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Occupational gender segregation in post-apartheid South Africa

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(work in progress)

Abstract

We study the segregation and stratification of occupations by gender in post-apartheid South Africa. We show that occupations are not only segregated and stratified by race, but also by gender. Women overwhelmingly fill low-paying jobs (mostly by blacks and Coloureds) but also higher-paying professional positions (especially by whites and Asians). We find evidence that points at a long-term reduction in gender segregation and stratification with women and men entering occupations previously dominated by the other gender, although this trend is sensitive to several data considerations. Distinct workers' characteristics by gender cannot explain this segregation, although they help to explain the overrepresentation women in high-pay positions.

Keywords: gender, occupational segregation, stratification, low-pay, post-apartheid, South Africa.

JEL Classification: J16, J42, J71, J82, O15, O55.

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1. Introduction

South Africa stands out for having a dysfunctional labour market. Despite the growing labour market participation of women and youth in the past years, employment rates are especially low among women and the black/African population, and fall below the average level in OECD countries, as well as those in Brazil, India or China (Arnal and Försters, 2011).

It is well-known that the apartheid regime, that ended after the first democratic elections in 1994, left South Africa with large racial inequalities in labour market outcomes such as employment rates and wages (e.g. Rospabé, 2002), or occupational attainment (e.g. Treiman et al., 1996) and segregation (Gradín, 2017b). Not surprisingly, there is much higher poverty among the black population (e.g. Gradín, 2013a). The apartheid system had dramatic effects for gender equality, too. Its particular migrant labour system forced black men to temporary leave their villages to work in cities or in the mining industry, while women and children were left in the rural areas, helping to explain higher poverty among female-headed households (Gelb, 2004). Because of this disruption of family life, many women had to fulfil the role of both breadwinner and care giver in challenging circumstances of high unemployment and HIV/AIDS prevalence, with very limited economic opportunities (Budlender and Lund, 2011).

Several factors, such as lower marriage rates, increasing access to higher education, or the implementation of non-discriminatory legislation (i.e. the Employment Equity Act, 1998) produced a growing feminization of the labour force after the end of apartheid that, however, also lead to an increase in female unemployment and self-employment in the informal sector (Casale and Posel, 2002; Posel, 2014). Compared with men, South African women face lower employment rates (e.g. Leibbrandt et al., 2010) and receive lower wages (e.g. Burger and Yu, 2007; Wittenberg, 2014), and none of them is fully explained by their different endowments. Women, however, tend to be over-represented at both, the bottom (e.g. domestic service) and top (e.g. professionals) of skills categories like in other middle income countries (Winter, 1999; Rospabé, 2001).

The literature on gender inequalities in post-apartheid South Africa has so far analysed in detail the extent, patterns, and drivers of the employment and wage gaps (Winter, 1999; Rospabé, 2001; Hinks, 2002; Grün, 2004; Oosthuizen, 2006; Ntuli, 2007; Shepherd, 2008; Casale and Posel, 2010; Bhorat and Goga, 2013; Kimani, 2015). At this stage, we know much less about what happened to gender segregation across occupations or the extent to which they are stratified with women working in jobs with lower pay. A few analyses of occupational attainment (Rospabé, 2001) and of occupational segregation (Parashar, 2008) being the exceptions.

In the case of racial inequalities, Gradín (2017b) has recently shown that occupational segregation by race continues to be high after the dismantlement of the discriminatory legislation in South Africa. There were also minor changes in its nature, the labour market is still strongly stratified by race with blacks systematically overrepresented at the lowest-paying occupations, even after controlling for the differences by population group in education and other observed characteristics of workers. The aim of this paper is to extend the analysis of segregation and stratification of occupations to gender in post-apartheid South Africa using the same approach and data sources. We will show that gender segregation and stratification across occupations seem to have been substantially reduced between 1996 and 2007, although this trend, especially the decline between 2001 and 2007, is sensitive to some data considerations. Both phenomena have been stagnated in most recent years and cannot be generally explained by differences in education or other relevant characteristics that male and female workers bring to the labour market.

In what follows, the second section briefly reviews the relevant literature, while the third and fourth sections describe the methodology and data. The fifth section presents the empirical results, with the last section finishing with some concluding remarks.

2. Gender and labour market outcomes in South Africa

Earlier studies after the end of apartheid in South Africa, like Winter (1999) or Rospabé (2001), showed that there were substantial gender inequalities in labour market outcomes such as employment, occupational attainment, or wages. These inequalities could be barely explained by gender differences in endowments of productive characteristics and exhibited different patterns across population groups.

Regarding the employment gap, Oosthuizen (2006) found a decreasing role of gender in explaining the probability of employment between 1995 and 2004 (while the same result did not apply to race). Using survival analysis, Kimani (2015) has recently shown, that the probability of exiting unemployment is lower for women than for men if the exit is into employment, but higher when exiting into economic inactivity. Furthermore, higher education increases the hazard rate of women into employment more than for men, like earlier studies already pointed out.

Some studies already reported lower earnings among women than among men, with the differential being only partially explained by endowments, during earliest post-apartheid labour force surveys (Winter, 1999 and Hinks, 2002 using OHS 1994 and 1995 respectively). The gender gaps increased in the following years (Ntuli, 2007). Different patterns by race were identified.

For example, white women were more affected by direct wage discrimination, whereas black women were found to increasingly suffer from discrimination at the hiring stage (Grün, 2004). The gender wage gap tends to be higher in the union sector (Casale and Posel, 2010) and at the bottom of the wage distribution, evidence of a sticky floor, especially among black women (Ntuli, 2007; Shepherd, 2008; Bhorat and Goga, 2013).

The occupational distribution by sex has been identified as an important driver of changes in the gender wage gap in many countries (e.g. Groshen, 1991; Bayard et al., 2003; Amuedo-Dorantes and De la Rica, 2006; Brynin and Perales, 2015). Shepherd (2008) showed that the decreasing wage gap in South Africa was also largely driven by the increasing number of white women entering higher skilled occupations and industries since 1999. Some limited research has focused on the analysis of this occupational distribution by gender. Laltbapersad (2002), for example, discussed the differential in the percentage of men and women across the main occupational groups and income levels using the 1996 census. Rospabé (2001) used a multinomial logit model to estimate the gender gap in occupational attainment, i.e. the probability of working in a high skilled, skilled, or semi-skilled/unskilled occupation with the 1999 October Household Survey. Women were found to be over-represented at both extremes of the skill categories. While their larger presence at the top was fully explained by their individual characteristics, their segregation into the bottom remained entirely unexplained. Parashar (2008) provided us with the only (up to our knowledge) quantification of occupational segregation by gender in South Africa. Using the 2001 census she measured the dissimilarity index to be at 0.437 (2-digit classification). Unlike the US, this level was smaller than in the case of race (e.g. 0.572 between blacks and whites).

3. Methodology: Measuring segregation and stratification

Occupational gender segregation means that men and women work in different occupations. The unequal distribution of occupations is aggravated with stratification when, furthermore, one gender, typically women, generally work in low-paying occupations (women´s low-pay segregation).

Let $N^w$and N^m indicate the number of women and men in the workforce, n_j^w and n_j^m the corresponding numbers working in occupation $j = 1, \dots, J$, where occupations have been sorted in ascending proportion of men, $n_j^m/(n_j^w + n_j^m)$. Then, $F_j^i = \sum_{s=1}^{j} f_j^i,\ i = w, m$ are the corresponding cumulative values for the j occupations with largest over-representation of women. We label as g_j^i and G_j^i the relative and cumulative frequencies when occupations are

indexed by their average earnings instead (w_j). In measuring these gender inequalities in the South African labour market, we use two distinct types of tools following Gradín (2017a).

On the one hand, the segregation and concentration (or low-pay segregation) curves plot the cumulative proportions of women (horizontal axis) and men (vertical axis) when occupations are indexed by the proportion of males (F_j^i, segregation) and by average earnings (G_j^i, concentration). These curves play the same role as the Lorenz and concentration curves in the measurement of income inequality. In the case of absence of segregation, when men and women work in the same proportion across all occupations, both curves correspond with the line of equality (the diagonal).

The segregation curve falls between the diagonal and the horizontal axis, the latter indicating the case of maximum segregation – there are only workers of one gender in each occupation. If two segregation curves do not overlap, the one falling below unambiguously indicates higher segregation (for a large set of segregation indices consistent with a small set of value judgements).

The concentration curve can fall between the segregation curve and its mirror image above the diagonal. In the range in which it falls below the diagonal, it indicates that women tend to be segregated into low-paying occupations compared with men below any low-pay threshold in that range, i.e. there is (restricted) first-order stochastic dominance in the occupational distributions by gender. If it falls above the diagonal, instead, it indicates the contrary, high-pay segregation of women. The farther this curve is from the diagonal (the closer to the segregation curve or its mirror image), the more stratified the distribution of occupations by gender. Non-overlapping curves allow to assess higher level of low-pay/high-pay segregation in the one farthest from the diagonal.

On the other hand, we use the dissimilarity and Gini segregation and concentration (low-pay segregation) indices to quantify these phenomena and being able to assess the trends over time even if the corresponding curves overlap (at the price of having to agree on additional value judgements). The dissimilarity index of segregation measures the proportion of women that should shift from female- to male-dominated occupations to eliminate segregation, $D(f) = \frac{1}{2}\sum_{j=1}^{J}\left|f_j^w - f_j^m\right| = \max_{j\in[1,J]}\left\{F_j^w - F_j^m\right\}$. The corresponding concentration (or low-pay segregation index) indicates the proportion of women that should shift from their current occupation to another with higher average earnings to eliminate women´s segregation into low-paying jobs (for any possible threshold defining low-pay), $D(g) = G_s^w - G_s^m$; where

$|G_s^w - G_s^m| = \max_{j\in[1,J]}\{|G_j^w - G_j^m|\}$. Both indices represent the maximum (absolute) vertical distance between the diagonal and the segregation and concentration curve respectively.

The Gini indices of segregation and concentration are measured as twice the area between the line of equality and the segregation and concentration curve, respectively. The Gini segregation index deviates from the dissimilarity index because it also considers inequality in the distribution of occupations by gender within the sets of male and female-dominated occupations (not only between both types of occupations like the dissimilarity index). It is indeed the average (among women) of all the vertical distances between the diagonal and the segregation curve: $Gini(f) = 2\sum_{j=1}^{J}(\hat{F}_j^w - \hat{F}_j^m) f_j^w$, where the hat indicates the midpoint between two adjacent occupations: $\hat{F}_j^i = \frac{1}{2}(F_{j-1}^i + F_j^i) = F_{j-1}^i + \frac{1}{2}f_j^i$. The Gini index of concentration, similarly measures women´s low-pay segregation as the average distance between the diagonal and the concentration curve, adding the area below and subtracting the area above the diagonal, $Gini(g) = 2\sum_{j=1}^{J}(\hat{G}_j^w - \hat{G}_j^m) g_j^w$.

All these indices range in absolute terms between 0 and 1, with higher values indicating more segregation or stratification respectively. While the segregation indices are always non-negative, the sign of the concentration indices indicates whether stratification of women is into low-pay (positive) or high-pay (negative), with their absolute values bounded from above by the corresponding segregation indices. The concentration ratios measure the proportion of segregation that is low-pay by dividing each concentration index by its maximum (the segregation index): $r_S = \frac{S(g)}{S(f)}, S = Gini, D$.

We will measure the observed level of (low-pay) segregation (i.e. unconditional) but also the level (i.e. conditional) that remains after equalizing the observed characteristics (e.g. education, age, …) of men and women, by giving one sex the characteristics of the other. The level of (low-pay) segregation that goes away after this equalization is the aggregate compositional effect, that is, the level that can be explained by men and women having distinct characteristics. For that, we follow Gradín (2013a) and estimate a counterfactual distribution in which we re-weight the sample of women to reproduce the distribution of characteristics of men (and the other way around) based on their propensity score. In line with DiNardo et al. (1994), the re-weighting factors are obtained by estimating with a logit model the probability of being male based on

individual characteristics described in the data section. Then, sample weights of women with a higher probability of being male will be increased relative to women with a lower probability.

The contribution of each set of characteristics can be obtained in a second stage. We start with all logit coefficients switched-off, that is, set to zero. We then estimate a sequence of re-weighting factors in which the coefficients associated with each factor are progressively switched on (changed from zero to their estimated values). The change in (low-pay) segregation before and after the corresponding coefficients are switched on, indicates the contribution of that factor. Because this contribution depends on the order in which factors are introduced (path-dependency problem), we compute the average over all possible sequences, known as the Shapley decomposition (Chantreuil and Trannoy, 2013; Shorrocks, 2013).

4. Data

In our analysis, we primarily use the 1996 and 2001 census and the 2007 Community Survey undertaken by Statistics South Africa harmonized by the Integrated Public Use Microdata Series (IPUMS-I, Minnesota Population Center, 2015). The 1996 census was the first one in democratic South Africa. Although other censuses have been conducted since 1911, they suffer from lack of reliability, especially in what regards the black population (e.g. Statistics South Africa, 2007). There was a more recent census in 2011 but the essential information about occupation was not codified.

The universe refers to the working population not living in group quarters, 15-65 years old, who were employed, not in the Armed Forces. Separate analysis is made by racial groups, especially for blacks/Africans (69% of workers in 2007) and whites (16%), the rest being either Coloured (11%) or Indian/Asian workers (4%). This implies a total of 1,727,981 observations: 739,668 women and 988,313 men. With the following distribution by year: 322,252 (women) and 450,338 (men) in 1996; 315,797 and 406,484 in 2001, and 101,619 and 131,491 in 2007.

We use the IPUMS harmonized 3-digit International Standard Classification of Occupations (ISCO-1988). This differs from the original unharmonized classification (161 categories) because some small occupations were aggregated by IPUMS within the same group. This leaves us with 125 categories, including one for those with occupation not classified elsewhere or unknown, which is problematic given its substantial importance, especially in 2007 (16% compared with around 7% in the previous years).

There are some other relevant issues regarding the codification of jobs by occupations. For example, there is a low proportion of women in occupations “223 Nursing and midwifery

professionals" and "233 Primary and pre-primary education teaching professionals" in 2001 with respect to the other years and, accordingly, an over-representation of two related occupations: "323 Nursing and midwifery associate professionals" and "331 Primary education teaching associate professionals".

Earnings for each occupation will be approximated using contemporary average income using person's annual income in Rands for the twelve months prior to the census, computed for the entire working population.[1] Among the workers' characteristics to estimate conditional segregation we used the following. To account for location, area of residence (urban or rural) and province (Western Cape, Eastern Cape, Northern Cape, Free State, KwaZulu-Natal, North West, Gauteng, Mpumalanga, and Limpopo). Educational attainment: no schooling, some primary, primary (6 years), lower secondary, secondary, university, other education, and unknown education. Immigration is measured by immigrant status (no immigrant, national immigrant, immigrant from abroad) and years residing in current dwelling. Marital status (single, never married, or unknown; married or in consensual union; separated, divorced, or spouse absent; widowed). Other demographic variables include: race (black/African, white, Coloured, and Indian/Asian), age interval (15-24, 25-34, 35-44, 45-54, and 55-64 years old), and disabled statuses.

Given the limited temporary coverage of census data, and for the sake of robustness, the analysis is complemented by using different labour force surveys (LFS) statistics compiled by DataFirst (University of Cape Town) in "The South Africa - Post Apartheid Labour Market Series, 1994-2015" (PALMS v3.1, Kerr, Lam, and Wittenberg, 2016). They are the annual October Household Surveys (OHS 1994-1999), the biannual Labour Force Surveys (LFS 2000-2007), and the Quarterly Labour Force Surveys (QLFS 2008-15). The sample consists of 1,242,585 observations (566,269 women and 676,316 men), with about 56 thousand observations/year on average, from a minimum of 14,692 in 1996 to a maximum of 99,706 in 2008.[2] We will also use PALMS estimation of real earnings to rank occupations, after some adjustments.[3]

[1] Values recoded by IPUMS to the midpoints of the broad intervals given in the original data, with the top interval coded to its lowest possible value. The average was preferred in this case to the median due to the high probability of ties when income is reported in intervals.

[2] For intertemporal consistency, we deleted 2,090 observations with unknown occupation (most from 1996 and 1997). Observations are weighted using the cross Entropy weight derived by DataFirst from 2008 ASSA demographic model. For details of these data, see Kerr and Wittenberg (2016).

[3] We used the median instead of the mean due to the presence of outliers. In some cases, median earnings were imputed using the closest available information (this affected all occupations in 1996, 2008-9, and 2015, and some small occupations in the other years).

Occupations in LFS are also based on ISCO-1988 (3-digit classifications). However, the smaller sample sizes, compared with census data, impose some cautions about the more detailed results and for that reason we also used the 2-digit classification. There are some gender-specific issues to consider that may substantially affect the results. There is an exceptionally low proportion of women in OHS 1995 (33% versus 38% in 1994 or 1996), which makes this year an outlier. There are also some large discontinuities in the occupational trends that could reflect different ways of categorizing jobs. For example, the share of workers in occupation "621 Subsistence agricultural and fishery workers", while insignificant in OHS (1994-1999) and QLFS (2008-15), is large in LFS (2000-2007), especially among women in the first year. At the same time, there is a larger share of men in "921 Agricultural, fishery and related labourers" in 1994-95. Even more problematic because it affects a largely female dominated occupation, the share of women in "913 Domestic and related helpers, cleaners and launderers" is particularly small in 1994-95 compared with the other years. It looks like they are just underrepresented in 1995, explaining the lower proportion of women in the labour force (as noted by Muller, 2009), while in 1994 they might be hidden in the mixed category 919 for other elementary workers. The share of women in occupation 913 is particularly large in 2000, which seems to be compensated by a smaller proportion in "911 Street vendors and related workers". In general, LFS tend to under-represent the share of domestic helpers compared with the census in 1996 and 2001.

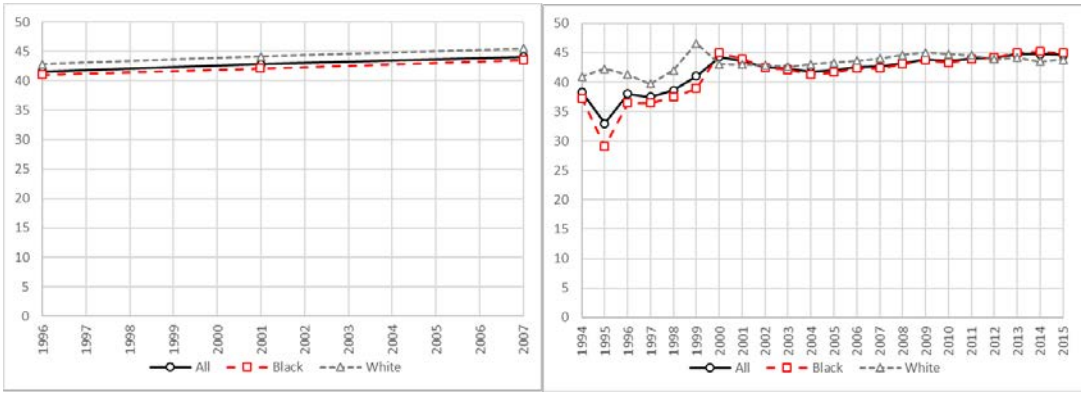
5. Gender segregation and stratification trends after apartheid

5.1 Occupations and gender

Before quantifying the levels of segregation, it is useful to have a look at the distribution of occupations by gender and how they changed over time, taking into account that during the analysed period there was an increasing feminization of the employment according to LFS: 38% in 1994 to 45% in 2015, more moderate with the census, from 42% in 1996 to 44% in 2007 (Figure 1). Table 1 summarizes the distribution of men and women across the main occupational groups in 1994-2015. The evolution in occupations with the largest misrepresentation of women (in the most recent year) is displayed in Table 2 (1996-2007) and Table 3 (1994-2015).

Figure 1. Percentage of female workers

a. Census **b. LFS**



Source: Own construction based on IPUMS-International (census) and PALMS (LFS).

It becomes clear that South African women tend to be largely over-represented among elementary low-paying occupations, especially as domestic helpers and cleaners, street vendors, or housekeepers (all with average income below 50% of the 2007 median). However, women are also over-represented at the middle of the occupational distribution (50-150% of the median) in clerk occupations (e.g. tellers, office or client information clerks) and at the top (above 150% of the median) employed as professionals or technicians (i.e. teachers, nurses, …). On the opposite side, the largest under-representation of women occurs among mid-paying jobs such as drivers, building, protective services, or mining, and at the top of the earnings distribution in managerial positions, as well as among physicists or engineers. Some of these gender gaps seem to be quite persistent over time, although as explained below, there was a substantial reduction in the gender gap in the proportion of domestic workers (at least, based on the census). This picture hides large racial inequalities interplaying with gender, though.

Figures 2 (census) and 3 (LFS) draw the trends in the shares by race and gender in three occupational groups with large women misrepresentation.[4] There is no doubt that race is even more important than gender when it comes to determining the presence in these occupations. White and Asian women have a much higher representation at skilled occupations (managers and professionals), while Coloured and, especially, black women tend to be over-represented at the bottom of the skills distribution (elementary occupations). When compared with men of their same race, black women clearly tended to be more over-represented at elementary occupations than women of any other race, while the same is true for white women as

[4] In 2007 (census), 68% of female workers were African, 17% white, 12% Coloured, and 3.4% Asian (in LFS 2015: 45% were women, of which 73% African, 14% white, 11% Coloured, 2.6% Asian).

professionals (although still under-represented as managers). In all cases, these gender gaps seem to have been reduced over time.

A similar picture emerges if we use LFS instead. However, a relevant fact that will most certainly and critically affect our results in segregation analysis is the large discrepancy between census and LFS data regarding the evolution of women in the massively female dominated occupation 913 "domestic service workers" (Figure 4; Table 2). Although both data sources give us similar figures for the total and by main population groups in 2007 (19% census versus 21% LFS; 27% versus 26% for blacks), census data have higher figures in 1996 (29% versus 23% LFS; 43% versus 34% blacks) and 2001 (25% versus 21% LFS; 36% blacks versus 27%). Therefore, there is a sharp reduction of the gender gap in this important occupation in the census that is much smaller in the LFS. Both datasets exhibit problematic issues here. The reduction observed with census data between 2001 and 2007 may be overestimated, given the larger share of women (and men) with unknown occupation in 2007 (see Table 1). The LFS might be underestimating this important occupation with respect to the census and have large discontinuities in the series (e.g. in 1995 or between 1999 and 2000).[5] For these reasons, we will primarily rely on the census data to assess the long-term trend, although running some sensitivity analysis on how to deal with the unknown category, but we keep using the LFS surveys for robustness, and for a closer look, especially, at more recent years, in which we expect data to be more comparable over time.

[5] Note, however, that the reduction observed with census data may be overestimated, given the larger share of women (and men) with unknown occupation in 2007 (see Table 1).

Table 1. Occupation by gender (ISCO88, 1-digit)

Code	Label	1994			1996			2001			2007			2015		
		Women	Men	Diff.	Women	Men	Diff.	Women	Men	Diff.	Women	Men	Diff.	Women	Men	Diff.
	Census															
1	**Legislators, senior officials and managers**	-	-	-	2.8	5.1	-2.3	3.8	6.9	-3.1	7.7	9.5	-1.8	-	-	-
2,3	**Professionals and Technicians**	-	-	-	20.5	13.2	7.4	20.1	14.8	5.3	19.5	14.4	5.1	-	-	-
4	**Clerks**	-	-	-	13.5	4.3	9.2	17.2	7.1	10.1	11.6	4.4	7.2	-	-	-
5	**Service workers and shop and market sales**	-	-	-	7.9	10.1	-2.2	8.7	11.5	-2.8	8.3	10.1	-1.9	-	-	-
6	**Skilled agricultural and fishery workers**	-	-	-	1.9	5.4	-3.5	1.5	3.5	-2.0	3.0	4.6	-1.6	-	-	-
7	**Crafts and related trades workers**	-	-	-	4.6	20.1	-15.5	4.4	17.5	-13.1	4.3	17.3	-13.0	-	-	-
8	**Plant and machine operators and assemblers**	-	-	-	2.9	11.5	-8.6	2.8	12.8	-10.1	2.0	12.6	-10.6	-	-	-
9	**Elementary occupations**	-	-	-	40.0	22.0	18.0	34.6	19.7	14.9	26.8	12.3	14.5	-	-	-
-	**Unknown**	-	-	-	5.9	8.3	-2.4	7.0	6.2	0.8	16.9	14.8	2.1	-	-	-
	Total	-	-	-	100	100	0	100	100	0	100	100	0	-	-	-
	LFS															
1	**Legislators, senior officials and managers**	3.2	7.1	-3.9	3.9	6.2	-2.3	2.8	7.5	-4.7	5.6	9.0	-3.4	5.8	10.3	-4.4
2,3	**Professionals and Technicians**	18.8	11.8	7.0	24.3	15.4	8.9	16.3	12.3	4.0	19.5	12.7	6.8	17.6	11.8	5.8
4	**Clerks**	18.7	7.0	11.7	15.5	6.4	9.1	14.2	5.3	8.9	14.9	5.3	9.7	17.6	5.1	12.5
5	**Service workers and shop and market sales**	11.9	9.7	2.2	11.6	12.8	-1.2	14.3	12.7	1.6	12.6	12.5	0.1	17.0	14.1	2.9
6	**Skilled agricultural and fishery workers**	0.4	1.9	-1.5	1.6	4.4	-2.7	5.1	7.3	-2.2	3.1	3.0	0.2	0.4	0.9	-0.5
7	**Crafts and related trades workers**	4.5	16.6	-12.1	6.2	19.0	-12.8	4.9	19.6	-14.7	5.2	20.5	-15.3	3.0	19.8	-16.9
8	**Plant and machine operators and assemblers**	4.9	16.5	-11.6	2.6	13.9	-11.3	3.3	15.2	-12.0	3.1	13.7	-10.6	2.5	12.7	-10.3
9	**Elementary occupations**	37.8	29.5	8.3	34.3	22.0	12.4	39.1	20.0	19.2	36.0	23.4	12.6	36.3	25.4	10.9
	Total	100	100	0	100	100	0	100	100	0	100	100	0	100	100	0

Source: Own construction based on IPUMS-I and PALMS. Groups 2 and 3 aggregated here into one single category (see data section).

Table 2. Occupation by gender (ISCO88, 3-digit)

10 occupations with largest over/under representation of women in 2007 Community Survey

(Difference between %women and %men)

Women are over-represented in 2007					Women are under-represented in 2007				
Census Code	**Label**	**1996**	**2001**	**2007**	**Census Code**	**Label**	**1996**	**2001**	**2007**
913	Domestic and related helpers, cleaners and launderers	25.4	20.9	15.2	931	Mining and construction labourers	-1.8	-2.4	-1.3
233	Primary and pre-primary education teaching professionals	2.9	1.1	2.6	311	Physical and engineering science technicians	-0.6	-1.2	-1.4
421	Cashiers, tellers and related clerks	2.2	2.7	2.4	131	General managers	-1.0	-1.6	-1.4
223	Nursing and midwifery professionals	2.4	0.5	2.1	811	Mining- and mineral-processing-plant operators	-0.2	-0.2	-1.5
911	Street vendors and related workers	0.4	0.4	1.8	721	Metal moulders, welders, sheet-metal workers, structural- metal preparers	-1.6	-1.4	-1.6
411	Secretaries and keyboard-operating clerks	3.5	2.2	1.6	723	Machinery mechanics and fitters	-2.6	-2.1	-1.8
512	Housekeeping and restaurant services workers	1.1	1.3	1.3	713	Building finishers and related trades workers	-4.2	-2.2	-2.3
419	Other office clerks	1.0	3.2	1.2	516	Protective services workers	-4.4	-4.9	-4.1
422	Client information clerks	1.3	1.3	1.1	712	Building frame and related trades workers	-4.5	-3.3	-4.5
232	Secondary education teaching professionals	0.7	0.1	1.1	832	Motor-vehicle drivers	-5.2	-7.3	-6.5
LFS Code	**Label**	**1996**	**2001**	**2007**	**LFS Code**	**Label**	**1996**	**2001**	**2007**
913+919	Domestic and related helpers, cleaners and launderers	20.8	19.2	18.2	931	Mining and construction labourers	-0.2	-2.3	-4.0
233	Primary and pre-primary education teaching professionals	0.2	0.6	1.1	311	Physical and engineering science technicians	-1.1	-1.1	-0.8
421	Cashiers, tellers and related clerks	2.3	2.3	2.8	131	General managers	-1.2	-2.4	-1.1
223	Nursing and midwifery professionals	0.3	0.4	0.3	811	Mining- and mineral-processing-plant operators	-0.3	-1.1	-0.6
911	Street vendors and related workers	1.0	7.2	4.1	721	Metal moulders, welders, sheet-metal workers, structural- metal preparers	-1.8	-1.9	-2.3
411	Secretaries and keyboard-operating clerks	3.1	2.3	1.8	723	Machinery mechanics and fitters	-2.3	-3.4	-3.1
512	Housekeeping and restaurant services workers	1.7	2.8	2.5	713	Building finishers and related trades workers	-2.4	-2.9	-3.1
419	Other office clerks	0.3	0.1	1.7	516	Protective services workers	-5.4	-4.6	-5.0
422	Client information clerks	2.0	1.5	1.3	712	Building frame and related trades workers	-3.7	-4.1	-5.0
232	Secondary education teaching professionals	0.5	0.3	0.6	832	Motor-vehicle drivers	-5.0	-5.6	-6.4

Source: Own construction based on IPUMS-I (Census) and PALMS (LFS).

Table 3. Occupation by gender (ISCO88, 3-digit) in LFS

10 occupations with largest over/under representation of women in 2015

(Difference between %women and %men)

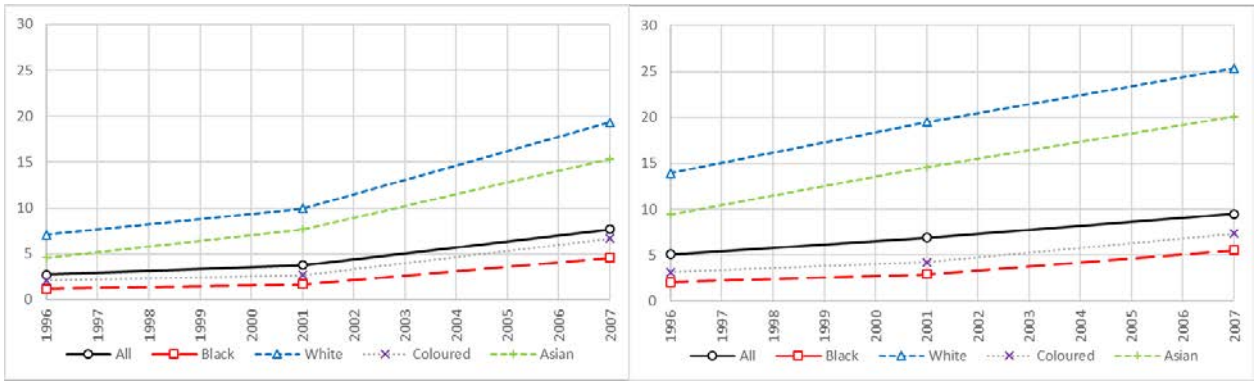
Women are over-represented in 2015				Women are under-represented in 2015			
LFS code		**1994**	**2015**	**LFS code**		**1994**	**2015**
913+919	Domestic and related helpers, cleaners and launderers	22.5	17.9	131	General managers	-1.9	-2.1
419	Other office clerks	4.0	4.5	833	Mining and construction labourers	-2.2	-2.2
513	Personal care and related workers	2.4	3.7	721	Metal moulders, welders, sheet-metal workers, structural- metal preparers	-1.9	-2.4
421	Cashiers, tellers and related clerks	2.5	3.7	723	Machinery mechanics and fitters	-3.3	-3.1
512	Housekeeping and restaurant services workers	1.7	3.0	931	Mining and construction labourers	-3.3	-3.2
911	Street vendors and related workers	0.1	2.5	713	Building finishers and related trades workers	-2.0	-3.2
323	Nursing and midwifery associate professionals	2.2	1.9	921	Agricultural, fishery and related labourers	-8.0	-4.7
331	Primary education teaching associate professionals	1.7	1.7	516	Protective services workers	-4.4	-4.8
422	Client information clerks	1.0	1.7	712	Building frame and related trades workers	-2.9	-5.2
411	Secretaries and keyboard-operating clerks	3.8	1.6	832	Motor-vehicle drivers	-7.3	-6.3

Source: Own construction based on PALMS.

Figure 2. Occupational groups by gender and race (Census)

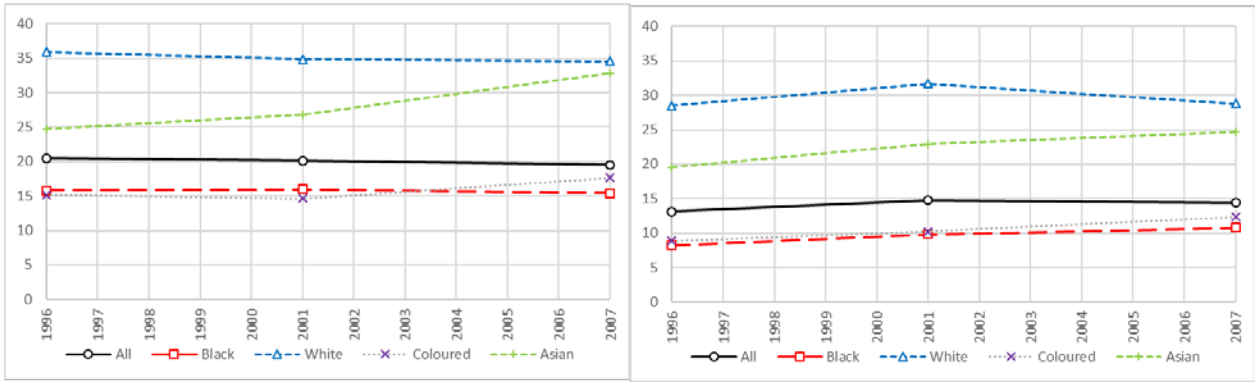
Managers

Women **Men**



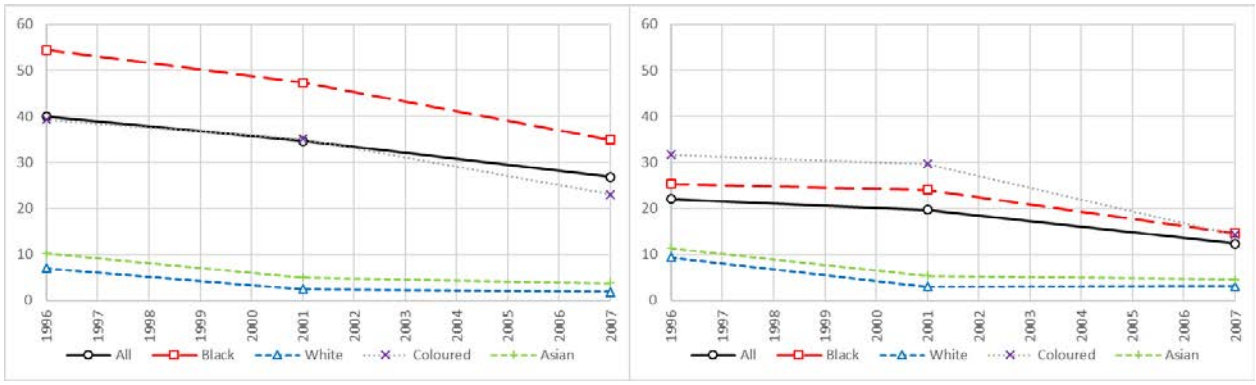
Professionals and Technicians

Women **Men**



Elementary occupations

Women **Men**

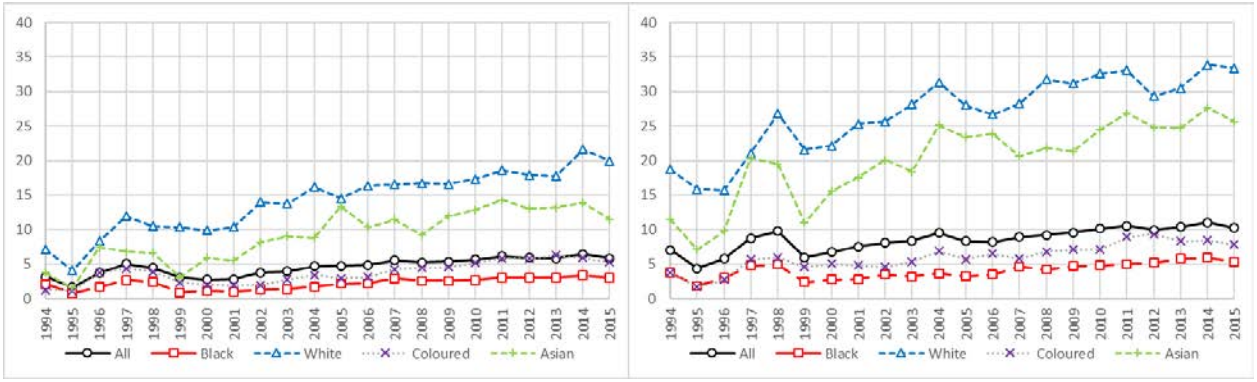


Source: Own construction using IPUMS-I.

Figure 3. Occupational groups by gender and race (LFS)

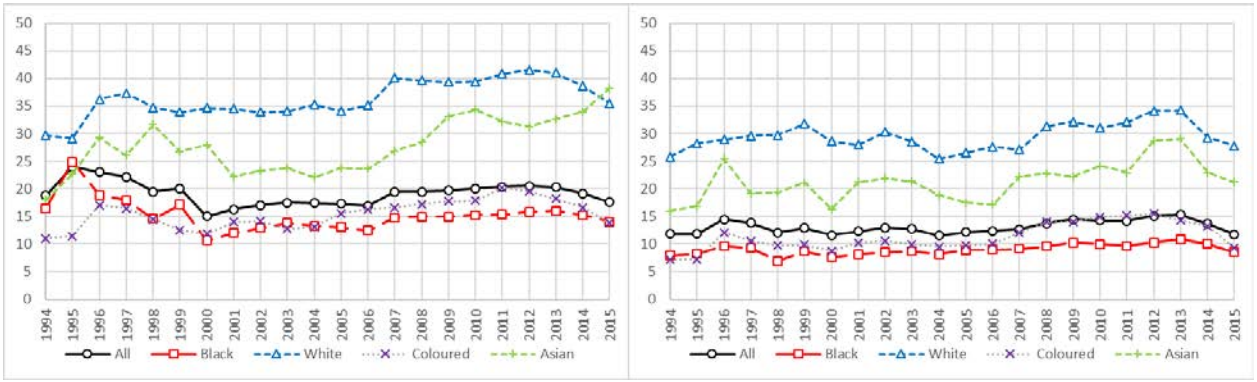
Managers

Women **Men**



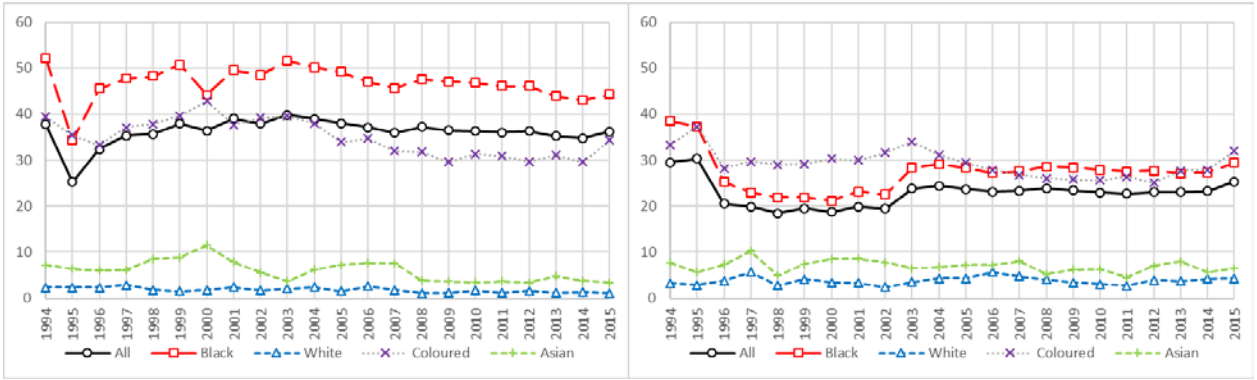
Professionals and Technicians

Women **Men**



Elementary occupations

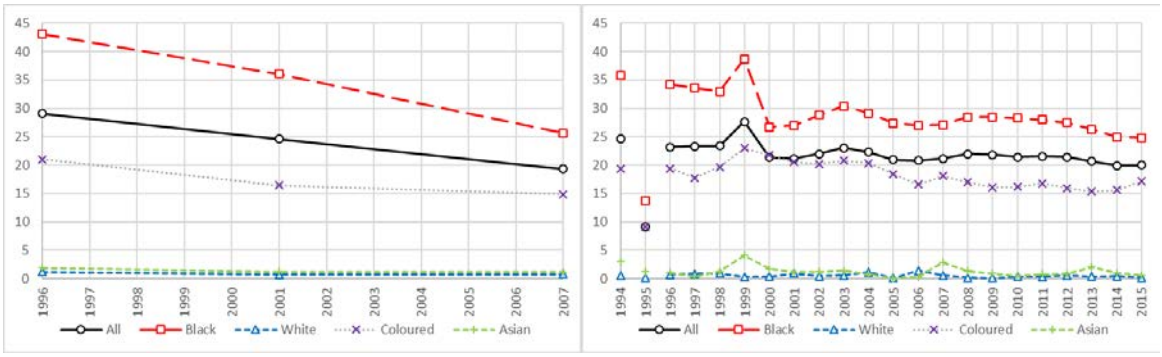
Women **Men**



Source: Own construction using PALMS.

Figure 4. Percentage of women in domestic service

a. Census **b. LFS**



Source: Own construction based on IPUMS-I (Census; code 913) and PALMS (LFS; codes 913 and 919). Note: For the discontinuities in LFS series, see data section.

5.2 Trends in gender occupational segregation

a. Unconditional trends

Gender segregation across occupations followed a clear declining trend between 1996 and 2007 based on census data (Figure 5a,b), with a 18% reduction with Gini, 24% with the dissimilarity index. The higher reduction with the latter reveals an intense desegregation between female- and male-dominated occupations. Indeed, there was a substantial increase in the proportion of women and men entering occupations that were initially dominated by the other gender (the unknown category excluded) between 1996 and 2001: from 22.7% to 25.6% (women) and from 19.7% to 23.8% (men). Between 2001 and 2007 there was a modest increase for women (to 26.5%) and a decline for men (20.8%), but these figures are clearly underestimated given the larger share of the unknown category.[6] On the contrary, there was no reduction over time in the Gini within the sets of occupations dominated by one gender (the difference between Gini and dissimilarity).

Segregation declined with similar intensity across all population groups if women are compared with men of their own race, except for a smaller reduction among Asians (12-13%). This general trend contrasts with the smaller decline in racial segregation (black versus white) estimated over

[6] We consider here an occupation dominated when the proportion of men employed in that occupation is either larger or smaller than that of women. If workers in the unknown category are completely removed from the sample or that category is treated as a male-dominated occupation in 1996, the increase would be larger in the case of women (24.1%, 27.5%, 31.8% in the first case; 28.6%, 32.6%, 43.3% in the second one), while there would be little difference for men (21.5%, 25.45, 24.4%; the same as above in the second case).

the same period (Gradín, 2017b): about 11 percent, with an increase between 1996 and 2001, and a decline between 2001 and 2007.[7]

The level of gender segregation in 2007 was still high, however, with a Gini of 0.553 and a dissimilarity index of 0.393; higher among blacks than among any other group (0.582, compared with 0.540 for Coloureds, 0.512 for whites, or 0.454 for Asians). This hierarchy among population groups was nearly constant over time (except that in 2001, when segregation for whites was slightly above that of Coloureds).

The decline in gender segregation in the census is robust to the choice of indices because it is corroborated by the segregation curves getting closer to the diagonal over time (Figure 6). This implies that most known segregation indices would point in the same direction. These segregation curves over time do not overlap for blacks either, but there is some overlapping at the bottom for whites between 2001 and 2007, which indicates no robust improvement in that case because indices more sensitive to occupations in which men are more strongly under-represented could point at an increase in segregation.

A note of caution is needed when assessing these trends, however, due to the large and variable proportions of workers with unknown occupations over time. Different assumptions about the actual occupations of these workers, may have a substantial impact on the segregation trend. For that reason, we now consider three possible scenarios as alternatives to the one considered before, in which we treated the unknown category as if it were one only occupation. In the first of these scenarios, we entirely remove workers with unknown occupation from the sample, which is equivalent to assume that their distribution across occupations is the same as for the rest of the sample, conditional on sex. In an intermediate second scenario, we fix the proportion of unknown workers of each sex as in 1996 (and treated as one occupation), with the increase/decrease in 2001 and 2007 redistributed across the other occupations conditional on sex. In a third and last alternative, we split workers with unknown occupation into two completely segregated occupational categories, one entirely made up of men and another with only women in it, thus assuming the worst scenario in terms of dissimilarity.

The robustness results reported in Table 4 show that the decline in segregation between 1996 and 2001 or 2007 is quite robust to the different assumptions about the occupations of those in the unknown category. The decline between 2001 and 2007, however, would be substantially smaller if the distribution of occupations in the unknown category or its changes over time did

[7] The level and trend of segregation is very similar if, in line with Anker et al, 2003, we exclude the agricultural sector (industry code 11: about 7% of all workers in 2007).

not differ much from the rest. If these occupations or changes over time are highly segregated, instead, it could be that segregation would have been constant or even increased between 2001 and 2007.

Table 4. Robustness in the evolution of segregation

	Gini			D		
	1996	**2001**	**2007**	**1996**	**2001**	**2007**
Base Scenario. Unknown as one occupation	0.675	0.629	0.553	0.517	0.472	0.393
Alternative 1. Unknown removed	0.698	0.650	0.609	0.544	0.501	0.454
Alternative 2. Unknown as in 1996, rest removed	0.675	0.628	0.589	0.517	0.476	0.434
Alternative 3. Unknown split into two segregated occupations	0.740	0.694	0.723	0.576	0.534	0.541

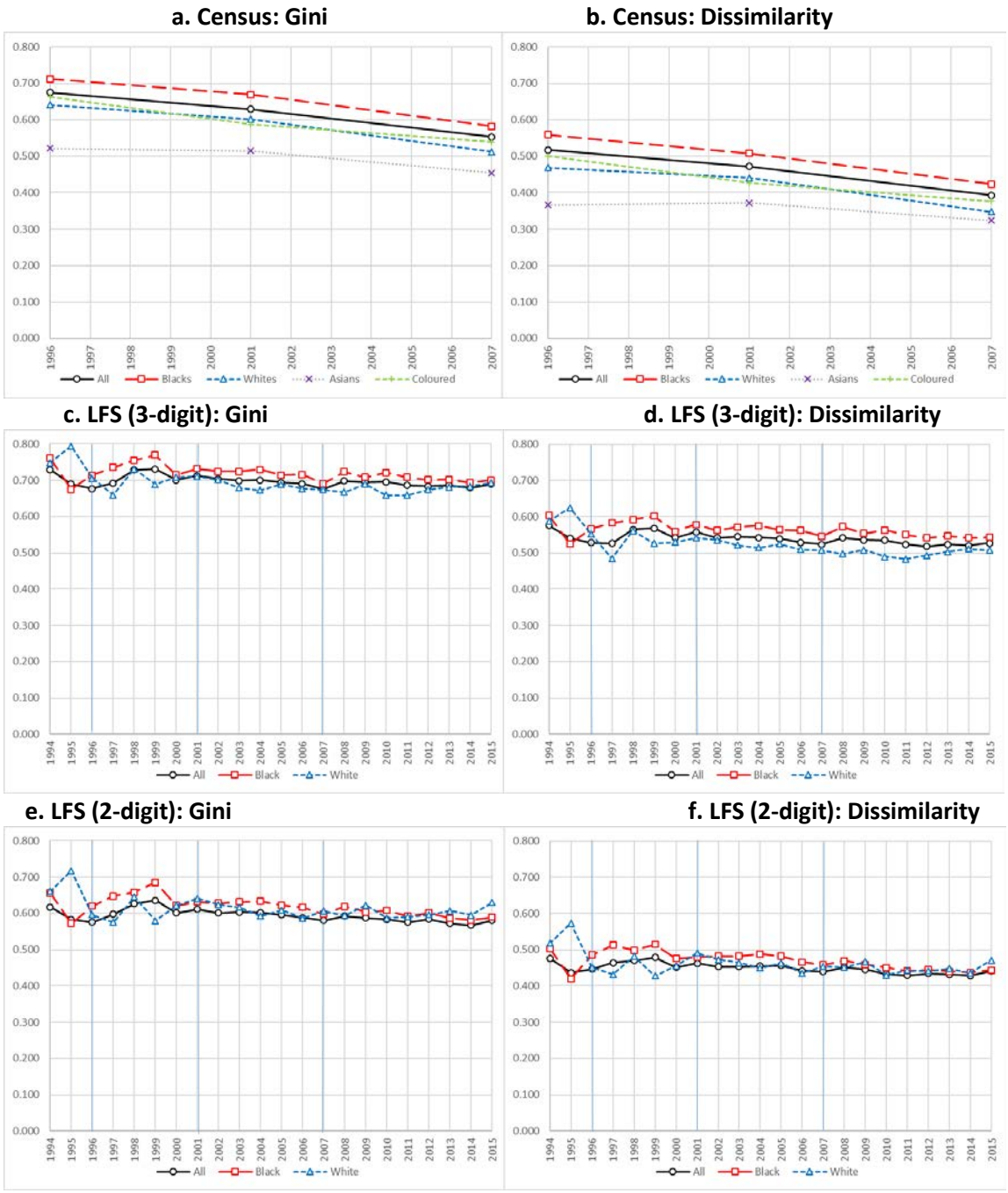
Source: Own construction based on IPUMS-International.

The LFS data point to a much higher persistence of gender segregation than the census (Figure 5.c,d), something that can be partially explained by the data issues discussed in the previous section, especially the under-estimation of domestic helpers in the initial years. We only observe an about 1% reduction with both indices either for the 1996-2007 period covered by the census or for the entire 1994-2015 period. The largest reduction between the highest and lowest pick years is still below 10%. A similar trend is obtained using 1- and 2-digit classifications of occupations (see Figure 5.e,f for 2-digit case).

Looking at the entire LFS trend, we see that after a short decline in the mid´90s[8], segregation appears to fluctuate around its average values of near 0.700 for Gini or 0.540 for dissimilarity. These fluctuations over time are negatively correlated with the proportion of women among workers (-0.217 correlation with Gini and -0.353 with dissimilarity). This suggests that the incorporation of women into employment tends to mitigate segregation because they enter occupations dominated by men. This trend also suggests a high persistence of gender segregation in most recent years in which the series should be more comparable over time. With LFS, we also find that segregation tends to be smaller by gender than by race (about 6-7% on average), and the gap between gender segregation of blacks and whites after 2000 is much smaller than what was found with census data.

[8] This decline would be a bit larger had we not removed workers with unknown occupation from the sample.

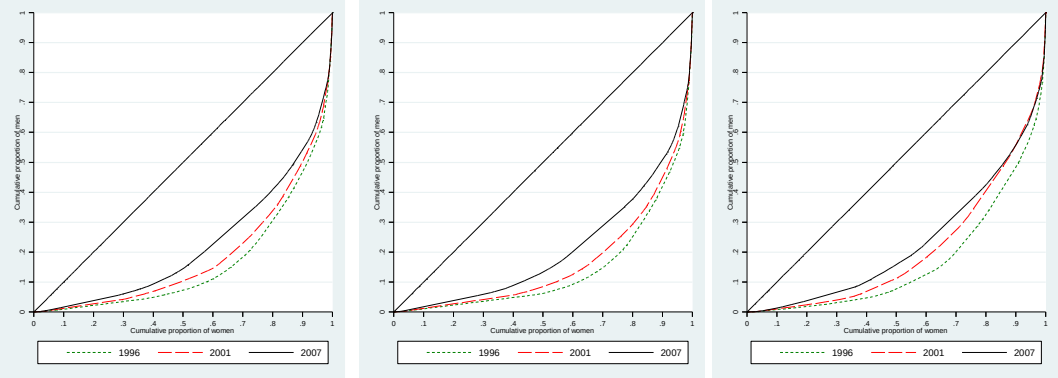
Figure 5. Gender occupational segregation indices



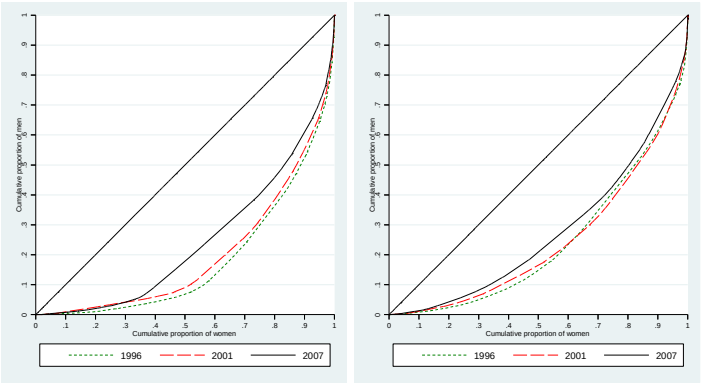
Source: Own construction based on IPUMS-International (census) and PALMS (LFS).

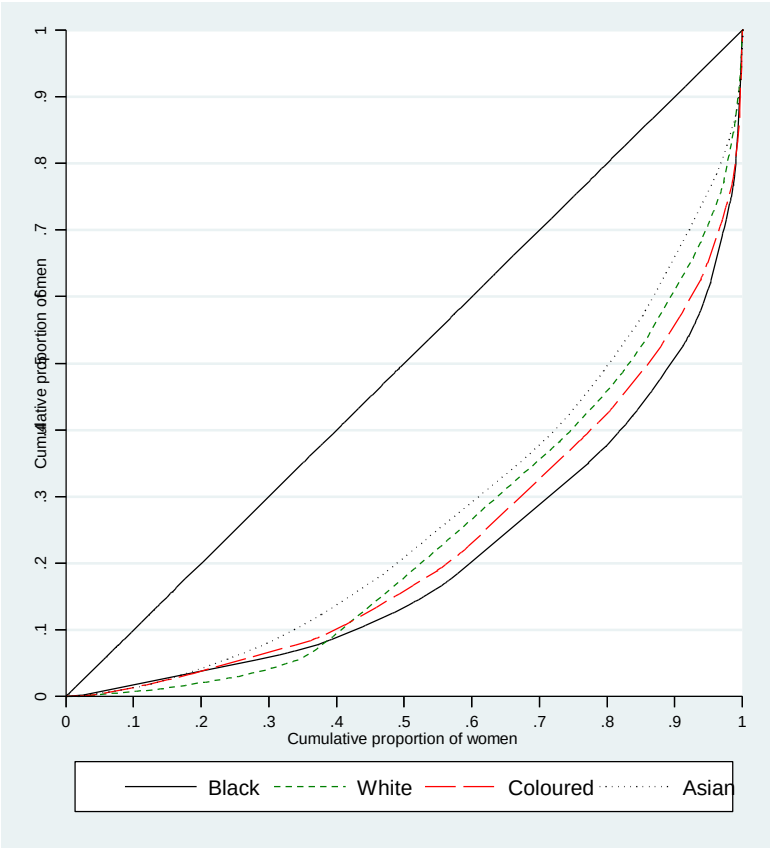
Figure 6. Gender segregation curves by population group

a. All **b. Blacks** **c. Coloured**



d. Whites **e. Asians**





Source: Own construction based on IPUMS-International (3-digit classification).

b. Conditional trends

Working women and men differ to some extent in their characteristics (Table 5). Women working in 2007 tend to be less likely than men to be married (49% versus 61%), Asian or black, and generally attained higher education (42% with secondary school and 9% with a university degree, compared with 38% and 7% of men). More working women are in middle-aged groups and live in rural areas or in provinces such as Eastern and Western Cape or KwaZulu-Natal (and a lower proportion in Gauteng or North West). These differences result from both, gender differences in the working-age population and a strong sorting of women into employment. Our analysis focuses only on the employed population. We will estimate segregation and

stratification conditional on gender differences in these observable characteristics, but, unlike some of the traditional wage gap decompositions, the available methodology does not allow to control for potential selection bias caused by unobservable traits, especially among women who have the lowest employment rates.

Those differences in observable characteristics by gender altogether explained virtually nothing of their occupational segregation in any year and population group, however. Only between 0 and 2% of Gini segregation goes away after women are given the characteristics of men while keeping their conditional occupational distribution in South Africa (Table 6).[9] This might be somehow underestimated for not considering the different field of degree of college workers of each gender, as occurred in the case of the US (the total segregation explained rose from 1.7 to 7.1% after including that variable in that case using a similar approach in Gradín, 2017a). But it seems that gender segregation has little or nothing to do with workers´ distinct characteristics by gender. In contrast, about 29% of racial segregation in 2007 in South Africa was directly associated with differences in observed characteristics between blacks and whites (Gradín, 2017b).

5.2 Occupational stratification by gender

a. Unconditional trends

The previous section showed that the labour market in South Africa is segregated along gender lines, but this does not consider the quality of the occupations that women and men hold. The concentration curve crossing the diagonal from below in 2007 (Figure 7.a) reflects the large over-representation of women at the bottom of the earnings occupational distribution, but also at occupations at intermediate positions. The cumulative proportion of women in least-paying occupations is larger than that for men up to the level in which both groups accumulate about 44% of workers (when the concentration curve crosses the diagonal indicating restricted stochastic dominance).

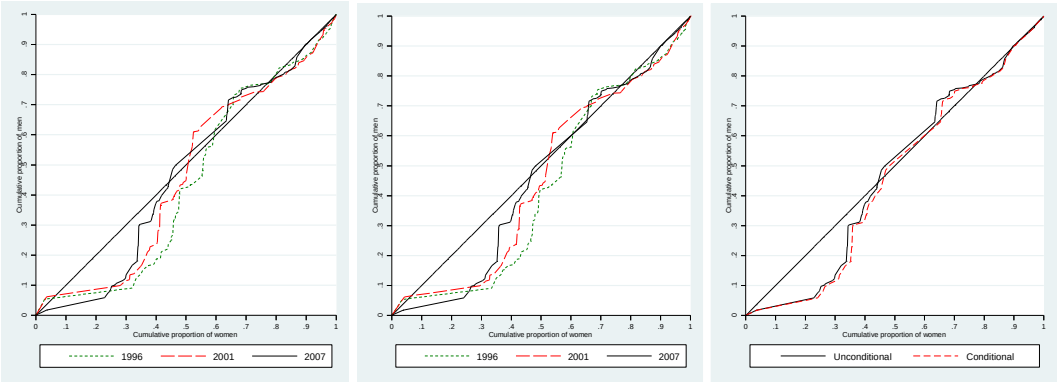
It is in the nature of gender segregation where we find more striking differences across population groups. Only black and, to a lower extent, Coloured women are clearly over-represented in lowest-paying occupations in 2007 compared with men of their own race (their concentration curves fall below the diagonal at the bottom of the distribution, Figures 8.a,b). This is the result of the importance of (low-paying) female domestic helpers among these two

[9] The proportion of segregation explained is only slightly higher (2.1%) if, instead, we give women the male conditional distribution across occupations (while keeping their own distribution of characteristics), i.e. we reweight the male sample to reproduce women´s characteristics.

groups, 26% and 15% respectively, compared with only around 1% of white and Asian women (Figure 4). On the contrary, it is men who are over-represented at the bottom of the occupational earnings distribution in the case of whites and, especially, Asians (their concentration curves fall above the diagonal at the bottom, Figures 8.c,d). However, the "bottom" has a different meaning for these two groups (it is equivalent to the set of occupations at the middle range of income for the other groups) given the marginal proportions of whites and Asians of any gender in occupations with average income below 50% of the median.

Figure 7. Concentration curves

a. Unconditional **b. Conditional** **c.2007**

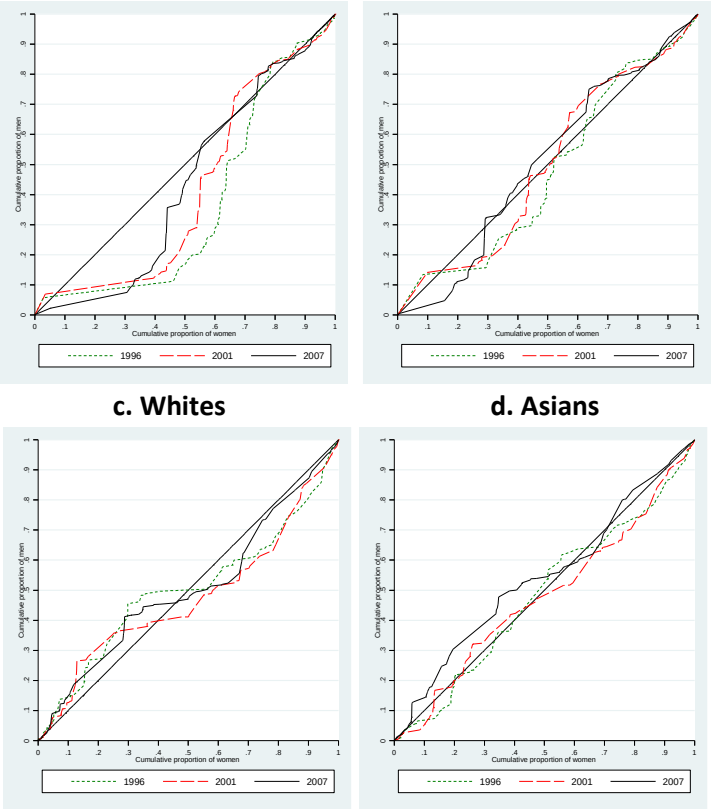


Source: Own construction based on IPUMS-International.

Figure 8. (Unconditional) Concentration curves by population groups

a. Blacks **b. Coloured**

c. Whites **d. Asians**



Source: Own construction based on IPUMS-International.

The concentration curves of the different years overlap, but there is some reduction in the stratification of women at the very bottom of the distribution between 1996 and 2001 at the country level (and for blacks), but an increase between that year and 2007.[10] For the rest of the distribution of occupations, however, the concentration curve gets closer to the equality line. Therefore, to draw a conclusion on the overall trends, we must rely on the indices of concentration that aggregate these contradictory changes.

The Gini measure of concentration exhibit positive values, indicating that, on the overall, if we consider any possible low-pay threshold, there is stratification by gender, with women segregated into relatively low-paying occupations, but with a clear downward trend over time (around 50% reduction with Gini in Figure 9.a). However, due to the changes in the concentration curves above, had we relied on indices more sensitive to the very bottom of the distribution, stratification would have increased between 1996 and 2007 (e.g. computing the Gini for a restricted range of low-paying occupations).

Thus, the labour market is not only less segregated by gender, but also the remaining segregation implies in general less stratification (except for the bottom): the low-pay segregation Gini ratio went down from 19% of segregation in 1996 to 12% in 2007.[11][12] The reduction in stratification between 2001 and 2007, unlike that in 1996 compared with either 2001 or 2007, is not robust to the removal from the sample of the category of workers with unknown occupation or the change by gender in the share of that category over time (see Table 6). [13]

[10] This is however, the result of a slight change. The worst-paying occupation with a significant number of workers in 2001 was a male-dominated one, 921 "Agricultural, fishery and related labourers". It was followed by two largely female-dominated occupations: 913 "Domestic and related helpers, cleaners and launderers" and 911 "Street vendors and related workers" (with an integrated one, 614 "Forestry and related workers", in the middle). In 2007, the worst-paying significant occupations were all female-dominated, such as 621 "Subsistence agricultural and fishery workers", and the above-mentioned 913 and 921 (also 912 "Shoe cleaning and other street services elementary occupations" with men over-representation, but much smaller).

[11] The dissimilarity ratio was rather constant, instead: 44% in 1996, 41% in 2001 and 44% again in 2007. This results from the fact that the main improvement in terms of stratification did not occurred at the bottom of the earnings distribution, where the largest gap between both cumulative distributions (i.e. the dissimilarity index) was obtained.

[12] If we forget about comparability issues, this means that occupations are more segregated and to a larger degree stratified in the US than in South Africa (Gradín, 2017a), although the figures are much closer if we restrict the analysis to black South Africans. In 2007 segregation in the US was 0.682 (Gini) and 0.512 (dissimilarity); concentration was 0.204 (Gini) and 0.200 (dissimilarity), that is respectively 30% and 39%.

[13] Similarly, the Dissimilarity indices show a smaller reduction of about 24% between 1996 and 2007, with also the reduction between 2001 and 2007 not being robust to what assumptions we made about workers with unknown occupation. For simplicity, we focus here in the Gini concentration index.

On the overall, the distribution of occupations seems to be only strongly stratified in the case of black women compared with men of their own population group, it is roughly neutral for Coloured and whites (the concentration Gini index is around zero), while Asian women tend to be more clearly segregated into high-paying occupations (the low-pay index is negative). The areas between the concentration curve and the diagonal falling above and below the latter cancel out for whites and Coloured, but their situation is different (as revealed in Figure 7). While Coloured tend to be over-represented at the bottom, this is compensated by a higher over-representation at the middle. In the case of whites, it is men who are over-represented at the bottom (which is the middle for Coloureds or blacks), but this is compensated by their over-representation at occupations with also higher earnings. This means that Coloured women are segregated at low-paying occupations along black women if we restrict the measure to the bottom 30% of women in worst-paying occupations. The value of Gini would be positive (0.041) although still below the corresponding value for blacks (0.066) and in contrast with the negative levels obtained for whites (-0.030) and Asians (-0.039) in that case.

The trends over time of these population groups also differ. Black and Coloured women improved their situation over time, especially between 1996 and 2001. For example, the concentration Gini ratios for blacks went down from 38% of segregation in 1996 to 24% in 2007, from 8% to 2% in the case of Coloureds. Between 1996 and 2001, white women exhibited an increase in their low-pay segregation (from nearly zero), smaller in the case of Asians. Between 2001 and 2007 these two groups reduced their low-pay segregation, with Asians becoming more clearly segregated into high-paying jobs (about 19% of segregation is of this type).

These levels of low-pay segregation of women in 2007 are smaller (8% and 11%) than those based on race (blacks compared with whites) in Gradín (2017b) using the same approach. Low-pay segregation were similar for blacks and women in 1996, but the former exhibited a more modest decline (13 and 16%) over time.

The trend with LFS (Figure 9) shows an increase of women´s Gini low-pay segregation between 1994 and 2000 (excluding the outlier 1995 observation displaying negative values), which might be explained by the data issues in the LFS during the first years discussed above. It also shows an (oscillating) decline between 2000-12 (consistent with the 2001-07 reduction in the census). This was also the trend for blacks, but not for whites. The latter exhibited a decline in low-pay segregation until 1999, followed by an increase until 2002, and another decline afterwards, becoming negative in the last two years (which implies high-pay segregation).

In the case of the dissimilarity index, the values are negative in 1995-96, low-pay segregation increases between 1997-2000, declines until 2004 and stagnates after that year.

b. Conditional trends

Differences in characteristics altogether do not explain why South African women tend to be over-represented in low-paying occupations. In fact, with similar characteristics by gender, we would expect to observe a level of stratification about 37% higher with the Gini index (compared with 16% and 25% in the previous years, Table 7).[14] Figure 7.c suggests that there are only small changes in the concentration curves after conditioning on characteristics. The area below the diagonal increases while the area above decreases. That is, only part of the over-representation of women at middle/high-paying occupations can be explained by their characteristics, but neither their large over-representation at the bottom or their under-representation at some top occupations.

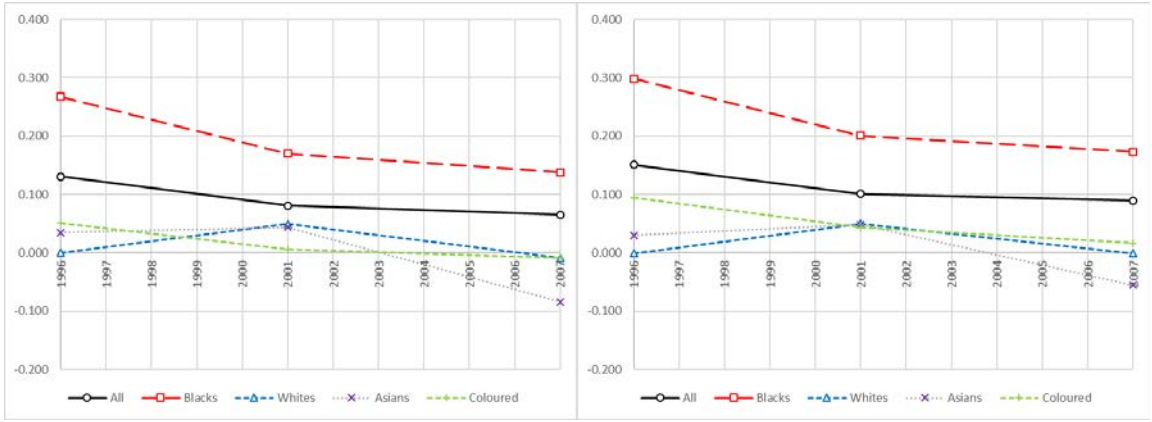
The different distribution of men and women by marital status (with a lower proportion of married women compared with men) increasingly explains significant proportions of women´s low-pay Gini segregation (16% in 1996, 36% in 2007). An additional 8% can be explained in 2007 by the larger proportion of women living in rural areas (as opposed to a negative contribution in the other years when the proportion of working women living in urban areas was higher than for men). But these effects are more than compensated by a much stronger and also increasing negative impact of education (-21% in 1996, -83% in 2007) which prevents women to be even more segregated into low-pay. This is also the situation of black women. Their characteristics prevent low-pay segregation to be higher (an effect of -26%), especially due to education (-42%) more than compensating the positive effects of marital status (10%), age (5%) or area of residence (2%). All the high-pay segregation of whites, Coloured, and one third of that of Asians can be explained by their women´s distinct characteristics, education being the most important. Coloured women would in fact be segregated into low-paying occupations if they had men´s characteristics. These facts indicate that education has become an effective way for women of all population groups to scale up in the pay distribution. [15]

[14] Stratification would be about 28% higher with the alternative counterfactual in which we give women the male conditional distribution across occupations.

[15] The effect of education might be over-estimated given the lack of information about field of college degree, as women tend to specialize in fields with lower average earnings (see Gradín, 2017a for the US). However, the impact would be smaller in South Africa as only 9% of women and 7% of men had university degree in 2007. The advantage of women is larger in secondary education (42% versus 38%).

Figure 9. Gini low-pay segregation of women (Census)

a. Unconditional **b. Conditional**

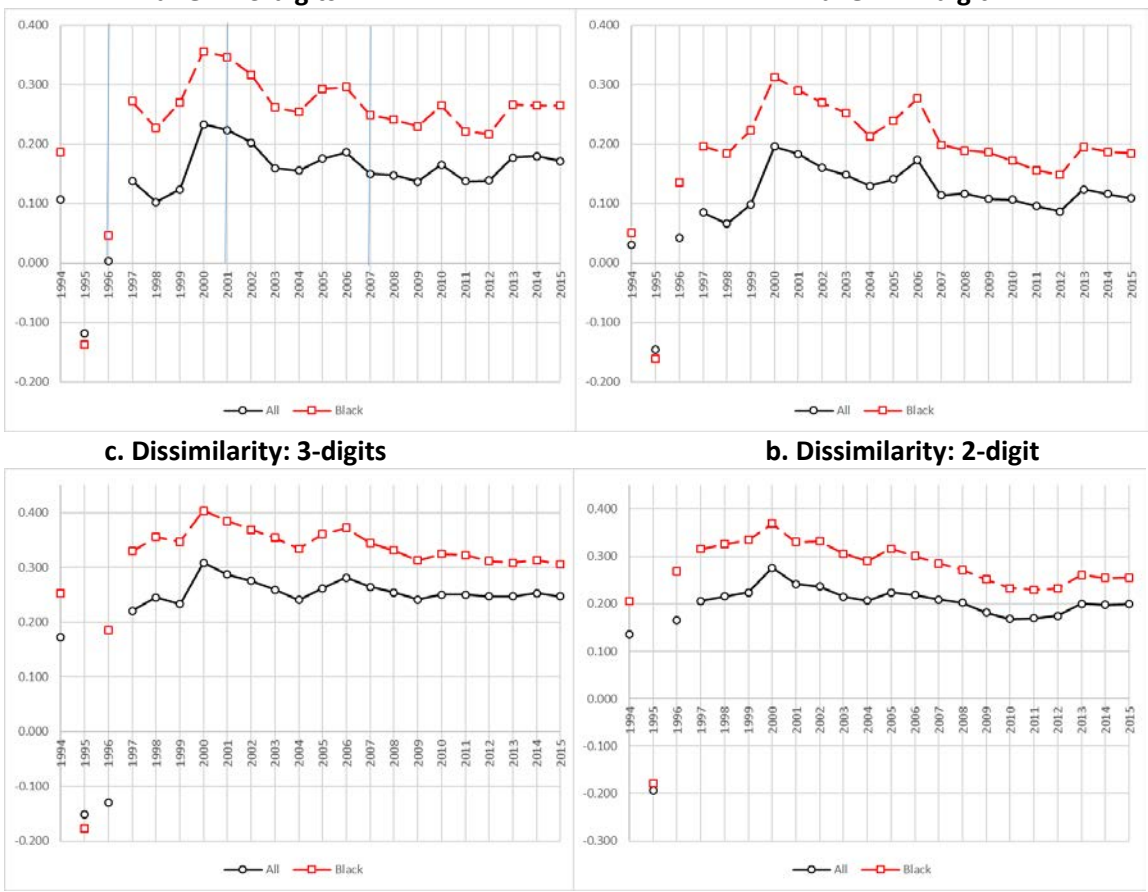


Source: Own construction based on IPUMS-International (3-digit classification).

Figure 10. Low-pay segregation of women (LFS)

a. Gini: 3-digits **b. Gini: 2-digit**

c. Dissimilarity: 3-digits **b. Dissimilarity: 2-digit**



Source: Own construction based on PALMS.

Table 5. Workers' characteristics by gender

	Women			Men		
	1996	2001	2007	1996	2001	2007
Rural	24.1	22.7	26.1	27.5	25.8	24.3
Urban	75.9	77.3	74.0	72.5	74.2	75.7
Western Cape	16.3	16.8	16.2	15.4	15.5	15.0
Eastern Cape	9.9	9.0	11.2	8.5	7.5	8.5
Northern Cape	2.3	2.0	1.8	2.6	2.2	2.0
Free State	7.1	6.1	5.1	7.0	6.3	5.9
KwaZulu-Natal	17.7	17.4	17.3	17.1	16.2	15.7
North West	7.0	6.5	6.0	8.2	8.4	8.3
Gauteng	27.5	29.8	28.8	28.0	30.8	31.3
Mpumalanga	6.0	5.7	6.7	7.4	6.8	7.6
Limpopo	6.3	6.7	7.0	6.0	6.3	5.8
No schooling	10.2	9.2	5.3	11.6	10.0	5.3
Some primary	8.3	8.3	8.0	9.6	9.9	9.9
Primary	20.0	16.6	14.6	20.1	17.2	16.3
Lower secondary	21.0	20.1	20.4	20.9	21.4	22.1
Secondary	31.2	39.6	41.9	28.1	35.5	38.0
University	4.2	6.3	8.6	4.2	6.1	7.4
Other education	3.9	0.0	1.3	4.1	0.0	1.1
Unknown education	1.3	0.0	0.0	1.5	0.0	0.0
15-24 years old	12.8	11.5	12.6	12.5	11.6	13.4
25-34 years old	34.6	31.6	28.6	34.3	33.3	30.3
35-44 years old	30.3	31.8	29.9	28.8	29.6	27.7
45-54 years old	16.4	19.0	21.0	17.1	18.1	19.6
55-65 years old	5.9	6.1	8.0	7.3	7.4	9.0
White	22.1	20.8	17.0	21.0	19.7	16.0
African/Black	59.6	61.2	67.9	61.0	63.2	69.4
Indian/Asian	3.6	3.9	3.4	4.6	4.8	4.2
Coloured	13.7	14.2	11.7	12.5	12.4	10.4
Other	1.0	0.0	0.0	0.9	0.0	0.0
Single/never married/unknown	36.0	35.9	39.8	31.1	29.1	35.6
Married/in union	51.8	51.9	48.8	65.4	67.6	61.2
Separated/divorced/spouse absent	7.2	7.1	5.6	2.6	2.4	2.0
Widowed	4.9	5.2	5.8	0.9	0.9	1.2
Disabled	5.8	2.8	1.7	5.2	2.8	1.8
Native	91.2	94.1	94.9	88.8	92.8	92.4
National immigrant	7.9	5.4	4.4	9.5	6.4	6.2
Immigrant from abroad	0.9	0.5	0.7	1.7	0.9	1.4

Source: Own construction based on IPUMS-International.

Table 6. Segregation indices

	1996			2001			2007		
Gini	**Unc.**	**Unexp.**	**%E**	**Unc.**	**Unexp.**	**%E**	**Unc.**	**Unexp.**	**%E**
All	0.675	0.671	0.7	0.629	0.624	0.8	0.553	0.553	0.1
Black	0.712	0.704	1.1	0.669	0.660	1.4	0.582	0.581	0.2
White	0.641	0.636	0.8	0.602	0.596	0.9	0.512	0.509	0.5
Coloured	0.663	0.656	1.1	0.587	0.582	0.8	0.540	0.535	0.9
Asian	0.522	0.516	1.0	0.514	0.506	1.6	0.454	0.446	1.9
Dissimilarity									
All	0.517	0.512	1.1	0.472	0.465	1.4	0.393	0.393	-0.1
Black	0.559	0.549	1.8	0.507	0.495	2.4	0.423	0.421	0.3
White	0.468	0.466	0.6	0.441	0.438	0.5	0.347	0.346	0.2
Coloured	0.500	0.487	2.6	0.426	0.412	3.4	0.376	0.372	1.1
Asian	0.366	0.362	1.1	0.372	0.362	2.9	0.323	0.315	2.6

Note: Unc.=Unconditional; Unexp.=Conditional; %E=% Explained. Bootstrap standard errors (200 replications).

Source: Own construction based on IPUMS-International (3-digit classification).

Table 7. Robustness in the evolution of low-pay segregation

	Gini			D		
	1996	**2001**	**2007**	**1996**	**2001**	**2007**
Base Scenario. Unknown as one occupation	0.131	0.081	0.065	0.229	0.193	0,175
Alternative 1. Unknown removed	0.149	0.106	0.106	0.241	0.208	0.214
Alternative 2. Unknown as in 1996, rest removed	0.131	0.087	0.092	0.229	0.199	0.205

Source: Own construction based on IPUMS-International.

Table 8. Low-pay Gini segregation index

	1996					2001					2007				
	All	**Black**	**White**	**Coloured**	**Asian**	**All**	**Black**	**White**	**Coloured**	**Asian**	**All**	**Black**	**White**	**Coloured**	**Asian**
Unconditional	0.130	0.267	0.000	0.051	0.035	0.081	0.170	0.049	0.006	0.044	0.065	0.138	-0.009	-0.009	-0.085
Ratio	19.3%	37.5%	0.0%	7.7%	6.7%	12.8%	25.5%	8.2%	1.0%	8.5%	11.8%	23.6%	-1.8%	-1.7%	-18.6%
Unexplained	0.151	0.298	-0.001	0.094	0.030	0.101	0.200	0.050	0.043	0.048	0.090	0.173	-0.001	0.017	-0.056
Explained	-0.020	-0.031	0.001	-0.043	0.005	-0.020	-0.030	-0.001	-0.037	-0.004	-0.024	-0.036	-0.008	-0.026	-0.029
Area	-0.011	-0.004	-0.004	-0.017	-0.002	-0.008	-0.004	-0.003	-0.013	-0.002	0.006	0.003	-0.001	-0.004	-0.003
Province	-0.001	-0.006	-0.002	-0.006	-0.002	0.000	-0.003	-0.003	-0.006	-0.002	0.000	-0.001	-0.001	-0.002	-0.002
Education	-0.027	-0.034	0.003	-0.016	0.020	-0.039	-0.045	0.002	-0.016	-0.005	-0.054	-0.057	-0.004	-0.028	-0.027
Age	-0.003	-0.001	0.004	-0.008	-0.027	0.001	0.007	0.003	-0.005	-0.014	0.002	0.008	0.001	-0.001	-0.008
Race	0.000					-0.002					-0.002				
Marital	0.021	0.016	0.001	0.002	0.015	0.027	0.016	0.000	0.002	0.017	0.023	0.013	-0.002	0.009	0.010
Disability	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.001
Immigration	-0.001	-0.004	0.000	0.000	0.001	0.001	-0.001	0.001	0.000	0.003	0.002	-0.001	0.000	0.001	0.002

Note: Bootstrap standard errors (200 replications). Source: Own construction based on IPUMS-International.

6. Concluding remarks

In this paper, we have analysed gender inequalities in the distribution of occupations in post-apartheid South Africa, making the most of the limited and often problematic available data sources, the census and a series linking different labour force surveys. With these results, we have also contributed to the understanding of segregation in developing countries for which the research on the matter is much scarcer.

We mostly relied on the census data to assess the long-term trend and found a substantial decline in the level of segregation and stratification of occupations by gender, with women persistently holding lower-paying jobs (especially black and Coloured women), but at the same time increasingly filling higher paying positions (especially true for Asian and white women). Using the LFS, we can add that gender segregation has shown to been more persistent in the last years, although the level of stratification continues to decline.

We have found no evidence that this segregation and stratification by gender now or in the past were the result of the distinctive characteristics of male and female workers. Barely no segregation can be justified on these terms, and only the over-representation of women in some higher-paying professional positions may be justified on their higher education and other attributes, but not their over-representation at the bottom of the pay scale. That is, men and women with similar characteristics tend to work in different occupations, with a tendency for (black) women to work in lower-paying jobs.

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APPENDIX

Table A1. Occupational gender segregation (All)

	Segregation indices						Concentration indices and ratios											
	Gini			Dissimilarity			Gini						Dissimilarity					
Digits	1	2	3	1	2	3	1	ratio	2	ratio	3	ratio	1	ratio	2	ratio	3	ratio
1994	0.361	0.617	0.730	0.291	0.476	0.576	0.001	0.2	0.031	5.0	0.107	14.6	-0.148	-50.7	0.136	28.5	0.172	29.9
1995	0.454	0.583	0.689	0.337	0.437	0.541	-0.195	-42.9	-0.146	-25.0	-0.119	-17.2	-0.277	-82.1	-0.193	-44.2	-0.152	-28.1
1996	0.379	0.576	0.677	0.304	0.446	0.528	-0.011	-2.9	0.043	7.5	0.003	0.5	-0.157	-51.8	0.166	37.2	-0.129	-24.4
1997	0.414	0.598	0.692	0.338	0.464	0.527	0.000	0.1	0.085	14.2	0.138	20.0	-0.143	-42.3	0.206	44.4	0.221	41.9
1998	0.444	0.627	0.729	0.362	0.470	0.565	0.038	8.5	0.066	10.6	0.102	14.1	0.150	41.3	0.216	45.9	0.245	43.3
1999	0.444	0.636	0.731	0.365	0.479	0.568	-0.002	-0.4	0.099	15.5	0.124	16.9	-0.152	-41.5	0.224	46.8	0.233	40.9
2000	0.414	0.601	0.701	0.323	0.451	0.542	0.151	36.4	0.196	32.6	0.233	33.3	0.212	65.6	0.276	61.2	0.308	56.9
2001	0.422	0.612	0.713	0.336	0.462	0.558	0.154	36.5	0.184	30.0	0.224	31.4	0.192	57.0	0.242	52.4	0.287	51.5
2002	0.418	0.601	0.704	0.327	0.453	0.542	0.095	22.8	0.160	26.7	0.202	28.7	0.175	53.6	0.237	52.2	0.275	50.8
2003	0.394	0.604	0.699	0.310	0.453	0.545	0.113	28.6	0.148	24.6	0.159	22.8	0.163	52.6	0.215	47.5	0.259	47.6
2004	0.397	0.602	0.701	0.314	0.455	0.543	0.093	23.5	0.130	21.6	0.155	22.2	0.149	47.4	0.207	45.4	0.241	44.4
2005	0.393	0.596	0.694	0.308	0.456	0.539	0.092	23.4	0.141	23.7	0.175	25.3	0.156	50.7	0.224	49.1	0.262	48.5
2006	0.383	0.588	0.691	0.303	0.442	0.529	0.101	26.5	0.174	29.5	0.186	27.0	0.162	53.5	0.219	49.6	0.281	53.1
2007	0.381	0.580	0.675	0.294	0.439	0.524	0.065	17.1	0.114	19.6	0.150	22.3	-0.130	-44.4	0.209	47.5	0.264	50.4
2008	0.392	0.592	0.698	0.314	0.452	0.542	0.077	19.5	0.117	19.7	0.148	21.2	0.146	46.5	0.203	44.9	0.254	46.9
2009	0.398	0.588	0.695	0.316	0.445	0.535	0.077	19.4	0.108	18.3	0.137	19.7	0.146	46.1	0.182	40.8	0.241	45.0
2010	0.402	0.583	0.695	0.310	0.433	0.535	0.069	17.3	0.107	18.3	0.166	23.8	0.141	45.4	0.168	38.9	0.250	46.8
2011	0.400	0.576	0.686	0.304	0.429	0.524	0.069	17.1	0.096	16.6	0.138	20.1	0.133	43.7	0.169	39.4	0.250	47.7
2012	0.403	0.584	0.684	0.308	0.434	0.518	0.077	19.1	0.087	14.9	0.139	20.3	0.143	46.2	0.175	40.2	0.247	47.6
2013	0.402	0.572	0.686	0.312	0.432	0.524	0.074	18.5	0.124	21.6	0.177	25.9	0.144	46.0	0.200	46.3	0.247	47.2
2014	0.396	0.567	0.679	0.309	0.429	0.521	0.069	17.3	0.116	20.5	0.180	26.5	0.140	45.4	0.198	46.2	0.253	48.6
2015	0.408	0.581	0.690	0.320	0.441	0.527	0.054	13.3	0.109	18.8	0.172	24.9	-0.139	-43.3	0.200	45.3	0.247	46.9

Source: Own construction based on PALMS.

Table A2. Occupational gender segregation (Blacks)

	Segregation indices						Concentration indices and ratios											
	Gini			Dissimilarity			Gini						Dissimilarity					
Digits	1	2	3	1	2	3	1	ratio	2	ratio	3	ratio	1	ratio	2	ratio	3	ratio
1994	0.315	0.656	0.761	0.261	0.504	0.604	0.061	19.4	0.051	7.7	0.187	24.6	0.136	52.1	0.205	40.7	0.253	41.9
1995	0.408	0.572	0.675	0.292	0.420	0.525	-0.179	-43.9	-0.161	-28.2	-0.137	-20.3	-0.236	-81.1	-0.179	-42.5	-0.178	-33.9
1996	0.394	0.620	0.714	0.332	0.485	0.566	0.082	20.7	0.136	21.9	0.046	6.5	0.210	63.4	0.268	55.2	0.185	32.6
1997	0.429	0.648	0.735	0.373	0.513	0.582	0.089	20.6	0.197	30.3	0.272	37.0	0.217	58.2	0.316	61.5	0.330	56.6
1998	0.455	0.658	0.755	0.382	0.498	0.592	0.158	34.7	0.184	28.0	0.227	30.1	0.240	62.8	0.326	65.3	0.355	60.0
1999	0.480	0.686	0.769	0.418	0.515	0.601	0.089	18.6	0.224	32.6	0.270	35.2	0.237	56.7	0.335	65.1	0.347	57.8
2000	0.415	0.621	0.715	0.330	0.475	0.560	0.252	60.8	0.313	50.4	0.356	49.8	0.289	87.7	0.369	77.7	0.404	72.1
2001	0.424	0.632	0.733	0.338	0.480	0.579	0.261	61.6	0.291	46.0	0.347	47.3	0.264	78.1	0.331	68.9	0.384	66.4
2002	0.427	0.628	0.725	0.335	0.482	0.562	0.187	43.7	0.270	42.9	0.317	43.8	0.250	74.5	0.332	68.8	0.369	65.7
2003	0.384	0.631	0.725	0.320	0.482	0.572	0.206	53.7	0.253	40.0	0.262	36.1	0.237	74.0	0.305	63.3	0.354	62.0
2004	0.386	0.633	0.729	0.320	0.488	0.575	0.180	46.6	0.213	33.7	0.254	34.8	0.216	67.6	0.290	59.4	0.334	58.0
2005	0.379	0.622	0.714	0.311	0.482	0.564	0.190	50.2	0.239	38.5	0.293	41.0	0.225	72.5	0.316	65.5	0.361	63.9
2006	0.370	0.617	0.716	0.305	0.466	0.562	0.195	52.7	0.277	44.9	0.296	41.3	0.228	74.7	0.301	64.5	0.372	66.2
2007	0.365	0.597	0.690	0.301	0.458	0.546	0.146	40.0	0.199	33.3	0.249	36.1	0.191	63.7	0.285	62.2	0.345	63.1
2008	0.373	0.619	0.723	0.317	0.469	0.572	0.145	38.9	0.189	30.6	0.241	33.3	0.203	64.0	0.271	57.8	0.331	57.8
2009	0.375	0.604	0.708	0.317	0.459	0.554	0.153	40.8	0.186	30.8	0.230	32.4	0.209	65.8	0.251	54.8	0.313	56.5
2010	0.385	0.608	0.721	0.312	0.451	0.563	0.138	35.9	0.172	28.3	0.265	36.7	0.192	61.6	0.233	51.7	0.324	57.7
2011	0.386	0.593	0.709	0.310	0.441	0.550	0.133	34.4	0.156	26.3	0.221	31.2	0.186	60.0	0.230	52.2	0.322	58.6
2012	0.392	0.601	0.702	0.317	0.444	0.542	0.135	34.5	0.148	24.7	0.217	30.9	0.192	60.7	0.232	52.2	0.311	57.5
2013	0.389	0.587	0.703	0.319	0.441	0.547	0.127	32.5	0.196	33.3	0.267	38.0	0.188	59.0	0.261	59.3	0.308	56.4
2014	0.381	0.581	0.693	0.312	0.437	0.542	0.118	31.1	0.187	32.2	0.265	38.2	0.182	58.3	0.255	58.2	0.314	57.9
2015	0.391	0.589	0.701	0.318	0.444	0.543	0.107	27.3	0.185	31.3	0.265	37.8	0.173	54.5	0.255	57.5	0.305	56.1

Source: Own construction based on PALMS.

Table A3. Occupational gender segregation (Whites)

	Segregation indices						Concentration indices and ratios											
	Gini			Dissimilarity			Gini						Dissimilarity					
Digits	1	2	3	1	2	3	1	ratio	2	ratio	3	ratio	1	ratio	2	ratio	3	ratio
1994	0.575	0.661	0.748	0.425	0.518	0.588	-0.053	-9.2	0.105	15.9	0.102	13.6	-0.286	-67.1	0.217	41.9	0.200	34.0
1995	0.633	0.718	0.794	0.455	0.573	0.625	-0.059	-9.4	0.144	20.0	0.160	20.2	-0.322	-70.8	0.255	44.5	0.235	37.6
1996	0.479	0.596	0.706	0.344	0.451	0.553	-0.064	-13.3	0.044	7.3	0.054	7.6	-0.245	-71.3	-0.156	-34.7	0.175	31.6
1997	0.493	0.575	0.660	0.343	0.432	0.485	-0.062	-12.5	-0.012	-2.1	-0.001	-0.2	-0.247	-72.0	-0.163	-37.7	-0.181	-37.4
1998	0.545	0.645	0.731	0.391	0.483	0.561	-0.058	-10.7	-0.020	-3.1	-0.017	-2.4	-0.208	-53.1	-0.111	-22.9	-0.140	-25.0
1999	0.471	0.580	0.689	0.325	0.428	0.527	-0.039	-8.2	0.020	3.5	-0.068	-9.9	-0.204	-62.7	-0.123	-28.6	-0.171	-32.4
2000	0.536	0.622	0.708	0.380	0.456	0.530	-0.031	-5.9	0.008	1.3	0.013	1.8	-0.246	-64.6	-0.166	-36.4	-0.191	-36.1
2001	0.553	0.641	0.711	0.395	0.491	0.542	0.030	5.4	0.050	7.8	0.060	8.4	-0.236	-59.7	0.155	31.6	-0.180	-33.2
2002	0.509	0.624	0.701	0.372	0.473	0.536	0.014	2.7	0.069	11.0	0.096	13.6	-0.211	-56.7	0.167	35.3	0.216	40.3
2003	0.520	0.616	0.679	0.378	0.464	0.521	0.052	10.1	0.046	7.5	0.056	8.2	-0.207	-54.7	-0.137	-29.6	-0.162	-31.1
2004	0.503	0.593	0.672	0.375	0.450	0.514	0.038	7.6	0.052	8.7	0.044	6.5	-0.210	-56.0	0.184	40.8	-0.160	-31.1
2005	0.516	0.609	0.689	0.377	0.463	0.524	-0.021	-4.0	0.032	5.3	0.028	4.0	-0.227	-60.3	-0.186	-40.2	-0.187	-35.6
2006	0.498	0.587	0.677	0.351	0.436	0.510	-0.021	-4.1	-0.001	-0.2	-0.001	-0.2	-0.243	-69.3	-0.183	-42.0	-0.177	-34.6
2007	0.511	0.606	0.674	0.373	0.454	0.507	-0.016	-3.2	-0.010	-1.7	-0.011	-1.6	-0.252	-67.5	-0.206	-45.4	-0.192	-37.8
2008	0.512	0.594	0.668	0.382	0.451	0.498	0.078	15.3	0.079	13.3	0.053	8.0	-0.194	-50.7	0.149	33.0	0.152	30.5
2009	0.536	0.622	0.690	0.373	0.467	0.509	0.058	10.8	0.043	6.8	0.026	3.8	-0.226	-60.6	-0.162	-34.6	-0.161	-31.6
2010	0.498	0.586	0.659	0.357	0.430	0.490	0.045	9.0	0.095	16.3	0.075	11.3	-0.192	-53.8	0.183	42.6	0.124	25.2
2011	0.487	0.591	0.659	0.348	0.443	0.483	0.042	8.6	0.090	15.2	0.054	8.1	-0.181	-52.0	0.156	35.2	0.132	27.3
2012	0.487	0.596	0.674	0.349	0.441	0.493	0.026	5.4	0.011	1.9	0.008	1.2	-0.200	-57.4	-0.154	-35.0	-0.157	-31.9
2013	0.497	0.607	0.682	0.364	0.448	0.504	0.042	8.4	0.048	7.9	0.034	5.0	-0.190	-52.1	-0.141	-31.5	-0.141	-28.0
2014	0.496	0.595	0.684	0.356	0.436	0.511	0.013	2.6	-0.007	-1.2	-0.004	-0.6	-0.203	-57.1	-0.166	-38.2	-0.138	-27.0
2015	0.520	0.631	0.693	0.373	0.471	0.508	-0.017	-3.4	-0.042	-6.6	-0.043	-6.3	-0.226	-60.6	-0.184	-39.0	-0.169	-33.4

Source: Own construction based on PALMS.

Table A4. Occupational gender segregation (Coloured)

	Segregation indices						Concentration indices and ratios											
	Gini			Dissimilarity			Gini						Dissimilarity					
Digits	1	2	3	1	2	3	1	ratio	2	ratio	3	ratio	1	ratio	2	ratio	3	ratio
1994	0.357	0.553	0.707	0.267	0.409	0.520	0.034	9.4	0.065	11.8	0.132	18.6	-0.111	-41.7	0.115	28.2	0.151	29.0
1995	0.366	0.528	0.695	0.256	0.397	0.547	-0.076	-20.9	-0.067	-12.8	-0.047	-6.8	-0.155	-60.5	-0.122	-30.8	-0.151	-27.6
1996	0.310	0.545	0.707	0.224	0.403	0.542	-0.036	-11.6	-0.014	-2.5	-0.025	-3.5	-0.164	-73.1	-0.088	-21.9	-0.145	-26.7
1997	0.325	0.518	0.661	0.255	0.365	0.491	-0.056	-17.3	0.010	2.0	0.062	9.4	-0.143	-56.1	0.103	28.1	0.130	26.5
1998	0.374	0.563	0.712	0.289	0.401	0.532	-0.029	-7.9	0.010	1.7	0.047	6.6	-0.139	-48.2	0.127	31.7	0.154	29.1
1999	0.367	0.608	0.720	0.299	0.461	0.564	-0.018	-5.0	0.056	9.2	0.084	11.6	-0.116	-38.8	0.131	28.4	0.183	32.4
2000	0.409	0.607	0.733	0.316	0.446	0.569	-0.014	-3.3	0.015	2.5	0.075	10.2	-0.143	-45.2	0.118	26.4	0.158	27.8
2001	0.364	0.592	0.717	0.283	0.448	0.562	0.010	2.8	0.040	6.8	0.068	9.5	-0.133	-47.0	0.117	26.2	0.145	25.8
2002	0.366	0.561	0.721	0.279	0.418	0.559	-0.031	-8.5	0.006	1.0	0.049	6.8	-0.141	-50.6	-0.095	-22.8	0.137	24.6
2003	0.353	0.581	0.711	0.260	0.439	0.555	0.001	0.2	0.037	6.4	0.029	4.1	-0.137	-52.5	-0.092	-20.9	0.123	22.1
2004	0.376	0.574	0.691	0.290	0.431	0.529	0.010	2.8	0.044	7.7	0.059	8.5	-0.147	-50.6	0.104	24.1	0.168	31.8
2005	0.381	0.567	0.713	0.290	0.435	0.546	-0.020	-5.3	0.038	6.7	0.054	7.6	-0.163	-56.0	0.104	23.9	0.151	27.7
2006	0.381	0.563	0.704	0.305	0.407	0.547	0.002	0.6	0.092	16.3	0.082	11.6	-0.152	-50.0	0.136	33.4	0.172	31.4
2007	0.334	0.573	0.720	0.254	0.420	0.547	-0.028	-8.5	0.042	7.3	0.074	10.3	-0.159	-62.5	0.104	24.9	0.179	32.8
2008	0.364	0.534	0.664	0.277	0.401	0.501	-0.015	-4.2	0.042	7.9	0.056	8.4	-0.161	-58.2	0.108	27.0	0.165	33.0
2009	0.386	0.579	0.711	0.284	0.447	0.550	-0.031	-8.0	0.025	4.3	0.039	5.5	-0.169	-59.7	-0.099	-22.1	0.169	30.7
2010	0.380	0.544	0.697	0.285	0.400	0.529	0.001	0.3	0.054	10.0	0.101	14.5	-0.153	-53.6	0.120	30.0	0.202	38.2
2011	0.340	0.522	0.669	0.250	0.385	0.505	-0.019	-5.5	0.016	3.1	0.055	8.3	-0.156	-62.7	-0.094	-24.5	0.172	34.1
2012	0.355	0.546	0.685	0.268	0.407	0.515	0.003	0.8	0.014	2.6	0.061	9.0	-0.144	-53.5	0.092	22.6	0.182	35.3
2013	0.371	0.528	0.690	0.266	0.391	0.523	-0.018	-4.8	0.031	5.9	0.098	14.2	-0.156	-58.5	0.115	29.4	0.185	35.5
2014	0.387	0.541	0.691	0.270	0.409	0.528	-0.031	-7.9	0.011	2.0	0.084	12.1	-0.160	-59.3	0.117	28.6	0.165	31.2
2015	0.418	0.571	0.718	0.297	0.434	0.543	-0.028	-6.7	0.033	5.8	0.097	13.5	-0.174	-58.7	0.139	32.0	0.197	36.3

Source: Own construction based on PALMS.

Table A5. Occupational gender segregation (Indians/Asians)

	Segregation indices						Concentration indices and ratios											
	Gini			Dissimilarity			Gini						Dissimilarity					
Digits	1	2	3	1	2	3	1	ratio	2	ratio	3	ratio	1	ratio	2	ratio	3	ratio
1994	0.291	0.469	0.624	0.194	0.341	0.465	-0.006	-2.1	0.072	15.3	0.102	16.3	-0.115	-59.3	0.126	36.9	0.124	26.7
1995	0.386	0.526	0.683	0.288	0.384	0.512	-0.102	-26.5	-0.013	-2.5	0.063	9.2	-0.226	-78.3	-0.113	-29.4	0.100	19.5
1996	0.272	0.408	0.630	0.199	0.289	0.470	-0.082	-30.0	0.005	1.1	0.033	5.2	-0.153	-76.8	-0.068	-23.4	0.127	27.0
1997	0.383	0.524	0.667	0.300	0.402	0.494	-0.022	-5.8	0.060	11.4	0.054	8.2	-0.123	-40.9	0.102	25.4	0.091	18.3
1998	0.393	0.649	0.802	0.326	0.523	0.650	-0.140	-35.6	-0.085	-13.2	-0.063	-7.9	-0.161	-49.5	-0.137	-26.3	-0.175	-26.9
1999	0.291	0.559	0.770	0.219	0.408	0.601	-0.053	-18.1	0.015	2.7	0.062	8.0	-0.125	-57.1	0.068	16.8	0.228	38.0
2000	0.423	0.534	0.689	0.334	0.401	0.528	-0.101	-23.8	-0.069	-12.8	-0.039	-5.7	-0.208	-62.1	-0.182	-45.5	-0.174	-33.0
2001	0.366	0.474	0.601	0.277	0.358	0.436	0.045	12.4	0.085	17.9	0.100	16.6	0.121	43.7	0.122	34.2	0.140	32.2
2002	0.372	0.480	0.607	0.277	0.355	0.464	0.031	8.3	0.077	16.2	0.099	16.3	0.117	42.4	0.131	36.9	0.157	33.8
2003	0.380	0.490	0.600	0.276	0.349	0.446	-0.027	-7.1	0.002	0.3	0.042	6.9	-0.166	-60.3	-0.133	-37.9	0.098	21.9
2004	0.356	0.519	0.630	0.250	0.382	0.459	0.075	21.1	0.149	28.7	0.142	22.5	0.164	65.4	0.161	42.0	0.157	34.2
2005	0.394	0.560	0.696	0.296	0.405	0.519	-0.037	-9.4	0.037	6.5	0.054	7.8	-0.190	-64.2	-0.090	-22.2	0.126	24.3
2006	0.399	0.564	0.663	0.302	0.443	0.501	0.012	3.0	0.070	12.4	0.062	9.3	-0.148	-48.9	0.115	25.9	0.130	26.0
2007	0.398	0.518	0.697	0.318	0.394	0.524	-0.023	-5.6	0.010	2.0	-0.006	-0.9	-0.198	-62.1	-0.136	-34.6	-0.173	-33.0
2008	0.430	0.529	0.651	0.322	0.371	0.487	0.003	0.8	0.034	6.5	0.027	4.1	-0.187	-58.1	0.098	26.5	-0.141	-29.0
2009	0.386	0.489	0.631	0.301	0.359	0.458	-0.058	-15.0	-0.033	-6.8	-0.030	-4.8	-0.207	-68.9	-0.143	-39.8	-0.173	-37.9
2010	0.406	0.517	0.645	0.306	0.386	0.473	-0.045	-11.1	0.013	2.5	-0.005	-0.8	-0.184	-60.2	0.110	28.5	-0.112	-23.6
2011	0.432	0.549	0.668	0.322	0.406	0.498	-0.039	-9.0	0.003	0.5	-0.015	-2.2	-0.197	-61.1	-0.132	-32.6	-0.121	-24.3
2012	0.419	0.544	0.659	0.313	0.386	0.477	0.035	8.3	0.041	7.6	0.019	2.9	-0.148	-47.4	0.099	25.6	0.100	20.9
2013	0.401	0.492	0.640	0.289	0.365	0.480	0.017	4.2	0.012	2.5	-0.012	-1.9	-0.147	-50.9	-0.092	-25.3	-0.110	-22.9
2014	0.424	0.501	0.624	0.318	0.381	0.472	-0.016	-3.9	0.003	0.7	0.009	1.4	-0.180	-56.6	0.130	34.2	-0.140	-29.7
2015	0.475	0.558	0.669	0.399	0.422	0.519	-0.131	-27.6	-0.125	-22.4	-0.134	-20.1	-0.258	-64.5	-0.199	-47.2	-0.197	-37.9

Source: Own construction based on PALMS.

Table A6. Occupational segregation by race (standard errors)

	Segregation						Concentration					
	Gini			Dissimilarity			Gini			Dissimilarity		
Digits	1	2	3	1	2	3	1	2	3	1	2	3
1994												
1995												
1996												
1997												
1998												
1999												
2000												
2001												
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												
2010												
2011												
2012												
2013												
2014												
2015												

Source: Own construction based on PALMS.

Table A7. Logit regression coefficients (probability of being male)

	All			White			Black			Asian			Coloured		
	1996	**2001**	**2007**	**1996**	**2001**	**2007**	**1996**	**2001**	**2007**	**1996**	**2001**	**2007**	**1996**	**2001**	**2007**
Urban	0.16***	0.13***	-0.10***	0.39***	0.35***	0.17***	0.14***	0.12***	-0.12***	0.47***	0.62***	0.51*	0.16***	0.14***	0.08*
Eastern Cape	0.15***	0.17***	0.18***	-0.04	-0.01	-0.05	0.35***	0.31***	0.22***	0.2	0.12	0.18	-0.09***	-0.09***	-0.17***
Northern Cape	-0.09***	-0.13***	-0.17***	-0.07*	-0.17***	-0.17*	0.08**	-0.01	-0.19***	0.12	-0.06	-0.44	-0.15***	-0.17***	-0.16***
Free State	0.06***	0.01	-0.20***	-0.06*	-0.06*	-0.01	0.22***	0.10***	-0.24***	0.09	0.1	-0.80*	-0.04	-0.14**	-0.15
KwaZulu-Natal	0.11***	0.12***	0.06**	-0.01	-0.01	-0.02	0.26***	0.21***	0.07**	-0.06	-0.11	-0.09	0.10**	0.06	-0.06
North West	-0.05***	-0.21***	-0.36***	-0.15***	-0.19***	-0.18**	0.08***	-0.17***	-0.40***	-0.11	-0.41**	-0.38	-0.01	-0.16*	-0.38**
Gauteng	-0.02**	-0.05***	-0.11***	-0.01	0	-0.04	0.06***	-0.04**	-0.16***	-0.03	-0.04	0.03	0.07**	0.07**	0.01
Mpumalanga	-0.11***	-0.10***	-0.17***	-0.27***	-0.21***	-0.19***	0.05*	-0.02	-0.18***	-0.16	-0.31*	-0.50*	-0.1	-0.06	-0.16
Limpopo	0.16***	0.16***	0.09***	-0.05	-0.06	-0.17*	0.31***	0.24***	0.09**	-0.03	-0.56***	-0.62	0.14	0.16	-0.27
Some primary	-0.06***	-0.11***	-0.22***	-0.02	0.19	-0.53	-0.05***	-0.13***	-0.23***	0.11	0.31*	0.75*	0.05	0.01	-0.01
Primary (6 years)	0.06***	0.01	-0.09***	-0.75***	-0.26**	-0.67*	0.09***	0.04**	-0.08**	-0.40***	-0.08	0.41	0.18***	0.09**	0.06
Lower secondary	0.06***	-0.02	-0.03	-0.15*	-0.15*	-0.49	0.10***	0.05***	0.03	-0.87***	-0.45***	0	0.14***	0.04	0.02
Secondary	0.18***	0.19***	0.21***	-0.14*	0.11	-0.19	0.22***	0.23***	0.23***	-0.69***	-0.26**	0.39	0.23***	0.18***	0.25***
University	0.11***	0.15***	0.30***	-0.27***	-0.1	-0.32	0.28***	0.41***	0.55***	-0.62***	-0.05	0.63*	0.1	0.08	0.17
Unknown	0.04**		0.22***	-0.38***		-0.11	0.16***		0.27***	-0.70***		0.5	0.06		0.14
Other education	-0.07**			-0.53***			0.28***			-0.79***			-0.07		
Aged 25-34	0.09***	0.13***	0.12***	-0.27***	-0.20***	-0.08	0.20***	0.20***	0.17***	-0.18***	-0.15***	-0.30***	0.13***	0.13***	0.08*
Aged 35-44	0.16***	0.34***	0.32***	-0.44***	-0.31***	-0.27***	0.39***	0.55***	0.46***	-0.37***	-0.30***	-0.36***	0.12***	0.20***	0.26***
Aged 45-54	0.01	0.28***	0.29***	-0.61***	-0.45***	-0.34***	0.30***	0.57***	0.51***	-0.86***	-0.63***	-0.67***	-0.06*	0.08**	0.08
Aged 55-65	-0.26***	-0.07***	0	-0.87***	-0.73***	-0.57***	0.06***	0.26***	0.24***	-1.52***	-1.42***	-1.16***	-0.48***	-0.41***	-0.27***
Married/in union	-0.38***	-0.55***	-0.42***	0.20***	0.18***	0.19***	-0.54***	-0.75***	-0.54***	-0.09**	-0.07*	0	-0.35***	-0.45***	-0.38***
Separated/divorced/ spouse absent	0.86***	0.76***	0.84***	1.02***	1.08***	1.14***	1.02***	0.85***	0.86***	1.18***	1.20***	1.15***	0.76***	0.75***	0.89***
Widowed	1.71***	1.53***	1.44***	2.15***	2.12***	1.98***	1.70***	1.44***	1.34***	2.13***	2.27***	2.34***	1.19***	1.15***	1.27***
Disable	-0.13***	0	0.14***	0.23***	0.22***	0.25*	-0.18***	-0.06***	0.11**	0.18*	0.15	0.31	0.07	0.24***	0.32**
Internal immigrant	-0.18***	-0.16***	-0.30***	-0.08***	-0.11***	-0.18***	-0.19***	-0.19***	-0.35***	0.02	-0.1	-0.03	0.02	-0.03	-0.16
Foreign immigrant	-0.62***	-0.66***	-0.70***	-0.12*	-0.23***	-0.37***	-0.74***	-0.80***	-0.77***	-0.49***	-1.16***	-0.85***	-0.38*	-0.43*	-0.43
Black	-0.05***	-0.08***	-0.06***												
Asian	-0.37***	-0.33***	-0.30***												
Coloured	0.06***	0.11***	0.07***												
Unknown race	0.06*														
Intercept	-0.30***	-0.33***	-0.27***	-0.50***	-0.69***	-0.23	-0.54***	-0.49***	-0.37***	-0.17	-0.64***	-1.23**	-0.48***	-0.46***	-0.54***
Number of obs.	772,590	722,281	233,110	166,560	139,085	33,268	463,790	451,142	160,967	34,025	32,374	7,778	101,029	99,680	31,097
Wald chi2(28)	30,959	33,052	8,924	5,744	4,280	807	24,343	28,037	8,060	1,657	1,567	339	3,002	3,296	822

Note: Omitted categories: Rural, Western Cape, No-schooling, Aged 16-24, Non-immigrant, (White), No disability.

p-values: * <0.05; ** <0.01; *** <0.001. Source: Own construction based on IPIMUS-International.