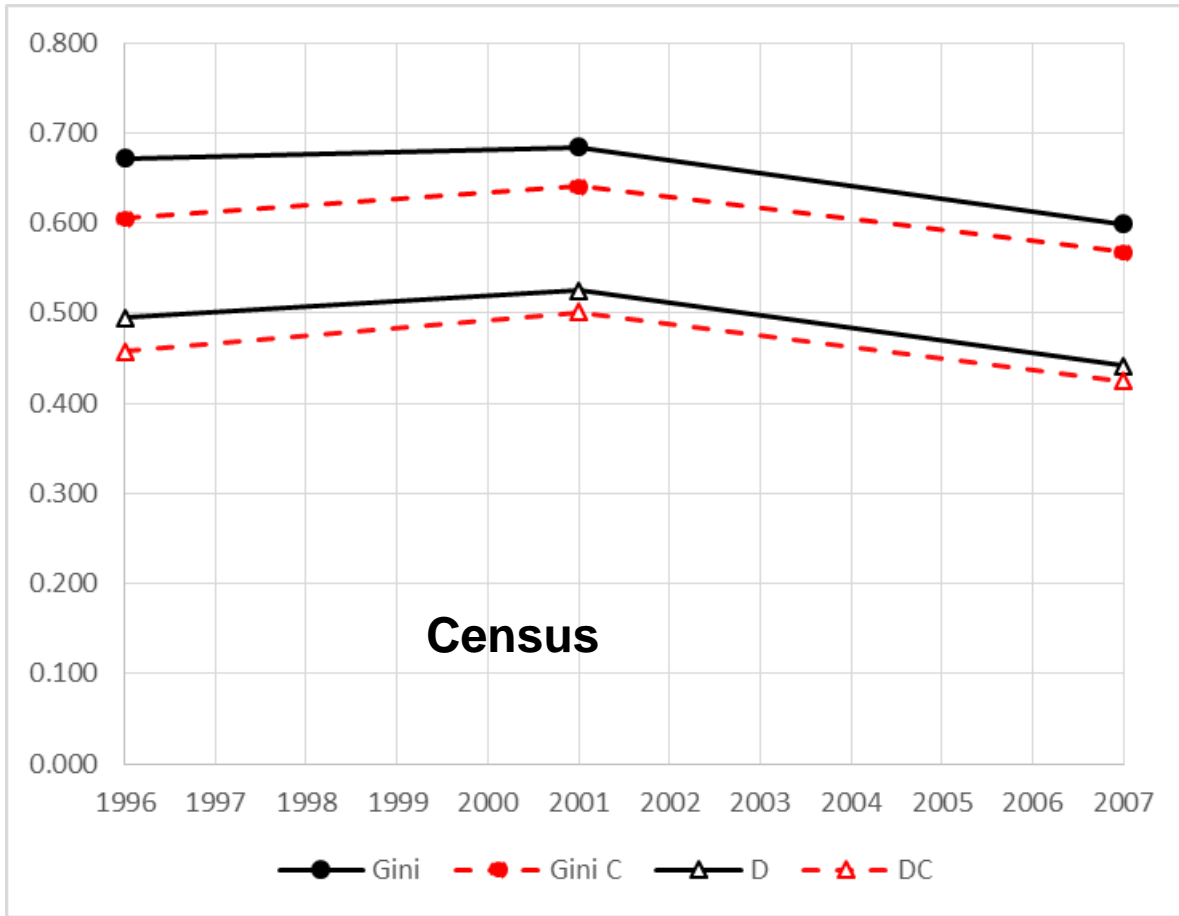


Table 1.
Workers' characteristics by race

	Africans			Whites		
	1996	2001	2007	1996	2001	2007
Rural	35.5	32.9	32.7	8.6	8.0	7.8
Western Cape	4.6	5.3	6.4	18.2	18.7	20.6
Eastern Cape	10.0	8.7	11.3	7.2	6.7	6.3
Northern Cape	1.2	1.1	1.1	2.4	2.2	1.8
Free State	8.8	8.0	6.4	6.6	4.9	5.6
KwaZulu-Natal	18.0	17.7	17.7	13.0	11.0	9.8
North West	10.8	10.3	9.3	4.5	5.0	4.2
Gauteng	28.5	31.1	30.5	40.4	44.2	43.5
Mpumalanga	9.0	8.6	8.8	5.5	4.4	5.9
Limpopo	9.1	9.3	8.5	2.5	2.9	2.3
No schooling	16.3	14.0	7.2	0.6	0.6	0.2
Some primary	12.5	12.4	11.8	0.2	0.3	0.2
Primary	25.6	20.7	18.4	1.5	2.4	2.3
Lower Second.	21.0	21.1	23.1	15.5	15.0	11.0
Secondary	19.4	28.7	33.8	58.5	64.3	62.1
University	1.5	3.1	4.6	12.6	17.4	23.6
Other	3.1	0.0	1.2	7.1	0.0	0.6
15-24	10.1	10.0	12.8	14.3	11.8	10.9
25-34	35.8	33.8	31.3	29.7	28.3	23.3
35-44	31.0	31.7	28.8	27.4	28.4	27.4
45-54	16.4	18.3	19.6	20.1	21.4	23.8
55-65	6.6	6.2	7.5	8.6	10.2	14.6
Female	41.0	42.0	43.6	42.8	44.2	45.5
Single	37.4	36.3	42.1	20.4	19.3	21.1
Married	56.0	56.9	51.1	70.4	72.0	71.4
Separated	3.7	3.6	3.0	7.4	7.0	5.7
Widowed	2.9	3.2	3.8	1.8	1.7	1.7
Head	57.8	58.8	57.2	55.1	52.1	51.1
Spouse	16.2	16.4	15.0	28.4	28.9	29.8
Disabled	7.3	3.3	2.0	2.5	1.9	1.5
Native	88.8	93.6	93.6	87.2	89.8	90.8

Figure 3. White-African (unexplained) segregation and concentration curves

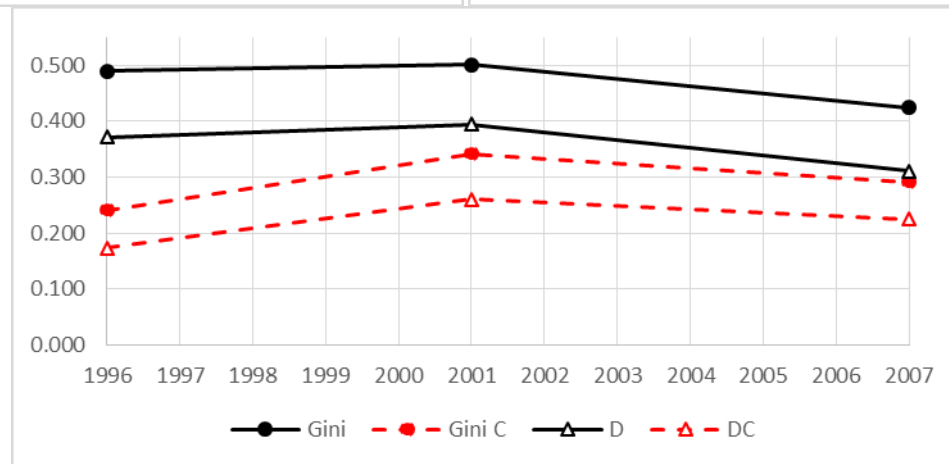
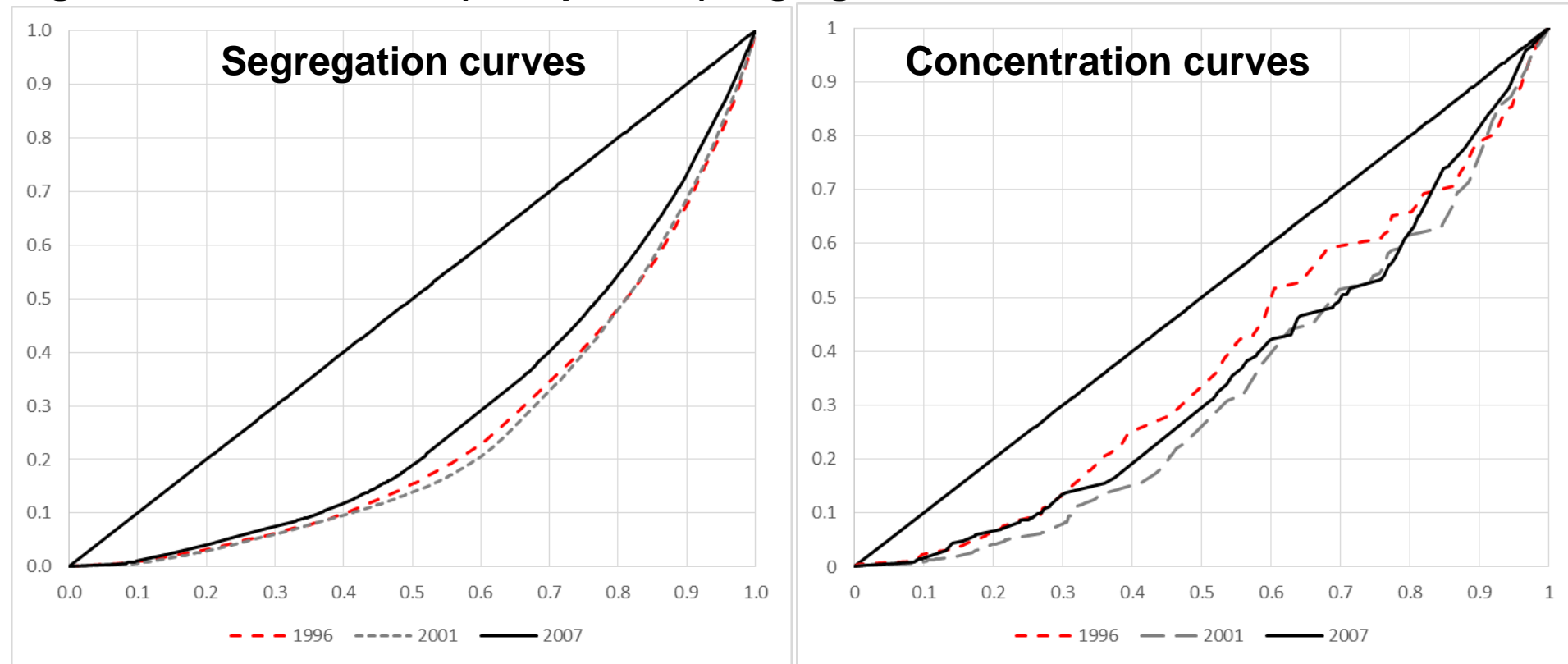


Table 2. Segregation

1996	Gini					
	Segregation	%	Concentration	%	Ratio	%
Observed	0.672		0.606		0.901	
Unexplained	0.490	72.9	0.242	39.9	0.493	54.7
Explained (total)	0.182	27.1	0.364	-60.1	0.408	45.3
Location	0.015	2.2	-0.014	-2.3	-0.040	-4.4
Education	0.169	25.2	0.373	61.6	0.432	47.9
Demographics	-0.001	-0.2	0.005	0.9	0.017	1.8
Immigration	0.000	0.0	0.000	-0.1	-0.001	-0.1
2001						
Observed	0.685		0.641		0.936	
Unexplained	0.501	73.1	0.342	53.3	0.683	72.9
Explained (total)	0.184	26.9	0.299	46.7	0.253	27.1
Location	0.019	2.8	-0.006	-1.0	-0.038	-4.1
Education	0.168	24.5	0.293	45.7	0.260	27.8
Demographics	-0.003	-0.5	0.013	2.0	0.032	3.4
Immigration	0.001	0.1	0.000	0.0	-0.001	-0.1
2007						
Observed	0.599		0.567		0.948	
Unexplained	0.424	70.8	0.292	51.4	0.688	72.6
Explained (total)	0.175	29.2	0.276	48.6	0.260	27.4
Location	0.021	3.6	0.005	0.9	-0.026	-2.7
Education	0.155	25.9	0.247	43.5	0.228	24.0
Demographics	-0.003	-0.6	0.023	4.0	0.059	6.2
Immigration	0.002	0.3	0.001	0.1	-0.001	-0.1

Concluding remarks

- Discriminatory legislation and social practices in pre-democratic South Africa lead to a **labor market strongly stratified by race**, with whites holding the most skilled and best-paying jobs.
- Lessons from other societies (e.g. US, LA) indicate that racial discrimination and segregation are more **difficult to eradicate** than removing all discriminatory legislation.
- **Discrimination may persist** before the entrance in the labor market in the form of lower quality of education for nonwhites or the negative influence of ghettos, compromising their economic opportunities.
- This may later be aggravated by **discriminatory practices** in hiring and promotion, whether based on direct prejudices or on information problems (statistical discrimination).

Concluding remarks

- With all the necessary cautions that data limitations impose, we have **not found strong evidence** supporting that the distribution of occupations has been effectively either desegregated or de-stratified in post-apartheid South Africa.
 - Limited evidence of such a process over short periods, such as 1994-97 or 2001-07, but no sustained path over time.
 - Situation in 2012 is not better than it was in mid'1990s.
- Not only has segregation remained high, but the nature of that segregation still implies a strong **racial stratification** with an over-representation of Africans in the lowest-paying jobs.
- Inequality in the distribution of worker's characteristics, especially **attained education**, explains less than a **third of segregation** and about a **half of segregation into low-paying jobs**.
- There persists, however, a **large unexplained part**, that generally drove the segregation trend, and that one could roughly relate with a gap in the quality of schooling and prevailing discriminatory practices.
 - Catching-up Africans made is not being effective enough to revert this important source of racial inequality.