UNIVERSITY OF CAPE TOWN

Wage Inequality: A Gender and Race Analysis of South African Wages between 1994 and 2015

A mini-thesis submitted in partial fulfilment of the requirements for the degree of

Master of Commerce

Economics

By Jack Thunde

Supervisor: Prof Haroon Bhorat

Declaration

1. I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.
2. This paper entitled: **Wage Inequality: A Gender and Race Analysis of South African Wages between 1994 and 2015** is my own work
3. I have used the convention for citation and referencing adopted by the following journal: **South African Journal of Economics**. Each significant contribution to, and quotation in, this paper from the work(s) of other people has been attributed and has been cited and referenced.
4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.

Signature: Signed by candidate

Table of Contents

List of Figures

List of Tables

Abstract

This paper examines wage inequality among the eight race-gender cohorts in South Africa between 1994 and 2015 by using the 1994 October Household Survey and four waves of the 2015 Quarterly Labour Force Survey. Wage inequality is estimated using the Lorenz Curve, Gini Coefficient, General Entropy class of indices, Atkinson class of measures and Oaxaca-Blinder Decomposition techniques. Quantile regressions are also run to identify potential factors that could explain inequality in the country. Inequality between 1994 and 2015 has increased and the decomposition of the General Entropy class of indices and Atkinson class of measures find that this increase is being driven by within-group inequality as between-group inequality has decreased over the period. The Asian/Indian Female cohort was identified as the most equal cohort in 1994 under a range of inequality measures, with the Coloured Female cohort and the Asian/Indian Male cohort the most unequal and equal cohorts in 2015 respectively. Union membership, educational attainment and the industry an individual worked in were found to be the factors affecting within-group inequality with unions and education attainment contributing to the increasing inequality. Differences in mean wages were found to largely be unexplained showing the presence of discrimination. Black/African Females and Coloured Females experienced the most discrimination in the labour market in 2015 while Asian/Indian Females and White Males experienced substantial favouritism.

1. Introduction

Since the attainment of democracy in 1994, South Africa has grown to become an upper middle-income country. However, the country carries many social indicators suggesting living standards closer to those of lower-middle income or even low-income countries. As is well known, the underlying cause of this lies mainly in the long history of segregation and discrimination that has left a legacy of inequality and poverty (van der Berg & Bhorat, 1999). South Africa entered the post-apartheid era with one of the most unequal distributions in income in the world with inequality in wages a key driver in overall inequality. The government committed itself to the redistribution of income as one of its top priorities, with the introduction of labour market reforms such as the Labour Relations Act (1995), the Basic Conditions of Employment Act (1997) and the Employment Equity Act (1998) (Wittenberg, 2015). These reforms hoped to eliminate racial and gender disparities in the labour market, but the change has not been as rapid as expected and has seen growth in intra-racial income inequality, particularly among Africans (Ntuli & Kwenda, 2014; Wittenberg, 2014). This has seen wage inequality as measured by the Gini coefficient remain the highest in the world for a number of years and remains high to date, to the point that it can be said that South Africa is the most consistently unequal society in the world (Bhorat et al., 2009).

The legacy of apartheid is still yet to be overcome and can still be felt in the labour market to the present day. Apartheid, a political system geared to advance the economic welfare of white people through relatively higher access to quality education, superior jobs, wages and working conditions, and income generating opportunities at the expense of non-whites has shaped the make up on the present-day labour market (van der Berg & Bhorat, 1999; Leibbrandt et al., 2001). The end of apartheid opened the labour market, but natural barriers to entry arising from the system still remained. The education gap between racial groups is seen as one such barrier. Although it is closing due to improvements in educational attainment, especially by Africans and Coloureds, it still exists (Lam & Leibbrandt, 2003). It can be seen by the increasing unemployment in the country due to a mismatch in skills, as there have been increased labour market opportunities for skilled labourers, deteriorating conditions for unskilled workers and a decline of labour market discrimination (Hoogeveen & Ozler, 2004).

Some of the prevailing wage inequality literature has focused on the general level of wage inequality and found that in the post-apartheid period inequality in earnings among employees has increased (Wittenberg, 2016; Leibbrandt et al, 2010; Bhorat et al., 2009). Other wage inequality literature has

focused on racial differences and found that inequality within racial groups has increased substantially while between racial groups wage inequality has decreased slightly resulting in the increase in total inequality (Lam & Leibbrandt, 2003; Leibbrandt, Finn & Woolard, 2012; Bhorat, van der Westuizen & Jacobs, 2009). Some wage inequality literature has focused on gender differences finding that women earn less than men but also that inequality among women is growing (Casale, 2004). However not many studies have analysed the eight groups to get a clear picture of the interaction between race and gender in South Africa especially given its historical background.

With the above in mind this paper addresses the question of wage inequality taking a gender and race approach between 1994 and 2015. It seeks to divide the South African working population into 8 groups stemming from the four racial groups and the two genders to analyse the levels of wage inequality as democracy started in 1994 and to see how they have changed by 2015. It further seeks to identify whether differences between the eight groups are driving wage inequality or whether differences within the groups is where the problem lies. This paper also looks to find possible factors that can best explain the wage inequality observed within each group. Lastly, the paper will find whether discrimination in the labour market can still be experienced and whether it still plays a significant role in explaining wage inequality.

This paper is structured as follows: Section 2 reviews the available South African literature on income inequality, wage inequality, racial inequality and gender inequality. Section 3 evaluates the dataset, while Section 4 sets out the empirical strategies that will be used to analyse the data. Descriptive statistics and graphical overviews of the data form Section 5, and Section 6 presents the empirical results surrounding wage inequality. Finally, Section 7 concludes the paper.

2. Literature Review

This section looks at the prevailing inequality literature. It firstly discusses the income inequality literature which looks at the distribution of incomes from all sources for example grants or self-employment. This is followed by a look at literature on wage inequality which focuses only on the distribution of income earned in the labour market. Literature concerning the racial impact on inequality is then examined before finally inspecting literature on gender wage inequality.

2.1 Income Inequality

Income inequality can be defined as the dispersion of income over the whole distribution independent of the mean of the distribution and not censored as is the case with poverty (van der Berg & Bhorat, 1999). Over the last few decades, in many countries around the world, inequality has widened with disproportionate gains concentrated at the top end of the income distribution (Wittenberg, 2014). The author lends this observation to the effect of weakening redistributive policies, especially in OECD countries where taxes have come down for top earners and corporations, while union power has significantly weakened across the board. South Africa however differs from this general trend as evidenced by the first democratic government's commitment to put in place redistributive policies and support the trade union movement (Wittenberg, 2014). However, like the many countries around the world, the country has seen inequality widen even in light of the redistributive policies in place.

Many studies have been carried out focusing on inequality in South Africa and the consensus is that inequality has remained high or has even increased in the post-apartheid period (Bhorat et al. 2009; Leibbrandt et al. 2010; Wittenberg, 2017). Leite, McKinley and Osorio (2006) explored the evolution of inequality in South Africa in the post-apartheid era. In their 2006 paper, they find that the Gini index for per capita income distribution was estimated to be 0.673, which was almost twice the average level of OECD countries. South Africa is historically ranked as the most unequal society in the world with Brazil, so these results are not unexpected. Nevertheless, the new results suggest that South Africa is now the most consistently unequal society in the world (Bhorat, van der Westuizen & Jacobs, 2009). Surveying the period 1995 to 2005, they found that all South Africans, irrespective of race, location, or the gender of the head of the household, experienced an increase in income inequality.

Milanovic (2005) in his research found that if the population of South Africa were to be situated within the world's per capita income distribution, the richest 5 percent of South Africans would belong to the richest tenth, while the poorest 5 percent would be among the poorest tenth of the global distribution. Bhorat, van der Westuizen & Jacobs (2009) find that the 90-10 and 50-10 wage differentials decreased, showing a decrease in inequality at the lower end of the distribution, while the 90-50 wage differential increased in so doing contributing the most to wage inequality. The authors further find that by 2005, the richest 20 percent of the population received almost 80 percent of the total income while in 1995 they only received 70 percent of the total income. South Africa has followed the global pattern in that earnings have improved rapidly for high incomes, while they have been stagnant at the median, leading to a growing gap between those at the top of the income distribution and those in the middle of the income distribution (Wittenberg, 2014).

The trends in household income inequality are often attributed to the labour market. Bhorat, van der Westuizen & Jacobs (2009) point out that wage income is the most dominant source of income at the aggregate for all race groups. They find that in 1995 wage income accounted for 60 percent of total income and by 2005, this share had increased to 70 percent of total income. They then go on to show that wage income is the main contributor to high income inequality found within South Africa as it is highly correlated to the Gini coefficient, with wage inequality also high as given by a high Gini coefficient and as aforementioned its share of total income is significant. Bhorat et al. (2001), Leibbrandt et el. (2010) and Leibbrandt et al. (2012) hold the same sentiment that labour market income is the primary contributor to overall South African inequality, accounting for around 85 to 91 percent of total income inequality.

2.2 Wage Inequality

Wage inequality has remained consistently high since the advent of democracy. Wittenberg (2004) evidenced that inequality among wage earners has widened over the post-apartheid period. The gap between the median and the earner at the 90th percentile has increased significantly, as earnings at the top tail of the distribution have moved away from the median. Wittenberg (2017) showed that between 1994 and 2011 real wages increased, with the mean pulling away from the median, resulting in a noticeable rise in overall wage inequality. This inequality in the labour market translates into even higher inequality in society because high earners tend to live together with other high earners while low wage individuals often end up having to share their incomes with the unemployed (Wittenberg, 2017). Most standard inequality measures agree with these findings as they show that wage inequality has increased over the period. These results are robust as estimates produced by Leibrrandt et al. (2010) and Bhorat, van der Westuizen & Jacobs (2009) are generally consistent with the inequality trends observed in Wittenberg (2017), although the studies used different datasets to arrive at their estimates.

The wage inequality observed has been driven by several different sources. Wittenberg (2017) finds that a quarter of overall inequality can be attributable to earnings among individuals with a post-matric qualification. Bhorat et al. (2018) in their paper looking into the missing middle of South African wage earners find that increasing wage inequality in South Africa is primarily driven by the increasing returns of those at the top of the wage distribution. They explain that this growth by this segment can be explained by the increase in the level and returns of tertiary education, as well as the increase in returns to analytic jobs which cannot easily be replaced with technology. They associate this trend to the strong

growth of the services and financial services sectors of the economy over the past two decades. The authors further find that institutional factors namely the elite capture of unions and the public sector have led to increasing wage premia at the top end of the distribution. Additionally, their study finds that gains in education level amongst the low-skilled were inequality decreasing, while increasing demand for and returns to tertiary education were inequality increasing.

Casale (2004) points out that wage discrimination could also explain the wage inequality especially at the gender and racial level. She draws attention to the fact that equally educated individuals appear to be earning significantly different returns to their education simply due to their group affiliation. She also identifies occupational segregation or job discrimination as another prevailing reality as groups have differential access to certain types of jobs or occupations. Winter (1999) and Rospabé (2001) provide some evidence for this type of occupational segregation by gender. Given its economic structure, occupational segregation was institutionalised along racial lines during the apartheid regime, as a result varying distributions across types of employment and occupational levels are likely to explain why different groups receive significantly different earnings on average (Casale, 2004).

2.3 Racial Inequality

Because of the policies implemented during apartheid, the high levels of inequality in South Africa have been thought to be driven by inequality between race groups. Bhorat, van der Westuizen & Jacobs (2009) confirmed this with the aid of Lorenz curves and found that in both 1995 and 2005, Africans experienced relatively higher levels of inequality than the White population. When they controlled for race, they found that the increased inequality was due to an increase in the contribution of within-group inequality, driven to a large extent by the increase in inequality amongst Africans. Leibbrandt et al. (2005) and Hoogeveen & Ozler's (2006) results correspond with those found by Bhorat, van der Westuizen & Jacobs (2009) and identify that the rising inequality amongst Africans was driven by high African unemployment, as well as increasing incomes at the very top of the distribution. Nevertheless, due to income gains made across race groups being the key determinants of rising aggregate income inequality, the view that the rise in income inequality has been mostly caused by the growing African affluence relative to the increasing unemployment within the African population has to be reconsidered (Bhorat, van der Westuizen & Jacobs, 2009).

Recent literature has come to show that inequality between races is not driving inequality as much as within race inequality. Lam and Leibbrandt (2003) report that between 1995 and 2000 between race inequality declined slightly, while inequality within racial groups increased substantially resulting in an

increase in total inequality. Leibbrandt, Finn & Woolard (2012) find similar results pointing out that increasing inequality is being driven by growing inequality within racial groups in general and within the African racial group specifically. The authors then go on to identify that even though between-race inequality in South Africa is declining, it is still at a very high level when compared to the rest of the world. Wittenberg (2017) finds that within race inequality measures have increased in importance over time, with inequality within racial groups and within education categories explaining more than half of all inequality. Leibbrandt et al. (2001) and Leibbrandt et al. (2010) perform decompositions for overall personal income by race and find a clear pattern showing that between race inequality is coming down and within race inequality has increased significantly. Bhorat et al. (2009) perform similar decompositions for 1995 and 2005 and come to the opposite conclusion. They find that the contribution of within-group inequality has declined while the between-group inequality has gained in importance.

Looking at the racial groups, available literature finds that since 2000 within race inequality has accounted for an increasing share of overall inequality. Ntuli & Kwenda (2004) in their article noted that there is intra-racial income inequality growth, with the African increase relatively higher than the other races. Considering the overall contribution of inequality Wittenberg (2017) finds that inequality within the White group is dropping. Bhorat, van der Westuizen & Jacobs (2009) in their analysis observe, that apart from Asian individuals, all population groups experienced a statistically significant increase in income inequality between 1995 and 2005 as measured by the Gini coefficient. By 2008 inequality within each racial group was a bigger contributor to overall inequality, with African income inequality displaying the strongest upward trend (Leibbrandt et al., 2012).

2.4 Gender Inequality

Persistent earnings differentials exist in South Africa along both the gender and as previously highlighted racial lines. Between 1995 and 2001 among the employed as a whole and among the employed within each racial group, women consistently earn less than men (Casale, 2004). Over the same period the author finds that the overall reported mean earnings fell by around 14 percent, with the median real earnings for women falling by more than twice as much as for men suggesting growing inequality among women. She explains that the fall in female earnings was driven largely by the fall in earnings among African women who experienced both decreases in mean and median real earnings while White women experienced increases in both (Casale, 2004). The female to male earnings ratio among Africans declined substantially from 0.792 in 1995 to 0.718 in 2001, while White

women's position improved relative to White men's as their female to male ratio increased from 0.498 to 0.612. The author also finds that at every level of education within each race group women receive significantly lower returns to their education than men. This result is not unique to South Africa as Horton (1999) finds that women earn less than men everywhere, although in some places the wage gap lessens while in others it increases. Part of the explanation for this finding is that women work in lower-paying occupations and because they hold lower-level positions (Mehra & Gammage, 1999).

Casale (2004) discovers that not all women are equal as some are more disadvantaged than others. Casale (2004) explains that White women earn higher returns to their education than equally educated African women and that over the period the percentage increase/decrease in their earnings was greater/smaller than that of African women at all levels of education. She further shows that White women find themselves employed as technical/associate professionals with hardly any White women in lower-skill occupations which has resulted in the earnings gap between African and White women broadening as African women find themselves in lower-skill occupations. In addition, Casale presents that White women experienced significant increases in the number of employees in managerial, professional and technical/associate professional category jobs. This suggests, that among women, affirmative action may have served to benefit White women relatively more than African women.

Gender discrimination in South Africa has been analysed with studies all revealing that women are subject to unequal underpayment (Casale, 1998; Isemonger & Roberts, 1999; Winter, 1999). Standing et al.'s (1996) findings seem to indicate that female disadvantages go beyond the wage area and concern their access to the labour market as well as their occupational distribution. Rospabé (2001) notes that the hiring discrimination against African women was higher than against the "average" woman. She further highlights that only 44 percent of the gender wage gap can be explained by differences in productivity between males and females. In other words differences in experience, tenure, family responsibilities, occupation attainment, and geographical localisation between the average female worker relative to the average male. The remaining 56 percent of the gender wage differential she attributes to the fact that males' and females' productive characteristic are not rewarded in the same way by the market (Rospabé, 2001). Male discriminatory overpayment is found to be 92 percent for Coloured workers, 68 percent for White workers, 54 percent for African workers and the lowest gender wage discrimination is found among Indian workers with 34 percent of the wage gap resulting from different returns in characteristics. These results show that on average women's incomes are substantially lower than men's irrespective of the racial group being considered.

Overall the literature above establishes some key results with regards to inequality in South Africa in the post-apartheid era. Firstly, South Africa is among the most unequal countries in the world as measured by the Gini coefficient. This has been the case throughout the entire post-apartheid with inequality increasing significantly in all time periods evaluated by the prevailing literature. Secondly, inequality has been driven by growth in within-race inequality as between-race inequality has decreased over the period. The African race has been identified as the racial group which has experienced the largest within-race inequality with the emergence of the black middle class as one of the main explanations. Furthermore, the literature points out that gender inequality has increased as women continue to be discriminated against in the labour market. It also highlights that not all women are equal as White women have fared a lot better than African/Black women which has resulted in increased within-gender inequality.

This paper tests whether within-group inequality is still the main driver of inequality. This is done differently than in previous literature as it breaks down the population into eight groups when previous literature only presented the four racial groups or two genders. It further looks to examine how wage inequality has changed within the race-gender groups and to check whether the African race has the largest within-group inequality. Furthermore, the paper seeks to examine gaps in the literature concerning what factors may be driving within-group inequality and how discrimination has evolved over the post-apartheid period.

3. Data

This study uses data that comes from the 1994 October Household Survey (OHS) and the 4 2015 Quarterly Labour Force Surveys (QLFSs). This data comes from nationally representative surveys, containing socio-economic information for individuals living in 30000 households across the country collected by Statistics South Africa, the national statistics bureau (Ntuli & Kwenda, 2014). A two-stage cluster sampling design is used in the sampling process with this process stratified at the provincial level (Bhorat et al, 2018). The data collected by Statistics South Africa is self-reported to the enumerator (or by proxy in the event that the respondent is absent). Earnings information for 2015 which corresponds to the QLFSs was sourced from the Labour Market Dynamics Surveys. In order to facilitate comparative work over the periods of interest, the Post-Apartheid Labour Market Series (PALMS) version of these datasets which harmonises variable definitions over time was used (Kerr, Lam & Wittenberg, 2013). To ensure that only real shifts are reflected from the estimates, demographic changes over time are taken into account and adjusted for with the use of the cross-entropy weights released with the PALMS

dataset (Branson & Wittenberg, 2014). The PALMS dataset also provides real earnings data which have been adjusted to a base of December 2016 and multiple imputations method have been used to correct for bracket incomes which arose in the original data.

The sample is limited to all employed individuals, whether full-time or part-time, in 1994 and 2015 between the age of 16 and 64 who reported a wage. The real wage variable provided by the PALMS dataset was used and it had 27448 missing real wages which were dropped and 1300 zero real wages. Wage outliers were removed with the use of absolute studentised residuals and as a result the sample included only real wages greater than zero. Outliers were removed to ensure that no spikes would be observed in the wage distributions. A cohort variable was created to categorise the population into their eight respective race and gender subgroups. A variable to categorise the occupations into their respective skill levels with; managers, professionals, semi-professionals and technicians categorised as highly skilled occupations; clerks, salesperson and skilled service workers, skilled agricultural workers and artisans categorised as skilled occupations; and operators, routine workers and domestic workers categorised as semi-skilled and unskilled occupations was also created (Casale, 2004). A log of hours worked last week was also created and used to control for hours worked in the quantile regressions. A married dummy variable was created to describe an individual's marital status. Widows or widowers, divorced or separated and never married individuals were group together to equate to the not married cohort and those married or living together as husband and wife formed the married cohort. A variable to categorise the type of area an individual lived in was created with; traditional areas, farms, and mining areas as non-urban areas; and the rest as urban areas.

4. Methodology

To help analyse the data so that changes in inequality between 1994 and 2015 can be observed well, a number of approaches will be used. Firstly, the widely used inequality measures namely the Gini Coefficient, the General Entropy class of indices and the Atkinson class of measures will be used. Additionally, a quantile regression and the Oaxaca-Blinder decomposition will be used to further help to highlight some of the causes of the prevailing inequality.

4.1 Inequality Measures

4.1.1 Lorenz Curve

The Lorenz curve is a graphical representation of the relationship between the cumulative percentage of income and the cumulative percentage of the population (Bhorat et al, 2009). The graphical representation consists of a straight line of equal distribution drawn from (0, 0) to (100, 100), with the Lorenz curve bending farther from the line of equal distribution with increasing inequality. Therefore, the more unequal a society, the larger the proportion of income that will amass to the richest segment of the population and as a result the lower the Lorenz curve from the line of equal distribution. The Lorenz curve is implicitly defined by:

$$\phi(\mathrm{F}) = \frac{1}{\mu}\int yf(y)dy \ , \ F = \int f(y)dy, \qquad (1)$$

where μ denotes the mean of the distribution.

Inference can easily be made between Lorenz curves of two distributions without the need of the underlying utility function if the curves do not intersect. The Lorenz curve that lies above the other at every single point, corresponds to a more equal distribution of income of the two societies being looked at. If the Lorenz curves of the two distributions intersect once, it can be inferred that one society has a more equal distribution at the top and the other society a more equal distribution at the bottom. However, equality of the two societies can no longer be compared without finding two functions that will rank them differently due to the intersection (Atkinson, 1970).

4.1.2 Gini Coefficient

The Gini coefficient is derived from the Lorenz curve and is one of the most commonly used measures of inequality because it is easy to understand and interpret, although it is not additively decomposable which is a notable drawback (Bhorat et al, 2009). It is the expected income gap, as a percentage, between two randomly selected individuals from a population and is sensitive to income differences around the mode (Leite, McKinley & Osorio, 2006). A Gini coefficient of zero indicates perfect equality within a society and a coefficient of 1 relates to a society with perfect inequality. Therefore, the higher the Gini coefficient, the higher the level of inequality present. The standard Gini coefficient is given by:

$$Gini = \frac{1}{2n^2\bar{y}}\sum_{i=1}^{n}\sum_{j=1}^{n}|\,y_i - y_j| \qquad (2)$$

where n is the number of individuals, $\bar{y}$ is the mean income and y_i and y_j are individual *i* and *j*s incomes respectively.

4.1.3 General Entropy class of indices

The General Entropy class of indices (GE) satisfy all the desirable axioms of inequality measures: anonymity, the Pigou-Dalton transfer principle, scale invariance, population replication invariance, and decomposability and as such it is used in this paper (Leite, McKinley & Osorio, 2006). If we let GE(α) represent all GE measures, the parameter α is the weight we give to the distance between incomes at different points of the income distribution. The GE measure is more sensitive to changes in the lower tail of the distribution when α takes on low values; and for higher values, it is more sensitive to changes in the upper tail. The most common values of a used are 0, 1 and 2: where an a value of 0 gives more weight to distances between incomes in the lower tail, a=1 applies equal weights across the distribution, while a value of a=2 gives proportionately more weight to gaps in the upper tail of the distribution (Litchfield, 1999). The general formula is as follows:

$$GE(\alpha) = \frac{1}{a^2-a}\left[\frac{1}{n}\sum_{i=1}^{n}\left(\frac{y_i}{\bar{y}}\right)^a - 1\right] \quad (3)$$

where *n* is the number of individuals in the sample, y_i is the income of individual *i, i* ∈ (1, 2,…, *n*), and $\bar{y} = (\frac{1}{n})\sum y_i$, the arithmetic mean income (Litchfield, 1999).

This paper uses the three commonly used GE inequality measures:

$$GE(0) = \frac{1}{n}\sum_{i=1}^{n} log\frac{\bar{y}}{y_i}, \text{ Mean Log Deviation or Theil-L;} \quad (4)$$

$$GE(1) = \frac{1}{n}\sum_{i=1}^{n}\frac{y_i}{y} log\frac{y_i}{y}, \text{ Theil-T;} \quad (5)$$

$$GE(2) = \frac{1}{2n\bar{y}^2}\sum_{i=1}^{n}(y_i-\bar{y})^2, \text{ half of the square of the Coefficient of Variation (CV)} \quad (6)$$

The value of GE ranges from 0 to ∞, with zero representing perfect equality, and higher numbers representing increasing inequality (Leibbrandt, Finn & Woolard, 2012; Litchfield, 1999). Due to the fact that it is not possible to take the logarithm of zero GE(0) and GE(1) do not accept zero values.

General Entropy class of indices are decomposable into components of inequality between groups (explained component) and within groups (unexplained component), and the general formula is given by:

$$GE(\alpha) = \frac{1}{a(a-1)}\left[\frac{1}{n}\sum_{i=1}^{n}\left(\frac{y_i}{\bar{y}}\right)^a - 1\right] \quad (7)$$

where *n* is the number of individuals in the sample, y_i is the income of individual *i, i* ∈ (1, 2,…, *n*) and $\bar{y}$ is the arithmetic mean income. This decomposition will help assess how much inequality is a result of differences between specified cohorts, and how much is because of differences within these cohorts (Leibbrandt, Finn & Woolard, 2012). As between-group inequality summarizes the proportion of inequality that would remain even if there was no inequality within each cohort of interest (Leite, McKinley & Osorio, 2006).

Both the GE measures and the Gini coefficient are used because the Gini is less sensitive to how the population is ranked than to how individual values differ, and the GE measures are decomposable.

4.1.4 Atkinson class of measures

The Atkinson class of measures are similar to the General Entropy class of indices as they also satisfy all the desirable axioms of inequality measures and have the general formula:

$$A_\varepsilon = 1 - [\frac{1}{n}\sum_{i=1}^{n}[\frac{y_i}{\bar{y}}]^{1-\varepsilon}]^{1/(1-\varepsilon)} \quad (8)$$

where ε is an inequality aversion parameter, 0<ε<∞: the higher the value of ε the more society is concerned about inequality (Atkinson, 1970). Similar to the Gini coefficient, the Atkinson class of measures range from 0 to 1, with zero representing perfect equality. When α is set to equal 1-ε, the GE class of indices become ordinally equivalent to the Atkinson class for values of α<1 (Cowell, 1995). A decomposition of the Atkinson class of measures will also be used to help highlight differences in inequality between-groups and within-groups.

4.2 Quantile Regression

To further help with the analysis of inequality a quantile regression model is used, instead of an ordinary least squares regression model, as it allows for a full characterisation of the conditional distribution of the dependent variable and not simply the mean regression as is the case with an ordinary least squares regression (Pereira & Martins, 2000).

The quantile regression model as used by Buchinsky (1994) can be written as:

$$lnw_i = x_i\beta_\theta + u_{\theta i} \text{ with } Quant_\theta(lnw_i|x_i) = x_i\beta_\theta \quad (9)$$

where x_i is the vector of exogenous variables and β_θ is the vector of parameters. $Quant_\theta(lnw|x)$ denotes the θth conditional quantile of lnw given x. The θth regression quantile, 0<θ<1, is defined as a solution to the problem:

$$\min_{\beta \in R^k} \sum_i \rho_\theta(lnw_i - x_i\beta_\theta), \quad (10)$$

where $\rho_\theta(\varepsilon)$ is the check function defined as $\rho_\theta(\varepsilon) = \theta\varepsilon$ if $\varepsilon \geq 0$ or $\rho_\theta(\varepsilon) = (\theta - 1)\varepsilon$ if $\varepsilon < 0$ (Pereira & Martins, 2000).

The above specified problem does not have an explicit form but can be solved by linear programming methods, with standard errors obtainable by using a bootstrapping method.

As the wage distribution is skewed in South Africa, relying on the mean as a measure of centrality would be misleading. Quantile regressions allow for use of the full sample of observations but with a focus on different portions of the wage distribution to get a more informative estimate as to how different explanatory variables affect the dependent variable at each portion.

4.3 Oaxaca-Blinder Decomposition

The Oaxaca decomposition is similar to the General Entropy decomposition and Atkinson decomposition as it helps us explain whether the observed inequality is attributable to differences in the explanatory variables, *x*, rather than differences in β's. The model seeks to explain differences between groups and the decompositions are given by:

$$y^{I_{i0}} - y^{I_{i1}} = \Delta x \beta^{I_{i1}} + \Delta\beta x^{I_{i0}},\ i \in (1, 2, \ldots., 8) \quad (11)$$

Where $\Delta x = x^{I_{i0}} - x^{I_{i1}}$ and $\Delta\beta = \beta^{I_{i0}} - \beta^{I_{i1}}$, $i \in (1, 2, \ldots., 8)$ or as

$$y^{I_{i0}} - y^{I_{i1}} = \Delta x \beta^{I_{i0}} + \Delta\beta x^{I_{i1}},\ i \in (1, 2, \ldots., 8) \quad (12)$$

where I_{i1} represents the variable being equal to 1 of the 8 *i* cohorts of interest and I_{i0} represents the variable not being equal to the specific cohort of interest.

In $\Delta x \beta^{I_{i1}}$, the difference in the x's are weighted by the coefficients of the *i* cohort and the differences in the coefficients, $\Delta\beta$, are weighted by the x's of the *non-i* cohort, whereas in the second case, the differences in the x's are weighted by the coefficients of the *non-i* cohort and the differences in the coefficients are weighted by the x's of the *i* cohort (O'donnell et al., 2008). Both options provide a way to split the gap in outcomes between cohort i and non-cohort i into a part attributable to the fact that

cohort i has worse x's than non-cohort i, and a part attributable to the fact that *ex hypothesi* they have worse $\beta's$ than those who are non-cohort i.

The above equations arise from a general decomposition:

$$y^{I_{i0}} - y^{I_{i1}} = \Delta x \beta^{I_{i1}} + \Delta \beta x^{I_{i1}} + \Delta x \Delta \beta$$

$$= E + C + CE$$

Which shows that the gap in mean outcomes can be thought to come from a gap in endowments (E), a gap in coefficients (C), and a gap arising from the interaction between endowments and coefficients (CE) (O'donnell et al., 2008). In effect the first decomposition above places the interaction in the unexplained part, while in the second decomposition it places it in the explained part.

As discrimination is a common problem in the labour market, the Oaxaca-Blinder decomposition helps to identify its presence by comparing the characteristics of the two groups of interest on a common dependent variable. This then allows for the differences that arise to be broken down into 3 parts; whether the observed difference in mean is due to individuals' characteristics such as their qualifications, whether the differences are due to our estimation process, and finally whether they are due to the interaction of the individuals' characteristics and our estimation process. These results allow for the portion of the differences in the dependent variable that can be explained to be identified. The remaining portion which is unexplained reveals the prevailing labour market discrimination.

5. Descriptive Statistics

Table 1A, 1B, 1C and 1D look at the characteristics of the sample in 1994 and 2015 highlighting their educational, employment and occupational profiles. From the tables it can be observed that there has been a significant increase in the average age of each cohort of interest. White Males notably had the highest average age in 2015 of 42 years, suggesting that on average White Males have been in the labour market longer than the other cohorts. The male cohorts in both 1994 and 2015 had a higher average age holding race constant, except for Black/African Males in 2015. It must also be noted that the gap in average age within each race for the genders did decrease suggesting that women are staying in the labour market longer. The tables also show an increase in urbanisation for most of the cohorts especially Coloured Males, Coloured Females, Black/African Females and Black/African Males between 1994 and 2015. This outcome was to be expected as there are more job opportunities in urban areas

and during this period there were no legal geographical restrictions limiting their movement as was the case during apartheid.

It is further seen that there has been a decline, on average, of the proportion of each cohort that are married, which is not surprising given the move away from the traditional male driven labour force to one with an increased role for women. Between 1994 and 2015 there has been an average increase in years of education of three years with Black/African Males experiencing the largest increase. It is also interesting to note that White Females had the highest average number of years of education and that all female cohorts had a higher average number of years of education when compared to their male counterparts of the same race in 2015.

The highest level of school categorises the cohorts into 7 groups corresponding to the educational attainment reported by each individual. The results in the tables show a significant decrease in the proportion of each cohort who reported No Schooling, Incomplete Primary and Primary. For Black/African Males, Black/African Females, Coloured Males, Coloured Females and White Females we see an increase in the proportion of individuals who have Incomplete Secondary education, while Asian/Indian Males and Asian/Indian Females saw a decrease in the proportion of individuals with Incomplete Secondary education and White Males did not experience any change in the proportion of individuals with Incomplete Secondary. The proportion of individuals with a Matric on average more than doubled for Black/African Males, Black/African Females, Coloured Males and Coloured Females. White Females saw their proportion of individuals with a Matric nearly half from 0.81 to 0.42, while White Males experienced a decrease of close to a third from the level it was in 1994. Looking at the proportion of individuals with a Certificate/Diploma and Degree, we observe an increase in proportion for all eight cohorts. This shift from No Schooling to higher proportion of individuals with a Matric, Certificate/Diploma and Degree is in line with our earlier observation of an average increase in years of education for the cohorts.

Table 1A: Summary Statistics, Black/African Female and Coloured Female cohorts

	Black/African Female		Coloured Female	
	1994	2015	1994	2015
Age	36.8	39.1	33.5	37.6
Urban	0.51	0.67	0.63	0.88
Married	0.54	0.4	0.58	0.52
Years of Education	7.3	10.3	7.3	10.5
Change in Highest Level of School				
No Schooling	-75%		-75%	
Incomplete Primary	-70%		-70%	
Primary	-58%		-58%	
Incomplete Secondary	44%		50%	
Matric/Secondary	115%		154%	
Certificate/Diploma	500%		800%	
Degree	500%		400%	
Employment Profile				
Self-Employed	0.36	0.13	0.2	0.04
Union Membership	0.26	0.26	0.21	0.23
Wage Worker	0.9	0.87	0.96	0.96
Real Monthly Wage (December 2016 base year)	R 2,876.84	R 6005.40	R 2,889.62	R 8,953.55
Change in Occupational Attainment				
High skilled	33%		125%	
Skilled	57%		52%	
Semi-skilled & unskilled	-26%		-37%	

Source*:* own calculations using PALMS; adjusted using sampling weights, sample consists of all employed adults of working age and with non-missing earnings data; earnings are in real December 2016 Rands. Highly skilled workers: managers, professionals, semi-professionals and technicians. Skilled workers: Clerks, salesperson and skilled service workers, skilled agricultural workers and artisans. Semi-skilled and unskilled: Operators, routine workers and domestic workers.

Table 1B: Summary Statistics, Asian/Indian Female and White Female cohorts

	Asian/Indian Female		White Female	
	1994	2015	1994	2015
Age	32	37.1	35	40.9
Urban	0.91	1	0.95	0.95
Married	0.62	0.63	0.68	0.68
Years of Education	9.9	12.9	11.6	13.4
Change in Highest Level of School				
No Schooling	0%		0%	
Incomplete Primary	-94%		-100%	
Primary	-83%		0%	
Incomplete Secondary	-40%		17%	
Matric/Secondary	-20%		-48%	
Certificate/Diploma	1700%		2100%	
Degree	2300%		190%	
Employment Profile				
Self-Employed	0.07	1	0.07	0.17
Union Membership	0.38	0.25	0.21	0.19
Wage Worker	0.99	0.9	0.94	0.83
Real Monthly Wage (December 2016 base year)	R 4,350.77	R 14,234.87	R 7,445.08	R 22,047.16
Change in Occupational Attainment				
High skilled	206%		84%	
Skilled	-12%		-33%	
Semi-skilled & unskilled	-83%		-80%	

Source*:* own calculations using PALMS; adjusted using sampling weights, sample consists of all employed adults of working age and with non-missing earnings data; earnings are in real December 2016 Rands. Highly skilled workers: managers, professionals, semi-professionals and technicians. Skilled workers: Clerks, salesperson and skilled service workers, skilled agricultural workers and artisans. Semi-skilled and unskilled: Operators, routine workers and domestic workers.

Table 1C: Summary Statistics, Black/African Male and Coloured Male cohorts

	Black/African Male		Coloured Male	
	1994	2015	1994	2015
Age	36.8	37.2	34	37.7
Urban	0.41	0.67	0.6	0.84
Married	0.64	0.52	0.66	0.62
Years of Education	6.6	10	7.1	10.1
Change in Highest Level of School				
No Schooling	-85%		-83%	
Incomplete Primary	-67%		-73%	
Primary	-55%		-50%	
Incomplete Secondary	90%		37%	
Matric/Secondary	142%		173%	
Certificate/Diploma	700%		∞	
Degree	300%		∞	
Employment Profile				
Self-Employed	0.03	0.16	0.02	0.09
Union Membership	0.3	0.31	0.25	0.25
Wage Worker	0.97	0.87	0.98	0.91
Real Monthly Wage (December 2016 base year)	R 3,952.09	R 8,188.05	R 3,747.02	R 9,618.39
Change in Occupational Attainment				
High skilled	86%		220%	
Skilled	50%		9%	
Semi-skilled & unskilled	-32%		-22%	

Source*:* own calculations using PALMS; adjusted using sampling weights, sample consists of all employed adults of working age and with non-missing earnings data; earnings are in real December 2016 Rands. Highly skilled workers: managers, professionals, semi-professionals and technicians. Skilled workers: Clerks, salesperson and skilled service workers, skilled agricultural workers and artisans. Semi-skilled and unskilled: Operators, routine workers and domestic workers.

Table 1D: Summary Statistics, Asian/Indian Male and White Male cohorts and Overall

	Asian/Indian Male		White Male		Overall	
	1994	2015	1994	2015	1994	2015
Age	35.6	39.5	37	42	36.4	38.5
Urban	0.91	0.98	0.93	0.92	0.53	0.73
Married	0.74	0.76	0.8	0.75	0.63	0.51
Years of Education	10.5	12.3	11.7	13.1	7.5	10.6
Change in Highest Level of School						
No Schooling	0%		0%		-81%	
Incomplete Primary	-67%		-100%		-72%	
Primary	-57%		0%		-55%	
Incomplete Secondary	-52%		0%		55%	
Matric/Secondary	9%		-36%		72%	
Certificate/Diploma	1200%		600%		1000%	
Degree	78%		37%		167%	
Employment Profile						
Self-Employed	0.1	0.29	0.1	0.3	0.05	0.15
Union Membership	0.36	0.24	0.41	0.26	0.29	0.28
Wage Worker	0.9	0.71	0.9	0.7	0.95	0.85
Real Monthly Wage (December 2016 base year)	R 8,201.35	R 15,996.78	R 13,867.14	R 31,538.27	R4439.36	R10206.59
Change in Occupational Attainment						
High skilled	129%		59%		83%	
Skilled	-27%		-38%		30%	
Semi-skilled & unskilled	-46%		-42%		-31%	

Source*:* own calculations using PALMS; adjusted using sampling weights, sample consists of all employed adults of working age and with non-missing earnings data; earnings are in real December 2016 Rands. Highly skilled workers: managers, professionals, semi-professionals and technicians. Skilled workers: Clerks, salesperson and skilled service workers, skilled agricultural workers and artisans. Semi-skilled and unskilled: Operators, routine workers and domestic workers.

The employment profile helps us understand the employment environment individuals are facing. Tables 1A to 1D above show a general increase in the proportion of individuals in Self-employment especially among the male cohorts. We also see an average increase in union membership among the Black/African and Coloured cohorts while an average decrease in union membership is seen among the

Asian/Indian and White cohorts. The wage worker category explains the proportion of individuals who are working for a wage whether or not they are also self-employed. As seen in the tables close to 85 percent of each cohort works for a wage with the generally observed trend being a decline in the proportion of individuals working for a wage. Notably there is a 19 and 20 percentage point decrease in Wage Workers for Coloured Males and White Males, respectively.

The average real earnings have increased between 1994 and 2015 for all eight cohorts with some cohorts growing at a faster rate than others as seen by the change in average real wage rankings. In 1994 the cohorts could be ranked by average real wage; White Males, R13867.14; Asian/Indian Males, R8201.35; White Females, R7445.08; Asian/Indian Females, R4350.77; Black/African Males, R3952.06; Coloured Males, R3747.02; Coloured Females, R2889.62; and Black/African Females, R2876.84. In 2015, this changed to; White Males, R31538.27; White Females, R22047.16; Asian/Indian Males, R15996.78; Asian/Indian Females, R14234.87; Coloured Males, R9618.39; Coloured Females, R8953.55; Black/African Males, R8188.05; and Black/African Females R6005.40. The observed changes show that White Females and Coloured Females have experienced substantially higher average real wage growth relative to Asian/Indian Males and Black/African Males, respectively. This is evident by their change in position in the wage rankings. As much as some cohorts have seen their real wages grow at a faster rate than other cohorts, with Asian/Indian Females experiencing the largest percentage increase in average real wage, all eight cohorts have on averaged experienced real wage increases.

Women were still earning lower than men on average in 2015 as in 1994, regardless of race group but this gap did decrease. In 1994, the ratio of female to male average earnings was 0.676, and by 2015 it had significantly increased to 0.730. This ratio shows that in 1994 women were on average earning 67.6 percent of what men were earning, but this increased in 2015 as they now on average earned 73 percent of what men earned. The results were very similar when the racial groups were considered individually but each racial group brought about a stand out outcome. Of the four racial groups, Blacks/Africans experienced the smallest change in the gap between the average female to male earnings of 0.76 percent. In 1994 Black/African Females earned on average 72.8 percent what their male counterparts earned but in 2015 this increase slightly to 73.3 percent. Coloureds had the smallest difference in average earnings between males and females in 1994 and in 2015. In 1994, Coloured Females earned on average 77.1 percent what Coloured Males earned and in 2015 this increased to them earning on average 93.1 percent what Coloured Males earned. Asians/Indians between 1994 and 2015 saw the biggest percent increase in female to male average earnings ratio of 67.7 percent. This moved them from the most gender unequal race with the lowest female to male average earnings ratio of 0.53 in 1994 to the second most gender equal earnings race behind Coloureds with a ratio of 0.89. Whites also experienced an increase in the female to male earnings ratio between 1994 and 2015 but

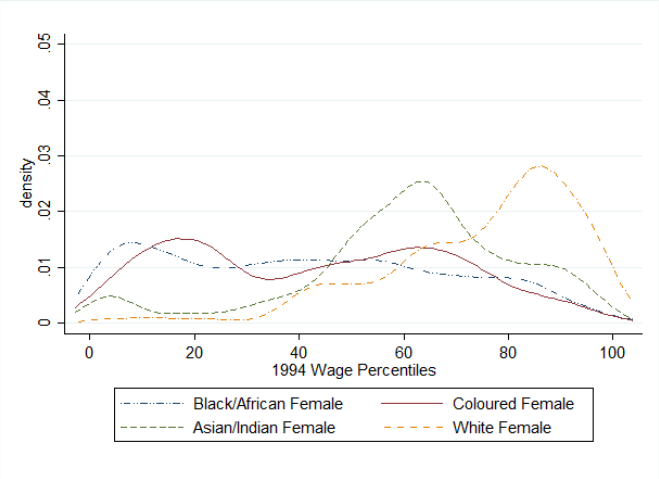
became the most gender unequal earnings race as White Females on average only earned 69.9 percent what White Males earned.

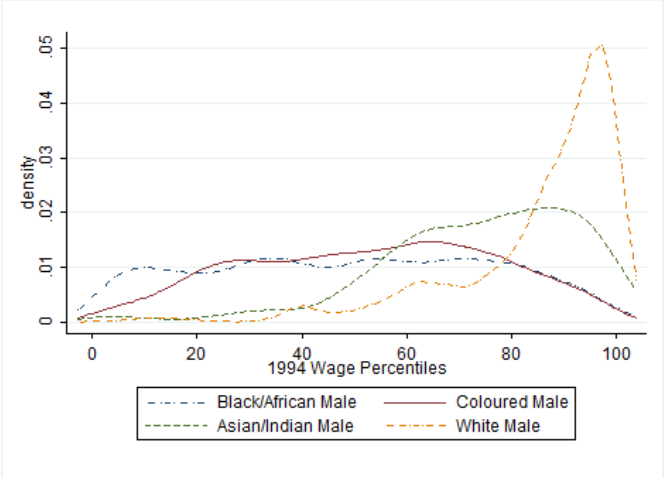
The changes in female to male average earnings ratios can be seen through the changes in real wages between 1994 and 2015. Coloured Females, Asian/Indian Females and White Females experienced the 3 highest average real wage increases of 210 percent, 227 percent and 196 percent respectively. The next largest increase was by Coloured Males 39 percentage points lower. These increases can be explained by the shift in occupations these cohorts were involved in as Coloured Females shifted away from semi-skilled and unskilled occupation to more skilled and highly skilled occupations, while Asian/Indian Females and White Females shifted towards highly skilled occupations from skilled occupations. These shifts resulted in significant increases in real earnings as higher skilled occupations pay more. Black/African Females were the only female cohort that experienced an average real wage increase less than 53 percentage points higher than of their male counterpart, with a 109 percent increase as compared to the 107 percent increase faced by Black/African Males. This difference in the Black/African race can be explained by a portion of Black/African Females employed in semi-skilled and unskilled occupations, as in 1994 both males and females had 0.65 percent of their cohorts in semi-skilled and unskilled occupations while in 2015 only 44 percent of Black/African Males were in these occupations while 48 percent of Black/African Females were in them. Black/African Males also experienced an 85.7 percent increase in the proportion of individuals in highly skilled occupations while Black/African Females only had a 33.3 percent increase. However Black/African Females still had a higher proportion of individuals in highly skilled occupations.

The occupation attainment segment of the tables looks at the skill level required for the job position each individual holds. The breakdown of the skill level and the type of position an individual holds is explained in the data section. We discover that each cohort has seen a decline in the proportion of individuals undertaking semi-Skilled and unskilled jobs. We also make out that there has been a rise in the share of the Black/African and Coloured cohorts involved in skilled occupations while the Asian/Indian and White cohorts have faced a reduction in the percentage of individuals holding similar positions. The highly skilled occupations category has seen an increase across all the cohorts particularly for the Asian/Indian and White cohorts which experienced the biggest percentage point increases. A few noteworthy observations are that White Males and White Females have the two highest highly skilled segments, Asian/Indian Females, Black/African Males and Coloured Females have the three highest skilled occupation segments and Black/African Females and Coloured Males have the highest semi-skilled and unskilled segments. In summary we detect that Black/African Males, Coloured Males and Black/African Females have their largest share of individuals in semi-skilled and unskilled jobs. Coloured Females have an even split in skilled jobs and semi-skilled and unskilled jobs, and the

Asian/Indian and White cohorts have their most substantial portion of individuals in highly skilled occupations.

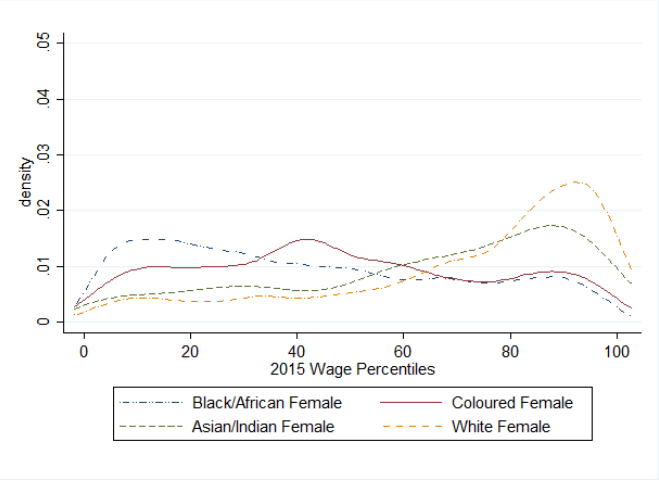
Figure 1A: 1994 Wage Distribution density functions

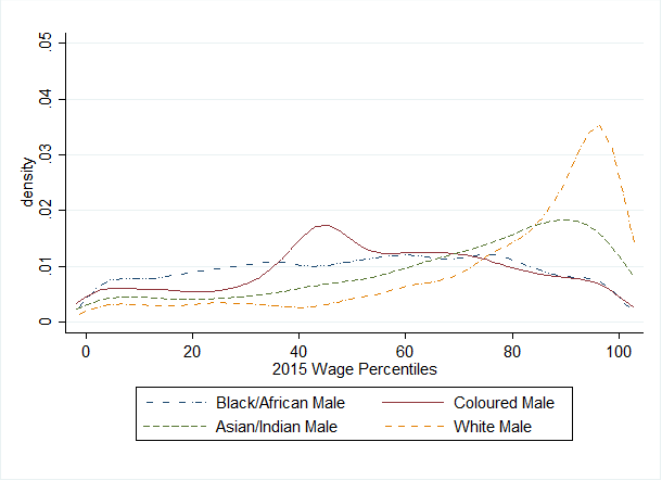




Source: own calculations using PALMS; adjusted using sampling weights

Figure 1B: 2015 Wage Distribution density functions





Source: own calculations using PALMS; adjusted using sampling weights

Figure 1A and 1B above illustrate the distribution of wages across wage percentiles in 1994 and 2015 for the eight cohorts of interest. Upon inspection the flattening out of the White Male distribution can be seen, which was highly concentrated between the 80th and 100th percentiles. This shows that there has been a decrease in the density of individuals who fall in the higher wage percentiles. Another standout result is that of Black/African Females which is very similar in both 1994 and 2015 with the exception of an increase in density in the lower tail below the 40th percentile. There has been an increase in the proportion of Black/African Females earning a wage which falls below the 40th

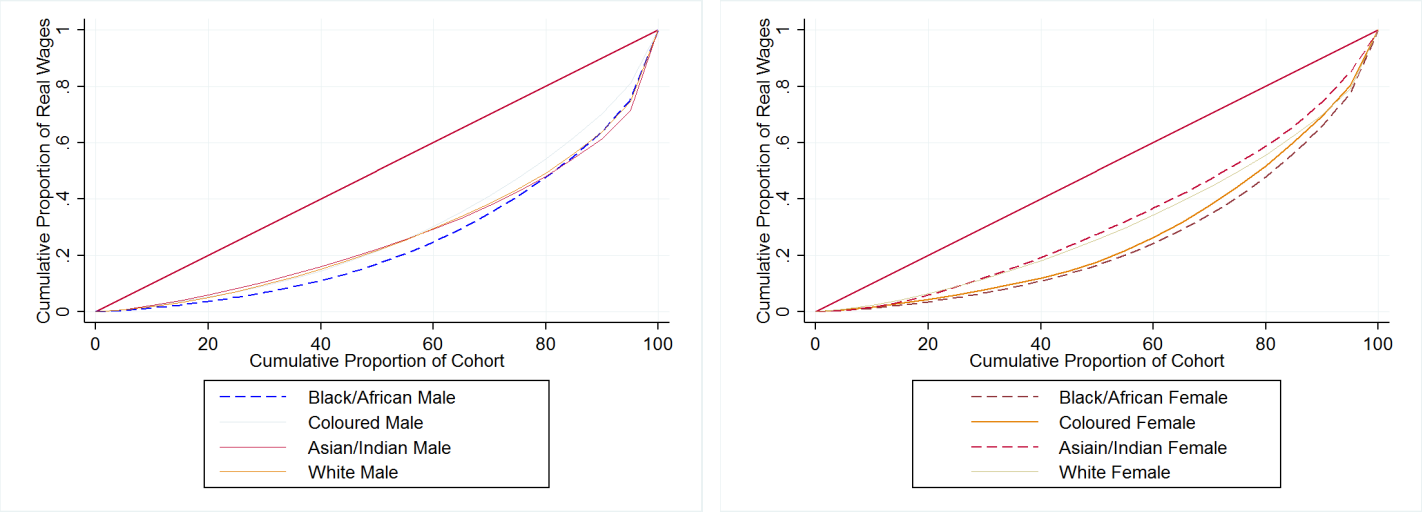
percentile. Looking at the overall distributions, it is observed that over time the densities corresponding to the different wage percentiles for the cohorts have converged. This is evident in that the lines representing each distribution are closer together in 2015. The convergence of the distributions shows that each cohort has similar proportions of individuals at the different wage percentiles. It is also important to note that Asian/Indian Females have seen a density increase between the 80^{th} and 100^{th} percentile closing the gap that existed in 1994. This observation shows that there are more Asian/Indian Females receiving wages that fall in the aforementioned gap. Another cohort of note is the Coloured Female cohort which has had a reduction in the density of wage earners in the lower wage percentiles as was the case in 1994 to an increase in the densities in the higher wage percentiles especially the 80^{th} to 100^{th} percentile region. All-inclusive the distributions have moved from high densities in the lower wage percentiles to higher wages in the middle percentiles. Put in another way more individuals are earning wages that fall in the middle or higher end of the wage percentile distribution than was the case in 1994.

Figure 2A and 2B below are of the Lorenz curves of the cohorts in 1994 and in 2015. As discussed previously, Lorenz curves help to analyse the distribution of income and therefore inequality. A Lorenz curve closer to the line of equal distribution represents a more equal state and an increase in inequality the further away from the line of equal distribution the Lorenz curve bends. In Figure 2A which relates to the 1994 Lorenz curve there are 3 distributions of interest; Asian/Indian Females, Black/African Females and Black/African Males. The Asian/Indian Female distribution is of particular interest as it lies clearly above the other distributions. This distinction allows for the inference that Asian/Indian Females in 1994 had the most equal distribution of income when compared to the other cohorts. Black/African Females and Males had the most unequal distributions of income for their respective genders as their distributions are clearly furthest from the line of equal distribution for all the percentiles. The other distributions cannot be ranked on visual inspection as they intersect one another. In Figure 2B which looks at the 2015 Lorenz curve we only have one striking distribution; Coloured Female. The Coloured Female distribution stands out as it has the Lorenz curve which bends the furthest from the line of equal distribution and falls below the other distributions. This is the exact opposite of what was seen with the Asian/Indian Female cohort in 1994 as this observation signifies that the Coloured Female cohort had the most unequal income distribution in 2015. Besides this review the other cohorts cannot be ranked as they intersect each other.

Comparing Figure 2A and Figure 2B opens a discussion about overall wage inequality between 1994 and 2015. As is evident from the Lorenz curves given above we see that the distributions in 1994 were closer to the line of equal distribution in comparison to those in 2015. This observation allows for two

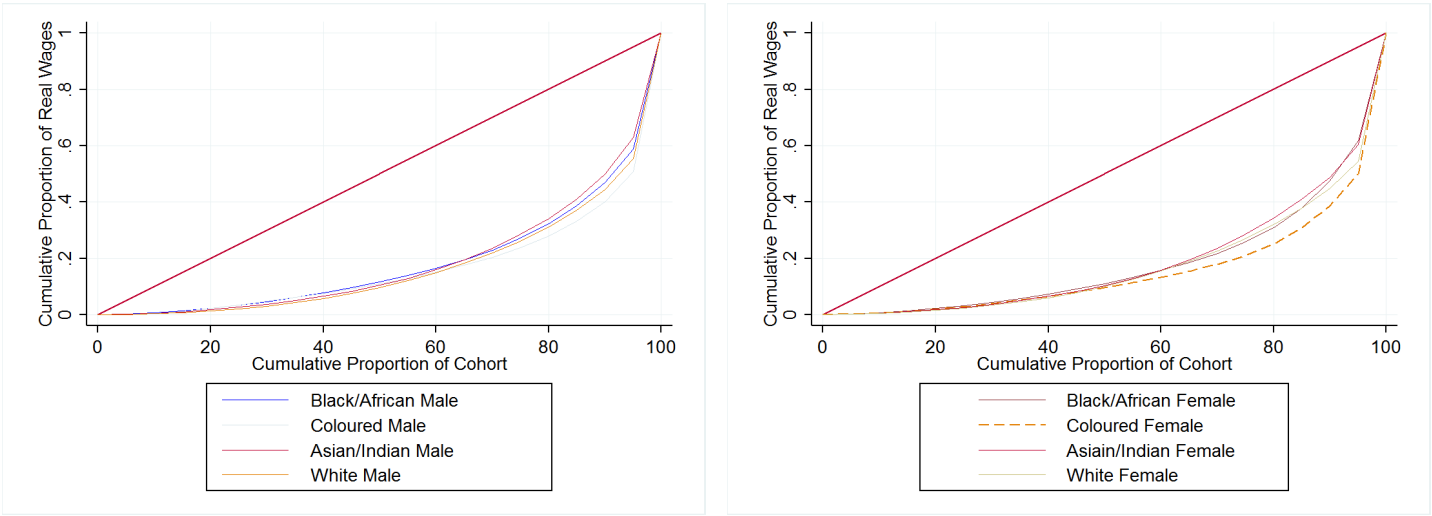
key findings to be concluded. Firstly, that overall inequality in the country increased and secondly that inequality within each individual cohort increased significantly between 1994 and 2015.

Figure 2A: Male and Female cohort Lorenz Curve, 1994



Source: own calculations using PALMS; adjusted using sampling weights.

Figure 2B: Male and Female cohort Lorenz Curve, 2015



Source: own calculations using PALMS; adjusted using sampling weights

The discussed points above give a clear understanding of the changes that have taken place between 1994 and 2015. The overall increase in average real wages can be seen to be driven by the higher educational attainment that existed in 2015. The White Female and Coloured Female cohort change in position of wage ranking between 1994 and 2015 can be explained by their distribution on occupational

attainment which saw the White Female cohort have the second largest cohort portion of individuals in high skilled occupations and the Coloured Female cohort have a higher portion of individuals in high skilled occupations and a lower portion of individuals in semi-skilled and unskilled occupations in comparison to Black/African Males. The occupational opportunities for these cohorts can further be explained by the increase in portion of individuals who have a Matric, Certificate/Diploma and Degree. The flattening out of the White Male wages across the wage percentiles can be attributed to the increase in the portion of White Males in high skilled and decrease in portion in skilled and semi-skilled and unskilled occupations. The increase in inequality highlighted by the Lorenz curves can be attributed to the reduction of those working in Semi-skilled and unskilled occupations and an increase in those in highly skilled and skilled occupations. This widens the gap as high skilled and skilled jobs command a higher premium than semi-skilled and unskilled jobs resulting in an increase in inequality. The female to male average earnings ratios highlight that on average the cohorts are becoming more equal, a result which agrees with the literature that found that between group inequality is decreasing.

6. Results and Discussion

This section of the paper will analyse the data to paint a clearer picture of the transformation of wage inequality in South Africa. Firstly, it will display with the aid of the Atkinson and General Entropy inequality measure decompositions, whether inequality between 1994 and 2015 was driven by inequality between the cohorts or whether it was the inequality within the cohorts that was the problem. Following this, it will evaluate how cohort inequality has altered since 1994 with the assistance of the Gini coefficient, General Entropy class of indices, Atkinson class of measures and the 90/10, 90/50 and 50/10 income ratios. Furthermore, it will use quantile regressions to show the factors that are driving inequality in each of the individual cohorts at the 10^{th}, 50^{th} and 90^{th} quantiles. Lastly, it will use the Oaxaca-Blinder decomposition to analyse between cohort differences to see if there is any discrimination present and its magnitude.

6.1 Inequality Measures

Table 2: Atkinson and General Entropy Decompositions, 1994 and 2015

	Within-Cohort Inequality		Between-Cohort Inequality	
Inequality Measure	1994	2015	1994	2015
Atkinson Family				
ε=0.5	0.188	0.368	0.065	0.075
ε=1	0.331	0.571	0.122	0.115
ε=2	0.562	0.812	0.203	0.101
General Entropy				
Theil L Index (α=0)	0.418	0.821	0.114	0.148
Theil T Index (α=1)	0.442	1.024	0.145	0.18
Coefficient of Variation (α=2)	1.463	5.12	0.204	0.242

Share of Inequality	Within-Cohort		Between-Cohort		Percentage point change
	1994	2015	1994	2015	
Atkinson Family					
ε=0.5	74%	83%	26%	17%	9
ε=1	73%	83%	27%	17%	10
ε=2	73%	89%	27%	11%	15
General Entropy					
Theil L Index (α=0)	79%	85%	21%	15%	6
Theil T Index (α=1)	75%	85%	25%	15%	10
Coefficient of Variation (α=2)	88%	95%	12%	5%	8

Source: own calculations using PALMS; adjusted using sampling weights

Table 2 above is the decomposition of the Atkinson and General Entropy inequality measures into the between cohort and within cohort inequality which account for overall inequality. As was explained in the methodology section of this paper the higher the value of ε the more society is concerned with inequality and the lower the value of α the more weight is being placed on distances between incomes in the lower tail of the distribution. It is demonstrated in the Atkinson class of measures in both 1994 and 2015 within-cohort inequality increased as the value of ε increased. This shows that the more concerned society is about inequality the more evident it is to them that there are discrepancies in the wage distribution. For between-cohort inequality we observe a similar trend in 1994 but not in 2015 as the value of between-cohort inequality reduces between $\varepsilon = 1$ and $\varepsilon = 2$. Looking at both within-cohort and between-cohort inequality in 1994 and 2015 it is observed that within-cohort inequality made up the biggest share of total wage inequality with it contributing as much as 74 percent in a society which isn't too concerned about inequality in 1994 and 89 percent in a society that is more

concerned about wage inequality in 2015. Overall for the Atkinson class of measures it can be seen that between 1994 and 2015 within-cohort inequality has increased on average with an increase of as much as 16 percent points in a society more concerned about inequality and therefore between-cohort inequality has decreased with a notable decline in a society more concerned about inequality of 59 percent (Lam and Leibbrandt ,2003; Bhorat, van der Westuizen & Jacobs, 2009; Leibbrandt, Finn & Woolard ,2012; Wittenberg, 2017).

The General Entropy inequality measures present very similar results as those identified with the Atkinson class of measures. As seen previously there is an increase in coefficient of both within-cohort and between-cohort inequality as α increases and unlike the Atkinson class of measures there is no decline at any point as α increases. This shows that when more weight it put on distances between incomes in the lower tail of the distribution there is less inequality and as more weight is put on the upper tail more inequality is evident. In other words, the wage distribution is more equal on the lower tail of the income distribution, therefore wages are closer together than on the upper tail where there is more distance between wages resulting in a more unequal society. In 1994 when equal weighting was placed across the distribution as is given by $\alpha = 1$, this resulted in the lowest percentage contribution of within-cohort equality. However in 2015 $\alpha = 0$ and $\alpha = 1$ had equal within-cohort proportions as was the case with the Atkinson class of measures for $\varepsilon = 0.5$ and $\varepsilon = 1$. Unsurprisingly between 1994 and 2015 within-cohort inequality rose and between-cohort inequality lessened. These results allow for the conclusion that inequality in South Africa is not driven by differences between the eight cohorts of interest, as the proportion of these differences has decreased, but that it is driven by inequality within-each of these cohorts as was found in earlier literature.

As inequality is being driven by within-cohort characteristics Table 3 and Table 3A in the appendix use the 3 inequality measures to analyse how inequality has changed within each of the cohorts between 1994 and 2015. The first inequality measure, the Gini Coefficient, shows an increase in coefficient for all eight cohorts. The largest increment in Gini coefficient came from the Asian/Indian Female cohort who also had the lowest Gini Coefficient in 1994 which was seen in Figure 2A. According to the Gini coefficient results the Coloured Female cohort had the highest Gini coefficient of 0.702 and Asian/Indian Male cohort the lowest Gini coefficient of 0.629 in 2015. This would make the Coloured Female cohort the most unequal wage distribution of the cohorts and this is in line with what was seen in the Lorenz curve in Figure 2B.

The Atkinson class of measures provide similar results to the Gini coefficient for $\varepsilon = 0$ and $\varepsilon = 1$, which are characterised as societies where not a lot of concern is given to inequality. This is to be expected as the Gini coefficient is most sensitive to income differences in the middle of the distribution. Therefore

the Asian/Indian Female cohort was found to be the most equal cohort in 1994 and also had the largest percentage increase in coefficient over the period. The Coloured Female cohort had the highest coefficients in 2015. Similar to the Gini coefficient results, the Asian/Indian Male cohort was the most equal of the cohorts when $\varepsilon = 0$, however for $\varepsilon = 1$ the Black/African Male cohort had the most equal income distribution which was different for 2015.

When $\varepsilon = 2$ a very different result from that found under the Gini coefficient is arrived at. The White Female cohort experienced the most substantial percentage change in coefficient of 94 percent. In other words, they saw the biggest increase in inequality over the period. It also had the lowest coefficient in 1994 very similar to what was observed with the Asian/Indian Female cohort under the other inequality measures. The White Male cohort represented the most unequal cohort in 2015 and the Black/African Female cohort the most equal which was much unexpected. Overall from the Atkinson class of measures a prominent increase in inequality within the cohorts is observed, especially in societies where there is little concern regarding inequality as by smaller values of ε.

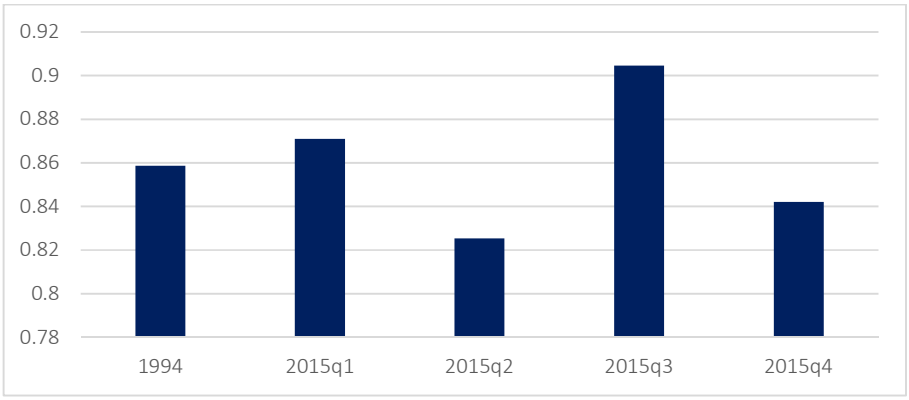
The General Entropy class of indices results appear to be in agreement with those of the Gini coefficient. When more weight is given to the lower tail of the distribution it is seen that the Black/African Female cohort was the most unequal in 1994 which corresponds with what was shown in Figure 2A. When the weighting is equally distributed across the distribution or more weight is given to the upper tail of the distribution the Black/African Male cohort is found to be the most unequal of the cohorts in 1994. Over all three weighting options in 1994 the Asian/Indian Female cohort is found to be the most equal cohort agreeing with earlier findings from the other measures. In 2015, it found that the White Male cohort represented the cohort with the highest inequality when more weight was put on distances between incomes on the lower tail of the distributions and the Coloured Female cohort the most unequal when the distribution was equally weighted, and more weight was given to the higher tail of the distribution. These results though differing slightly are in agreement that there was substantial increases in inequality within each cohort with noteworthy cohorts being the Black/African Female, Coloured Female, Asian/Indian Female and the Asian/Indian Male cohorts

To further analyse the within cohort inequality a percentile ratio approach was used namely the p90/p10, p90/p50 and p50/p10. The results from the percentile ratio analysis are given in Table 4. p90/p10 ratio is a standard inequality measure and is the ratio of the average income of the 10 percent of the people with the highest income to that of the 10 percent of people with the lowest income; the p90/p50 ratio looks at the income of the 90^{th} percentile relative to the median income; and the p50/p10 ratio shows the gap between the median income earned and the lowest 10^{th} percentile income in the society. As seen in the Lorenz curve and the previously presented inequality measures, the

Black/African Female cohort once again stands out when looking at the p90/p10 ratio. The Black/African Female cohort has the highest p90/p10 ratio of 11.093, this shows that the richest 10 percent of the individuals in the Black/African Female cohort earn a real wage that was 11.093 times that earned by the poorest 10 percent in 1994. Under the p90/p10 the Asian/Indian Male cohort has the least sparsely distributed real wages in 1994 as those in the 90th percentile earn only 4.795 times what those in the 10th percentile earn. In 2015, it is observed that the Asian/Indian Male cohort had the largest p90/p10 ratio value of 25, having had the lowest p90/p10 ratio in 1994. Overall, for the p90/p10 ratios there is a significant increase in some cases as big as 420 percent showing the increase in the divide between the rich and the poor increasing between 1994 and 2015 for each cohort.

Figure 3 below presents the Black/African p90/p10 to Non-Black/African p90/p10 ratio over the five surveys used. This ratio shows how the divide between the rich and the poor for Blacks/Africans has changed relative to the rest of the racial groups. For all five surveys it is observed that the gap between the rich and the poor for the Blacks/Africans was below that of the rest of the population. Between 1994 and the first quarter of 2015 an increase in the ratio can be seen. This shows that the p90/p10 for Blacks/Africans increased at a faster rate than that of the rest of the racial groups. In other words, the gap between the rich and poor widened by more among the Black/African race than for the rest of the population. In the remaining three quarters of 2015, a relatively higher increase in the gap between the rich and the poor for the rest of the racial groups combined can be observed in the second and fourth quarters. In the third quarter of 2015, an increase in the Black/African p90/p10 to Non-Black/African p90/p10 ratio can be seen, with the ratio reaching its highest level of 0.9045. This means that the Black/African p90/p10 ratio was 90.45 percent that of the rest of the population. Figure 3 shows that wage inequality among the Non-Blacks/Africans is higher than among Blacks/Africans, with periods where it increases at a slower rate but remains higher.

Figure 3: Black/African p90/p10 to Non-African p90/p10 Ratio



Source: own calculations using PALMS; adjusted using sampling weights

Next an evaluation of the wages of the richest 10 percent of wage earners and the median wage earner is made. It is found that the White Female cohort had the lowest p90/p50 ratio of 2. This shows that the top 10 percent wage earners received a wage which was double the median wage. At the other end of the spectrum it is observed that the Black/African Female cohort had the highest ratio of 3.328 in 1994. In 2015 the Coloured Female cohort experienced the largest percentage change in ratio of 146 percent and as a result had the largest ratio. Across all the cohorts the p90/p50 ratio increased between 1994 and 2015 but not by as much as the p90/p10 ratio. Regardless of the increase being of a smaller magnitude, it shows that the wages earned by those in the 90th percentile are increasing at a faster rate than the median wage over the period. The finding with regards to the Coloured Female cohort is consistent with what was found with the General Entropy results. It was found that when more weight was given to the higher tail of the income distribution the Coloured Female cohort was the most unequal and this increase in p90/p50 ratio together with that of the p90/p10 ratio show how it came to be.

The p50/p10 helps us understand what is happening on the lower end of the wage distribution. From the ratios it is evident that the Asian/Indian Male cohort had the lowest ratio of all the cohorts in 1994 of 2.055. This shows that the Asian/Indian Male cohort had the smallest gap between the poorest 10 percent wage and the median wage in 1994. In other words, the median wage was 2.055 times the 10th percentile wage in 1994 for the Asian/Indian Male cohort. The Black/African Male cohort in the same year had the highest ratio which corresponds to the cohort's 10th percentile wage being 3.575 times lower than the median wage. In 2015 a rise in ratio is seen for each cohort with only 2 cohorts, Coloured Female and Coloured Male, having a ratio lower than the highest 1994 ratio. This increase in ratio similar to the increases in the p90/p50 and p90/p10 ratios signifies an increase in the gap between the wages. It shows that the individuals who fall under the poorest 10 percent of wage earners in each cohort now earn significantly more below the median wage. All the percentile ratios examined have provided more insight as to how wage inequality within each cohort has continued to increase the gap between the poorest and richest individuals in each cohort.

Figure 4 shows the percentage changes in the percentile ratios between 1994 and 2015. As previously explained and evident from the figure, the p90/p10 ratio increased substantially for all the cohorts with the Asian/Indian Male and White Female cohorts experiencing the largest percentage increases and the Black/African Male cohort the smallest percentage change. For the Black/African Female, Coloured Female, Asian/Indian Female, Black/African Male and Coloured Male cohorts the increase in the p90/p10 ratio has been driven by the widening of the gap between the 90th percentile wage and the median wage. This means that the wages in these cohorts for the 90th percentile have increased at a much faster rate than the median wage relative to the 10th percentile wage. For the White Female,

Asian/Indian Male and White Male cohorts, their increase in the p90/p10 ratio has been due mostly to the median wage increasing at a much faster rate than the 10th percentile wage. These findings make sense as the former cohorts experienced an increase in individuals in more skilled and highly skilled occupations which would impact their 90th percentile wage by causing it to increase. And for the later cohorts more individuals moved from skilled occupations to highly skilled occupations which would shift the median wage upwards and since a large portion of them were already employed in highly skilled occupations the 90th percentile wage does not increase by as much. For all the cohorts though different portions of the distribution have driven the change, the figure shows that the gap between the poor and the rich has continued to increase.

Table 3: Change in Gini Coefficient, Atkinson and General Entropy, 1994 and 2015

Change in Inequality Measure	Black/African Female	Coloured Female	Asian/Indian Female	White Female	Black/African Male	Coloured Male	Asian/Indian Male	White Male	Overall
Gini Coefficient	31%	58%	92%	75%	30%	65%	40%	44%	31%
Atkinson Family									
ε=0.5	78%	169%	254%	204%	74%	198%	90%	104%	73%
ε=1	51%	102%	173%	161%	52%	130%	84%	91%	50%
ε=2	26%	49%	74%	94%	34%	80%	42%	59%	27%
General Entropy									
Theil L Index (α=0)	76%	164%	258%	248%	77%	203%	126%	145%	82%
Theil T Index (α=1)	123%	-60%	374%	260%	108%	333%	94%	110%	105%
Coefficient of Variation (α=2)	488%	1356%	1173%	534%	260%	1353%	154%	130%	222%

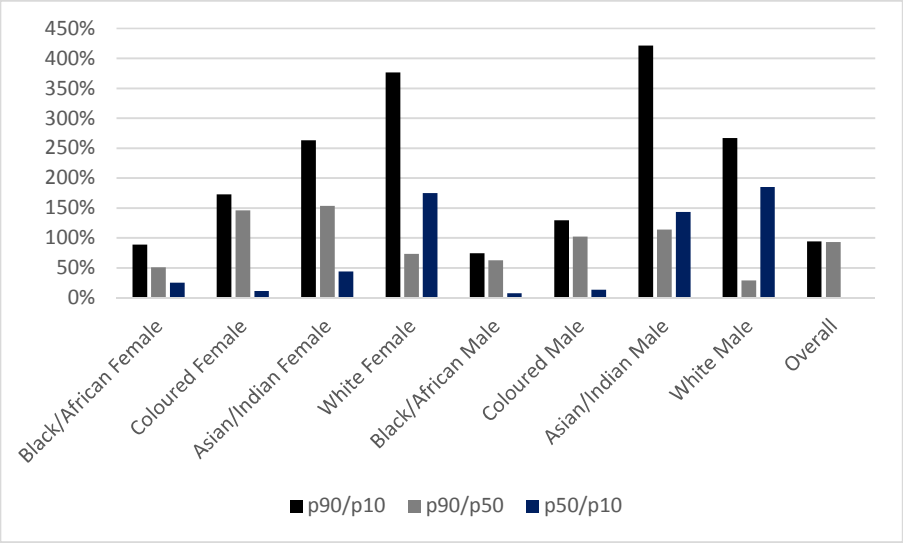
Source: own calculations using PALMS; adjusted using sampling weights.

Table 4: Percentile Ratios, 1994 and 2015

	p90/p10		p90/p50		P50/p10	
	1994	2015	1994	2015	1994	2015
Black/African Female	11.093	20.943	3.328	5.026	3.333	4.167
Coloured Female	7.813	21.333	2.500	6.154	3.125	3.467
Asian/Indian Female	5.500	20.000	2.115	5.357	2.600	3.733
White Female	4.848	23.111	2.000	3.467	2.424	6.667
Black/African Male	9.925	17.321	2.776	4.507	3.575	3.843
Coloured Male	6.964	16.000	2.437	4.923	2.857	3.250
Asian/Indian Male	4.795	25.000	2.333	5.000	2.055	5.000
White Male	6.542	24.000	2.487	3.200	2.630	7.500
Overall	12.245	23.750	3.077	5.937	3.980	4.000

Source: own calculations using PALMS; adjusted using sampling weights

Figure 4: Changes in Percentile Ratios

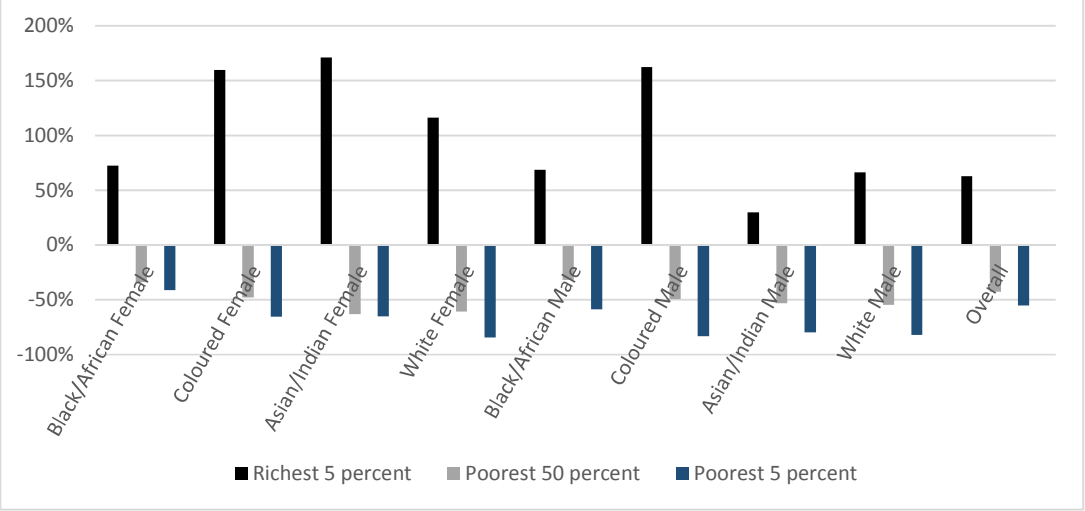


Source: own calculations using PALMS; adjusted using sampling weights

To further illustrate the inequality within the cohorts, Table 5A in the appendix and Figure 5 present the wage share and change in wage share for the richest 5 percent, poorest 50 percent and poorest 5 percent. Notable from Table 5A it can be seen that the richest 5 percent's wage share was on average close to 20 percent, with the richest 5 percent in the Asian/Indian Male cohort contributing 28.5 percent of total cohort wages. In 2015 a huge increase in the wage share of the richest 5 percent can be seen. The Asian/Indian Male cohort which had the highest cohort wage share in 1994 finds itself as the cohort with the lowest wage share of 37 percent in 2015. This change helps to explain our finding of the Asian/Indian Male cohort being the most equal cohort under the Gini coefficient as the wealth isn't concentrated at the top of the wage distribution. The Coloured Female cohort took the place at the top of the Asian/Indian Male cohort with the richest 5 percent accounting for 50.1 percent of total cohort wages. This finding helps in further understanding why the Coloured Female cohort was the most unequal cohort in 2015.

The wage share of the poorest 50 and 5 percent picks up from what was observed in table 4. The poorest 50 percent in the Asian/Indian Female cohort contributed 28.2 percent of total cohort wages in 1994 which was the highest among all the cohorts. In 2015 the highest contribution by the poorest 50 percent in any cohort was only 11.6 percent and this was the Black/African Male cohort. This contribution of 11.6 percent was 16.6 percentage points below the 1994 highest contribution and 5 percentage points lower than 1994's lowest cohort contribution by the poorest 50 percent. This helps to show that wages are highly concentrated at the top end of the distribution where the top 50 percent of the population account for close to 90 percent of total wages. The table further shows that in 1994 the Coloured Male cohort and the White Female cohort had the highest wage contribution of the poorest 5 percent among all the cohorts. As with the poorest 50 percent, the contribution to the total cohort wages of the poorest 5 percent decreased substantially to as low as 0.1 percent.

Figure 5: Change in Wage Shares for the richest 5 percent, poorest 50 percent and poorest 5 percent



Source: own calculations using PALMS; adjusted using sampling weights.

Figure 5 illustrates the magnitude of the change in the wage share contribution by the three subsets. It is clear from that the graph that between 1994 and 2015 only the wage share of the richest 5 percent has increased while those of the poorest 50 percent and poorest 5 percent have decreased significantly for each cohort. The Coloured Female cohort, which was earlier identified as the most unequal cohort in 2015, experienced a 160 percent increase in the wage share only behind the Asian/Indian Female cohort, which exhibited the biggest increase in inequality, and the Coloured Male cohort which experienced 171 percent and 162 percent increases respectively. The Asian/Indian Male cohort which was seen to be the most equal cohort in 2015 under several inequality measures can be seen to have the smallest percentage change in the share of the richest 5 percent of 30 percent which is 36 percentage points lower than the next lowest percentage change. At the other end the Asian/Indian Female and White Female cohorts faced the highest percentage change decrease in the wage share of the poorest 50 percent. Four cohorts saw their change in wage share contribution by the poorest 5 percent decrease by more than 60 percent; White Female cohort, Coloured Male cohort, Asian/Indian Male cohort and White Male cohort. These changes highlight the increased gap between the rich and the poor, as a large portion of the wages goes to a small portion of the population as already seen in Table 5A. This gap continues to increase as the share of the poorest 50 and poorest 5 percent decreases and that of the richest 5 percent continues to increase.

Table 6: Change in Wage Share of the richest 20 percent and Change in Cohort Wage Share to Change in Overall Wage Share ratio

	Change in Wage Share	Cohort to Overall Change Ratio
Black/African Female	33%	1.078
Coloured Female	58%	1.917
Asian/Indian Female	62%	2.034
White Female	53%	1.737
Black/African Male	31%	1.008
Coloured Male	59%	1.936
Asian/Indian Male	27%	0.903
White Male	33%	1.082
Overall	30%	1

Source: own calculations using PALMS; adjusted using sampling weights

Table 6A in the appendix looks at the Pareto principle and states that for many events 20 percent of the causes result in roughly 80 percent of the effects. In 1994 this principle is far from true as the richest 20 percent contribute to roughly 47 percent of total wages in each cohort with the highest contribution by any cohort of 52.1 percent coming from the Black/African Female cohort. In 2015 there is an upswing in the wage share contribution by the richest 20 percent. The Asian/Indian Female cohort saw their richest 20 percent contribute 65.6 percent of total cohort wages which was the lowest among all cohorts. The Coloured Female cohort is once again of note as they had the highest contribution of 75 percent by their richest 20 percent. These results

show that in 1994 the Pareto principle was far from true as wages were more equally distributed. However in 2015, there is a movement towards the richest 20 percent, possibly contributing to 80 percent of the wage share, a level which the Coloured Female cohort isn't far off.

Table 6 shows the percentage change in the wage shares displayed in Table 6A and presents a ratio looking at how each cohort's change in wage share compared against the overall wage share for the top 20th percentile. From the table the Asian/Indian Female cohort once again had the biggest percentage change in wage share of the cohorts of 62 percent. This could further help to explain how the cohort experienced the largest increase in inequality over the period. This percentage change of 62 percent faced by the Asian/Indian Female cohort was 2.034 times the change of the overall population. Just as with the change in the richest 5 percent's wage share, the Coloured Male and Coloured Female cohorts follow closely behind with changes of 59 percent and 58 percent respectively. All the cohorts as previously pointed out saw their wage shares increase, however only the Asian/Indian Male cohort showed an increased which was below the overall increase in the wage share of the top 20th percentile. This shows that the change in the concentration of wages at the top end of the wage distribution is growing at a slower rate for the Asian/Indian Male cohort relative to the population.

6.2 Quantile Regression

Tables 7.1 to 7.8, shown below and in the appendix, present the quantile regression results for each cohort, which analyse the effects of the chosen explanatory variables on the dependant variable, log real wages, at the 10th, 50th and 90th quantiles in 1994 and 2015. In each case only the most striking results will be discussed.

Table 7.1 looks at the quantile regression results for the Black/African Male cohort which present a lot of statistically significant points. The first result of note is how age impacts an individual's real wage. In 1994 for each quantile the real wage increases with age but at a decreasing rate until a turning point is reached. The turning points for each quantile were calculated to equate to 43.4 years, 50.4 years and 61.8 years ($-\frac{age}{2*(age\ squared)}$). This result in the case of individuals in the 10th quantile shows that an additional year in age sees their real wage increase at a decreasing rate until they are 43.4 years after which an additional year sees their real wage decrease at an increasing rate. This is an interesting finding, as it shows that individuals in the higher quantiles see their real wages continue to increase with age long after those in the 10th quantile have started to experience negative effects on real wages of an increase in age. In 2015 the turning point age for the 10th quantile decrease to 40.0 years while the 50th quantile turning point age increased to 66.4 years. This result illustrates that individuals in the Black/African Male cohort who fall in the 10th quantile see their real wages start to decrease close to 3.4 years earlier than was the case in 1994 and 26.4 years before those in the 50th quantile start to see their real wage decrease with age.

Looking at educational attainment in Table 7.1, in 1994 individuals in the 10thquantile experienced a higher percent change in the average real wage compared to those with no primary education across all the categories. An individual in the 10th quantile by having a degree had an average real wage that was 135.4 percent higher than that of an individual with no primary education, while those in the 50th and 90th quantiles only experienced 91.8 percent and 92.6 percent higher average real wages respectively when compared to individuals with no primary education in their quantiles. In 2015 for all the educational attainment levels we observe that the average real wage increases for the 10th quantile have significantly decreased from the levels they were in 1994. For Individuals in the 90th quantile it is found that they now experience the highest average real wage increases relative to the individuals with no primary education for individuals with Primary, Matric/Secondary and Certificate/Diploma, with overall increases in average real wage at each educational attainment after Incomplete Secondary exceeding their 1994 levels. Those in the 50th quantile experience both increases and decreases in the impact of educational attainment when compared to their 1994 level, and now experience higher changes when compared to those in the 10th quantile and the highest percent change in average real wage for individuals with Incomplete Secondary education and a Degree when compared to those with no primary education. The decrease in 2015 levels of the 10th quantile at the expense of increases for those in the 50th and 90th quantile helps to explain the increasing gap formed as shown by the p90/p10 and p50/p10 ratios.

In Table 1B an increase in union membership and a decrease in the proportion of married individuals between 1994 and 2015 was observed. In Table 7.1, married individuals in the Black/African Male cohort experienced roughly the same average real wage change across the 3 quantiles when compared to unmarried individuals in 2015, and each quantile experienced an increase from their 1994 level. The union membership result is a surprising finding as the union premiums in both 1994 and 2015 for individuals who were in unions was significantly high when compared to individuals in the same quantile who were not in a union. In 1994 individuals in the 10th quantile for being a union member received an average real wage which was 33.7 percent higher than individuals who were not in a union, while those in the 90th quantile only had an average real wage which was 14 percent higher for being in a union. The 2015 result for the 10th quantile is inconclusive but for the 50th and 90th quantiles the difference between union and non-union members increased. Both quantiles experienced a higher average real wage from 24.2 percent and 14 percent to 40.6 percent and 30.6 percent respectively.

Looking further down at job type and the industry one works in for the Black/African Male cohort there are some interesting results. Firstly, as expected the results show that those in skilled or semi-skilled & unskilled occupations earn less than those in highly skilled occupations in 1994 and 2015. An unexpected discovery is that the difference increased significantly to the extent that it almost doubles or doubles for each quantile for those in semi-skilled & unskilled occupations and skilled occupations in the 90th quantile. It is further found that relative to the Agriculture, Hunting, Forestry and Fishing industry in 1994 the Utilises industry resulted in the

highest average real wage increase for the 10th and 50th quantiles and the Finance for the 90th quantile. Given the number of observations available for the Utilises industry and the Finance industry we disregard these results though significant. Instead relative to the Agriculture, Hunting, Forestry and Fishing industry the Mining and Quarrying industry for the 10th quantile and the Transport industry for the 50th and 90th quantiles are found to give the highest average real wages.

Table 7.1: Black/African Male quantile regression, 1994 and 2015. Dependent variable lnwage

Years	1994			2015		
Quantiles	10	50	90	10	50	90
Age	0.0404***	0.0346***	0.0252***	0.0593***	0.0234***	0.00445
	(0.00850)	(0.00723)	(0.00792)	(0.00723)	(0.00378)	(0.00613)
Age Squared	-0.000455***	-0.000343***	-0.000204**	-0.000742***	-0.000183***	8.42e-05
	(0.000108)	(8.83e-05)	(0.000100)	(9.27e-05)	(5.02e-05)	(7.58e-05)
Educational Attainment						
Incomplete Primary	0.0785**	0.0669*	0.0673**	0.0767**	0.0656*	0.0573
	(0.0344)	(0.0379)	(0.0323)	(0.0359)	(0.0368)	(0.0435)
Primary	0.277***	0.184***	0.243***	0.102	0.107***	0.112**
	(0.0344)	(0.0473)	(0.0393)	(0.0830)	(0.0362)	(0.0455)
Incomplete Secondary	0.325***	0.186***	0.205***	0.191***	0.207***	0.184***
	(0.0364)	(0.0411)	(0.0477)	(0.0358)	(0.0347)	(0.0428)
Matric/Secondary	0.773***	0.503***	0.429***	0.146**	0.388***	0.531***
	(0.0474)	(0.0509)	(0.0362)	(0.0582)	(0.0365)	(0.0458)
Certificate/Diploma	0.852***	0.503***	0.669***	0.193***	0.703***	0.782***
	(0.0756)	(0.123)	(0.102)	(0.0651)	(0.0524)	(0.0583)
Degree	1.354***	0.918***	0.926***	0.788***	1.229***	1.210***
	(0.199)	(0.0681)	(0.159)	(0.0983)	(0.0500)	(0.0827)
Urban	0.167***	0.220***	0.232***	0.133***	0.119***	0.156***
	(0.0292)	(0.0341)	(0.0300)	(0.0274)	(0.0150)	(0.0186)
Married	0.0607**	0.116***	0.0923***	0.0791***	0.140***	0.124***
	(0.0248)	(0.0298)	(0.0297)	(0.0242)	(0.0130)	(0.0182)
Member of Union	0.337***	0.242***	0.140***	0.0313	0.406***	0.306***
	(0.0247)	(0.0272)	(0.0228)	(0.0521)	(0.0177)	(0.0189)
Province						
Eastern Cape	-0.293***	-0.0837*	-0.00339	-0.490***	-0.200***	-0.194***
	(0.0606)	(0.0484)	(0.0975)	(0.0768)	(0.0283)	(0.0535)
Northern Cape	-0.437***	-0.330***	-0.146	-0.105	0.0237	-0.0423
	(0.0650)	(0.0461)	(0.103)	(0.0946)	(0.0348)	(0.0501)
Free State	-0.698***	-0.379***	-0.295***	-0.423***	-0.225***	-0.173***
	(0.0542)	(0.0496)	(0.0969)	(0.0729)	(0.0272)	(0.0524)
KwaZulu-Natal	-0.212***	0.0449	0.301***	-0.424***	-0.166***	-0.0462
	(0.0299)	(0.0412)	(0.0979)	(0.0779)	(0.0275)	(0.0498)
North West	-0.366***	-0.0682	0.0561	-0.0546	-0.00457	-0.0249
	(0.0454)	(0.0540)	(0.0995)	(0.0764)	(0.0285)	(0.0488)

Gauteng	-0.0757**	-0.00880	-0.0738	-0.237***	0.112***	0.222***
	(0.0344)	(0.0371)	(0.0938)	(0.0731)	(0.0228)	(0.0477)
Mpumalanga	-0.222***	-0.136**	0.0665	-0.242***	-0.00432	0.0825
	(0.0375)	(0.0594)	(0.114)	(0.0798)	(0.0270)	(0.0502)
Limpopo	-0.0177	0.0662	0.173	-0.327***	-0.144***	-0.0878*
	(0.0355)	(0.0567)	(0.110)	(0.0794)	(0.0281)	(0.0508)
Log Hours Worked	-0.0343	-0.108*	-0.198***	0.418***	0.430***	0.239***
	(0.0343)	(0.0554)	(0.0521)	(0.0228)	(0.0214)	(0.0358)
Job Type						
Skilled	-0.318***	-0.277***	-0.305***	-0.390***	-0.460***	-0.624***
	(0.0935)	(0.0528)	(0.0516)	(0.0415)	(0.0323)	(0.0447)
Semi-skilled & unskilled	-0.320***	-0.366***	-0.443***	-0.635***	-0.586***	-0.842***
	(0.0935)	(0.0557)	(0.0549)	(0.0445)	(0.0336)	(0.0452)
Self-Employed	-0.803**	-0.711***	-0.487***	-	-	-
	(0.332)	(0.126)	(0.0793)			
Industry						
Mining and Quarrying	0.585***	0.643***	0.646***	-0.128	0.607***	0.824***
	(0.0546)	(0.0476)	(0.0440)	(0.104)	(0.0272)	(0.0291)
Manufacturing	0.455***	0.722***	0.751***	-0.0873	0.145***	0.503***
	(0.0406)	(0.0479)	(0.0517)	(0.0546)	(0.0254)	(0.0312)
Utilities	0.627***	0.787***	0.921***	0.116	0.316***	0.672***
	(0.0370)	(0.221)	(0.167)	(0.0985)	(0.0469)	(0.0276)
Construction	0.299***	0.611***	0.754***	-0.104**	0.0946***	0.419***
	(0.0308)	(0.0538)	(0.0704)	(0.0507)	(0.0233)	(0.0347)
Trade	0.332***	0.579***	0.675***	-0.148***	0.0187	0.255***
	(0.0577)	(0.0496)	(0.0401)	(0.0432)	(0.0216)	(0.0347)
Transport	0.448***	0.762***	0.820***	-0.205***	0.0637*	0.567***
	(0.0395)	(0.0707)	(0.104)	(0.0753)	(0.0327)	(0.0455)
Finance	0.521***	0.705***	0.988***	0.0288	-0.00789	0.251***
	(0.0604)	(0.184)	(0.118)	(0.0474)	(0.0239)	(0.0394)
Services	0.397***	0.590***	0.700***	-0.263***	0.144***	0.438***
	(0.0619)	(0.0478)	(0.0499)	(0.0419)	(0.0290)	(0.0280)
Domestic Services	0.421***	0.524***	0.592***	-0.319***	-0.325***	-0.249***
	(0.0552)	(0.0576)	(0.0891)	(0.0259)	(0.0231)	(0.0387)
Constant	6.116***	6.998***	8.029***	4.961***	5.898***	7.662***
	(0.233)	(0.260)	(0.267)	(0.185)	(0.118)	(0.198)
Observations	3,900	3,900	3,900	21,771	21,771	21,771

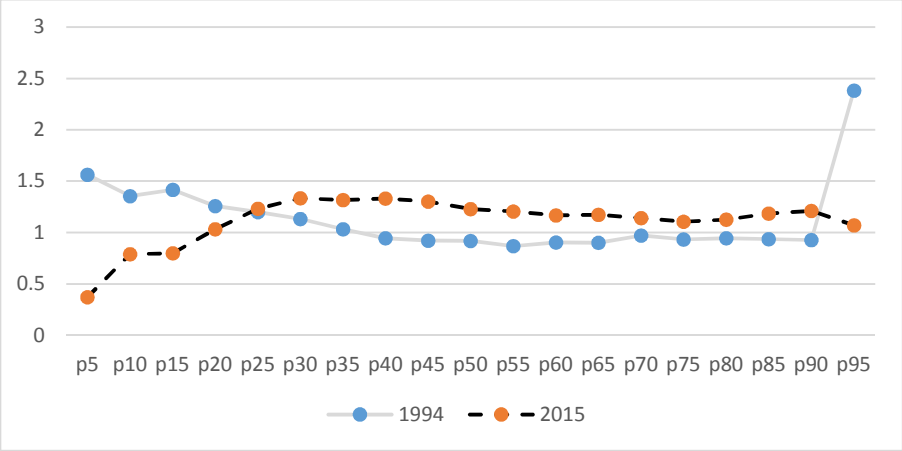
Source: PALMS 1994 and 2015.

Notes: No Primary base category for Educational Attainment. Western Cape base category for Province. Agriculture, Hunting, Forestry and Fishing base category for Industry. Standard errors in parenthesis; * p<0.10, ** p<0.05, *** p<0.01; Standard errors adjusted using sample weights.

Highly skilled workers: managers, professionals, semi-professionals and technicians. Skilled workers: Clerks, salesperson and skilled service workers, skilled agricultural workers and artisans. Semi-skilled and unskilled: Operators, routine workers and domestic workers.

In 2015 it is seen that for individuals in the 10th quantile working in each industry received an average real wage which was lower than that of the Agriculture, Hunting, Forestry and Fishing industry. This is an interesting finding and could be linked with the minimum wage in place for this industry which aims at protecting individuals at the lower end of the income distribution. It is also seen that across the quantiles those working in Domestic Services in 2015 find themselves earning less than those in the Agriculture, Hunting, Forestry and Fishing industry. The Mining and Quarrying industry replaces the Transport industry as the industry resulting in the highest average real wage relative to the Agriculture, hunting, forestry and fishing industry for individuals in the 50th and 90th quantiles. This result further illustrates that in 2015 the Agriculture, Hunting, Forestry and Fishing industry is where the average real wages are highest for the 10th quantile, while the other quantiles have seen their average real wages from the other industries continue to exceed those of the Agriculture, Hunting, Forestry and Fishing industry except for the Domestic Services industry.

Figure 6.1: Black/African Male Degree Coefficients by Percentile, 1994 and 2015



Source: own calculations using PALMS; adjusted using sampling weights.

In Figure 6.1 above the coefficients of the degree explanatory variable are presented across 19 percentiles to analyse its impact on real wage in 1994 and 2015. In 1994 the lowest four percentile groups yielded some of the highest average real wages relative to the individuals with no primary education. The remaining percentiles faced a very similar difference as shown by the line flattening out before peaking at the 95th percentile. In 2015, the first five percentiles and the 95th percentile saw their average real wage relative to individuals with no primary education reach levels lower than or equal to their 1994 levels. The remaining percentiles exhibited a similar pattern to that seen in 1994 as they faced slight differences but at levels higher than those experienced in 1994. This helps explain the increasing inequality among the Black/African Male cohort as having a degree is not as rewarding for the lower percentiles when compared to not going to school at all but it is more rewarding for the higher percentiles than it was in 1994.

Table 7.2 presents the results for the Black/African Female cohort. In 1994 educational attainment for individuals in the 10th quantile experienced the largest return in average real wages across the educational attainment categories relative to those with no primary for all but one educational attainment category, Incomplete Primary. In 2015 it is comparably found that the 50th and 90th quantiles saw an increase in the relative average real wage increase while once again the 10th quantile faced a decrease from its 1994 levels relative to those with no primary education. Furthermore, for all educational attainment levels it is evident that those in the 50th quantile had a larger percent change in average real wages than the other 2 quantiles. Notably those with a degree in the 50th quantile experienced an average real wage which was 148.2 percent higher than that of individuals with no primary education.

The results also show that the difference in average real wages of people living in urban areas and those in non-urban areas has decreased for all three quantiles. Interesting to see is that in 1994 those who were married earned significantly less than those who were not married for all 3 quantiles. However, in 2015 this changed with those married in the 50th and 90th quantiles earning a higher average real wage than those who were not married. Looking at union membership, it is observed that only the 10th quantile experienced a decrease in difference between union members and non-union members while the 50th and 90 quantiles saw an increase in union premium between 1994 and 2015. Union members on average earned 32.3 percent higher real wages than non-union members and this increased to 34.7 percent higher average real wages in 2015. Similar to the Black/African Male cohort the union premiums earned by each quantile except the 10th quantile in 2015 it must be noted are unexpectedly very high.

Furthermore, it is observed that the gap in average real wages taking into consideration the skill level required increased over the period. The difference between those in highly skilled occupations and those in skilled occupations increased by a small proportion than that between those in highly skilled occupations and those in semi-skilled & unskilled occupations in the various quantiles. For those in the 10th quantile the returns of those in highly skilled occupations do not differ by much with those in skilled and semi-skilled & unskilled occupations with differences of only 10.2 percent and 26.3 percent respectively. The 50th and 90th quantile experience differences between the groups in excess of 40 percent.

Table 7.2: Black/African Female quantile regression, 1994 and 2015. Dependent variable lnwage

Years	1994			2015		
Quantiles	10	50	90	10	50	90
Age	0.00797	0.0164	0.0197	0.000885	0.00495	-0.00128
	(0.0146)	(0.0107)	(0.0149)	(0.00634)	(0.00344)	(0.00416)
Age Squared	-5.40e-05	-0.000137	-0.000145	4.71e-05	2.60e-05	0.000114**
	(0.000194)	(0.000135)	(0.000183)	(8.12e-05)	(4.42e-05)	(5.08e-05)
Educational Attainment						

Incomplete Primary	0.135**	0.139***	0.0582	-0.0392	0.0379	-0.0188
	(0.0623)	(0.0463)	(0.0698)	(0.0251)	(0.0286)	(0.0667)
Primary	0.358***	0.177***	0.0382	0.0901**	0.146***	0.123*
	(0.0583)	(0.0625)	(0.0671)	(0.0350)	(0.0323)	(0.0653)
Incomplete Secondary	0.452***	0.289***	0.0877	0.187***	0.228***	0.174***
	(0.0514)	(0.0470)	(0.0744)	(0.0251)	(0.0278)	(0.0653)
Matric/Secondary	0.826***	0.610***	0.370***	0.326***	0.485***	0.461***
	(0.0778)	(0.0652)	(0.0862)	(0.0296)	(0.0302)	(0.0660)
Certificate/Diploma	0.836***	0.524***	0.766*	0.358***	0.902***	0.759***
	(0.257)	(0.0908)	(0.449)	(0.0558)	(0.0415)	(0.0691)
Degree	1.599***	1.007***	0.478***	1.039***	1.482***	1.158***
	(0.205)	(0.149)	(0.126)	(0.112)	(0.0392)	(0.0816)
Urban	0.326***	0.269***	0.266***	0.161***	0.189***	0.155***
	(0.0489)	(0.0376)	(0.0468)	(0.0200)	(0.0137)	(0.0177)
Married	-0.0944**	-0.0441	-0.104**	-0.00934	0.0402***	0.0698***
	(0.0373)	(0.0320)	(0.0407)	(0.0168)	(0.0117)	(0.0134)
Member of Union	0.381***	0.331***	0.258***	0.159***	0.455***	0.426***
	(0.0592)	(0.0430)	(0.0414)	(0.0352)	(0.0211)	(0.0216)
Province						
Eastern Cape	-0.223***	-0.243***	-0.308***	-0.365***	-0.362***	-0.317***
	(0.0864)	(0.0572)	(0.0867)	(0.0377)	(0.0250)	(0.0236)
Northern Cape	-0.410***	-0.346***	-0.571***	-0.0298	-0.167***	-0.206***
	(0.133)	(0.0643)	(0.0993)	(0.0488)	(0.0523)	(0.0646)
Free State	-0.774***	-0.565***	-0.609***	-0.467***	-0.413***	-0.339***
	(0.104)	(0.0713)	(0.0945)	(0.0470)	(0.0312)	(0.0260)
KwaZulu-Natal	-0.0267	0.0610	0.0607	-0.304***	-0.344***	-0.254***
	(0.0859)	(0.0507)	(0.0935)	(0.0376)	(0.0204)	(0.0300)
North West	-0.194**	-0.0565	-0.110	-0.130***	-0.159***	-0.191***
	(0.0930)	(0.0571)	(0.0968)	(0.0405)	(0.0216)	(0.0334)
Gauteng	0.0713	0.0468	-0.0496	-0.123***	-0.0628***	0.0321**
	(0.0960)	(0.0586)	(0.0863)	(0.0421)	(0.0183)	(0.0156)
Mpumalanga	-0.234**	-0.0558	-0.198	-0.149***	-0.159***	-0.176***
	(0.102)	(0.0591)	(0.168)	(0.0399)	(0.0255)	(0.0272)
Limpopo	-0.0574	0.0962	0.0647	-0.211***	-0.311***	-0.306***
	(0.0904)	(0.0618)	(0.150)	(0.0369)	(0.0268)	(0.0255)
Log Hours Worked	0.322***	0.0548	-0.0980	0.435***	0.611***	0.458***
	(0.0762)	(0.0641)	(0.0769)	(0.0129)	(0.00762)	(0.0226)
Job Type						
Skilled	-0.0895	-0.330***	-0.342**	-0.102***	-0.510***	-0.409***
	(0.144)	(0.0839)	(0.138)	(0.0394)	(0.0229)	(0.0294)
Semi-skilled & unskilled	-0.119	-0.553***	-0.577***	-0.263***	-0.723***	-0.831***
	(0.151)	(0.0893)	(0.139)	(0.0407)	(0.0233)	(0.0324)
Self-Employed	-0.550***	-0.482***	-0.469***	-	-	-
	(0.0729)	(0.0573)	(0.0442)			
Industry						
Mining and Quarrying	-0.291	-0.164	-0.158	-0.921***	0.469***	0.625***
	(0.403)	(0.454)	(0.219)	(0.0523)	(0.0970)	(0.212)
Manufacturing	0.237*	0.564***	0.586***	-0.0135	-0.100***	0.243***

	(0.142)	(0.0586)	(0.156)	(0.0691)	(0.0291)	(0.0483)
Utilities	0.998	1.364	1.343***	0.0560	0.144	0.543
	(0)	(0)	(0.204)	(0.0533)	(0.231)	(0.379)
Construction	-0.142	0.809***	0.481***	-0.0410	-0.344***	-0.113*
	(0.466)	(0.0831)	(0.158)	(0.0336)	(0.0298)	(0.0660)
Trade	0.136*	0.387***	0.533***	-0.129***	-0.168***	0.0336
	(0.0806)	(0.0745)	(0.134)	(0.0457)	(0.0262)	(0.0408)
Transport	0.589***	0.972***	0.823***	-0.223*	-0.0587	0.329***
	(0.144)	(0.169)	(0.162)	(0.121)	(0.0621)	(0.0793)
Finance	0.366***	0.460***	0.599***	0.106**	-0.0470	0.288***
	(0.0856)	(0.0986)	(0.158)	(0.0444)	(0.0322)	(0.0341)
Services	0.385***	0.521***	0.680***	-0.284***	-0.256***	0.197***
	(0.0822)	(0.0710)	(0.144)	(0.0290)	(0.0288)	(0.0315)
Domestic Services	0.427***	0.534***	0.633***	-0.140***	-0.216***	-0.154***
	(0.0824)	(0.0659)	(0.131)	(0.0281)	(0.0247)	(0.0181)
Constant	4.888***	6.673***	8.001***	5.368***	5.754***	7.052***
	(0.444)	(0.343)	(0.463)	(0.140)	(0.0788)	(0.145)
Observations	2,478	2,478	2,478	19,618	19,618	19,618

Source: PALMS 1994 and 2015.

Notes: No Primary base category for Educational Attainment. Western Cape base category for Province. Agriculture, Hunting, Forestry and Fishing base category for Industry. Standard errors in parenthesis; * p<0.10, ** p<0.05, *** p<0.01; Standard errors adjusted using sample weights.

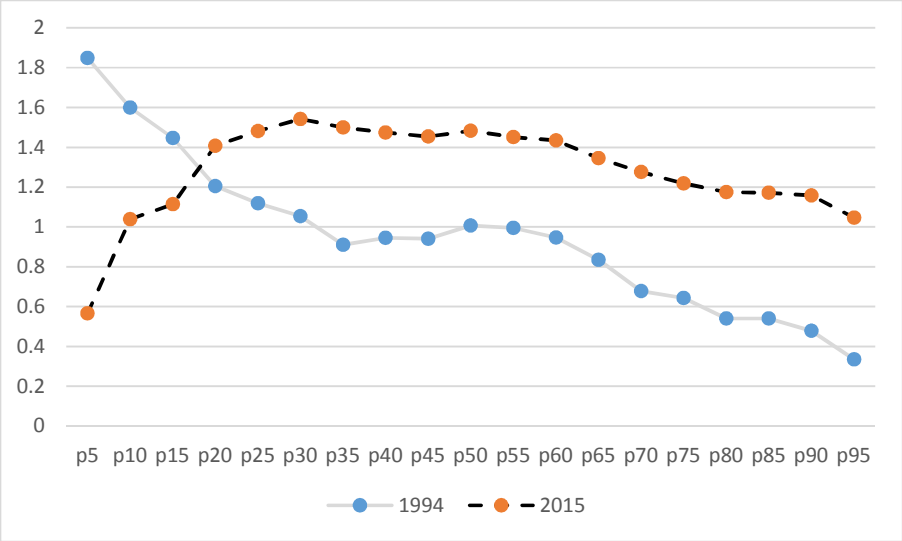
Highly skilled workers: managers, professionals, semi-professionals and technicians. Skilled workers: Clerks, salesperson and skilled service workers, skilled agricultural workers and artisans. Semi-skilled and unskilled: Operators, routine workers and domestic workers.

Furthermore, and unforeseen the Transport industry in 1994 had the highest average real wages when compared to the Agriculture, Hunting, Forestry and Fishing industry of all the industries. Similar to the Black/African Male cohort, in 2015 the Mining and Quarrying industry had the highest average real wages of all the industries relative to the Agriculture, hunting, forestry and fishing industry for the 50th and 90th quantiles. For the 10th quantile the Finance industry had the highest real average wage of all the industries relative to the Agriculture, Hunting, Forestry and Fishing industry and had an adequate level of observations to be regarded. The last observations of note for the Black/African Female cohort for 2015 for the 10th and 50th quantiles are that besides the Finance industry for the 10th quantile and the Mining and Quarrying industry for the 50th quantile, the average real wages for all other industries were below those of the Agriculture, Hunting, Forestry and Fishing industry signifying the importance of this industry.

Figure 6.2 presents the Degree percentile coefficients for the Black/African Female cohort and it can clearly be seen that there has been a shift in returns relative to those with no primary education between the two years. From the figure in 1994 those with a degree in the lower percentiles experienced a significantly higher real wage in comparison to those with no primary education and that there was a monotonically decreasing trend. In 2015, it is observed that percentiles below the 20th percentile had a smaller wage gap in comparison to their

1994 level, while all the following percentiles earned significantly more than their 1994 level. In other words, for all the percentiles those with a Degree earned a real wage that was higher than individuals with no primary education, but the gap between the two groups increased for those in percentiles higher than 20 while it decreased for those in percentiles below 20.

Figure 6.2: Black/African Female Degree Coefficients by Percentile, 1994 and 2015



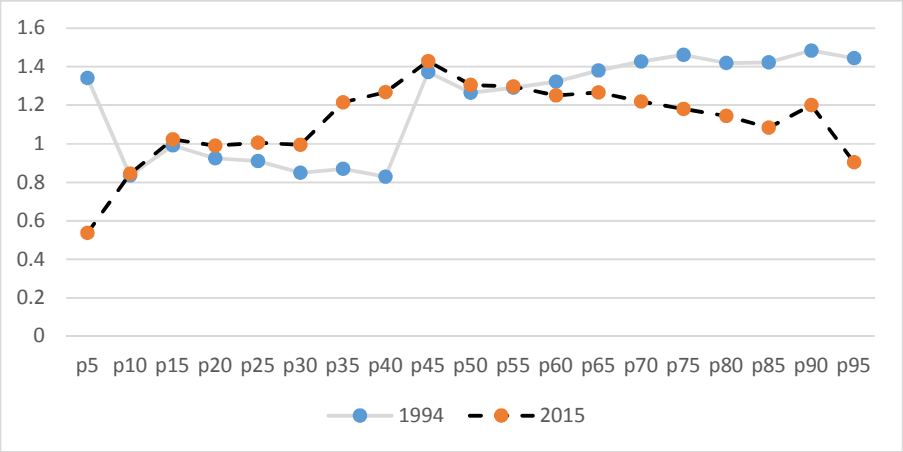
Source: own calculations using PALMS; adjusted using sampling weights.

Figure 6.3 presents the Coloured Male coefficients for individuals with a degree at different parts of the distribution. Looking at Figure 6.3 it is clear to see that for just under 50 percent of the percentiles chosen the 2015 coefficients are lower than they were in 1994. In 1994 it can be observed that there is a constant increase in coefficient for the top half of the percentiles. This means that the gap in average real wages between individuals with a degree and those with no primary education increased the higher up the distribution. In 2015 however, a reduction in the gap in average real wages between those with a degree and those with no primary education from the 45th percentile can be seen. One standout observation from 2015 that can be observed is that the 5th percentile and the 95th percentile experienced drastic decreases in coefficient between 1994 and 2015 although the coefficient remained positive. This result shows that individuals with a degree continued to earn more than individuals with no primary education, however the difference in real wages between these groups has decreased.

Figure 6.4 highlights the changes in the degree coefficient across different percentiles for the Coloured Female cohort. Two distinct patterns immerge between the two years; there was a decrease in coefficient across the percentiles in 1994 with the 10th percentile yielding the highest coefficient; and there was a sharp increase in the coefficient between the 5th and 15th percentiles in 2015 which was followed by a drastic decrease between the 25th and 55th percentiles. It must also be noted that in 2015 the 5th and 10th percentile coefficients were

significantly lower than the higher percentiles. This result could help explain how the Coloured Female cohort was the most unequal cohort in 2015. Having a degree in the lower percentiles in 2015 is not as rewarding as it was in 1994 with those with a degree only earning an average real wage which is more than 10 percent lower

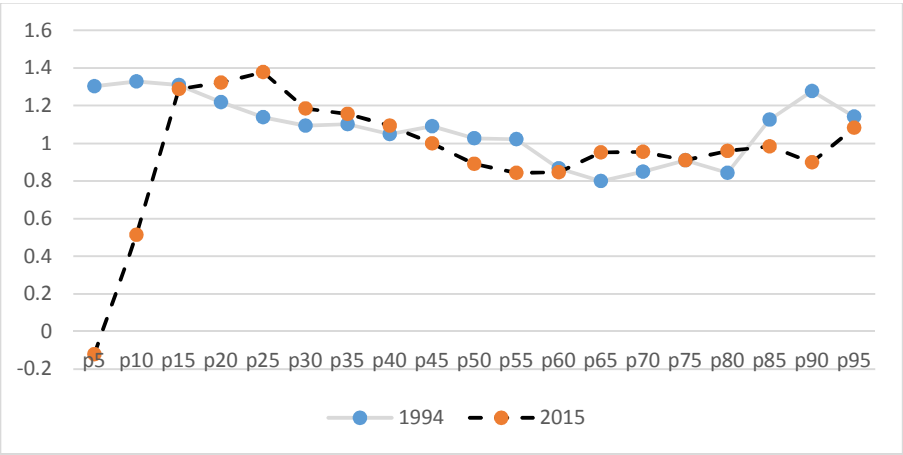
Figure 6.3: Coloured Male Degree Coefficients by Percentile, 1994 and 2015



Source: own calculations using PALMS; adjusted using sampling weights.

than someone with no primary education. For the higher percentiles, the average real wages of individuals with a degree was at least 80 percent higher than someone with no primary education showing a bigger reward for the higher qualification.

Figure 6.4: Coloured Female Degree Coefficients by Percentile, 1994 and 2015

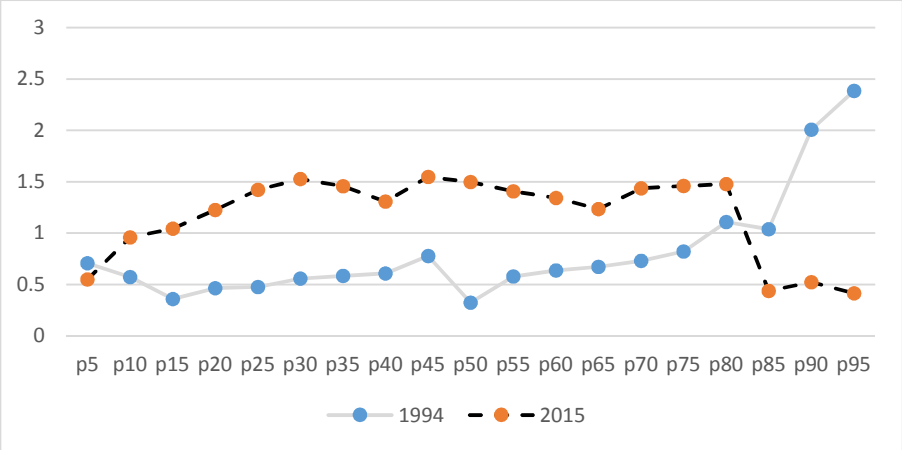


Source: own calculations using PALMS; adjusted using sampling weights.

The analysis of the Asian/Indian Male cohort's degree coefficient is illustrated in Figure 6.5. Once again, a very different pattern from the preceding cohorts can be observed. The 1994 line shows that between the 5th percentile and 75th percentiles no coefficient was above one. In other words, those with a degree in these

percentiles did not earn a real wage on average that was more than 100 percent of those with no primary education. The highest coefficient in this range was observed for the 75th percentile where individuals in the 75th percentile earned a real wage which was on average 82 percent higher than individuals with no primary education. In 2015, for most of the percentiles the 1994 coefficients were surpassed. The gap in average real wages between those with a degree and with no primary education clearly widened. This is not surprising as the portion of Asian/Indian Males with no primary education was close to zero and the portion of individuals

Figure 6.5: Asian/Indian Male Degree Coefficients by Percentile, 1994 and 2015

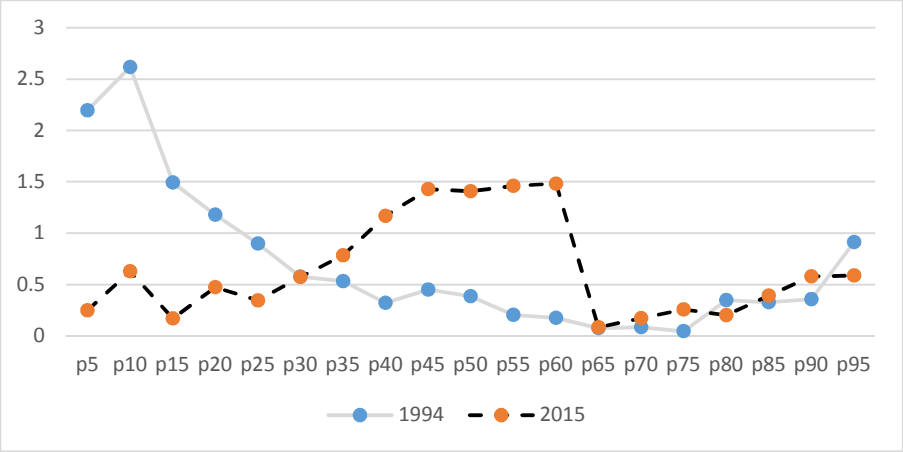


Source: own calculations using PALMS; adjusted using sampling weights.

with a degree increased significantly. For most of the percentiles the average real wage difference between individuals with a degree and those with no primary education was more than 100 percent, with the 45th percentile receiving a real wage which was on average 154.7 percent higher than those with no primary education. The change between 1994 and 2015 highlights the wage premium attached to having a tertiary education.

Figure 6.6 examines the Asian/Indian Female cohort degree coefficients in 1994 and 2015 over the 19 chosen percentiles. As discussed earlier, the Asian/Indian Female cohort was the most equal cohort in 1994 and these results help to understand why. In 1994 the tertiary education premium was not very high with most percentiles facing real wages which were less than 50 percent more than those of individuals with no primary education. From the figure it can be seen that the 1994 levels are far below those experienced in 2015 between the 30th and 65th percentiles. This increase in coefficient shows that the gap in real wages in these percentiles between those with a degree and those with no primary education increased substantially. The 5th and 10th percentiles, although they had positive coefficients had coefficients which were much lower than their 1994 levels, which shows that the gap in real wages between those with a degree and no primary education decreased.

Figure 6.6: Asian/Indian Female Degree Coefficients by Percentile, 1994 and 2015



Source: own calculations using PALMS; adjusted using sampling weights.

Table 7.7 carries out the quantile analysis for the White Male cohort. The examination of the age coefficient for the 50th quantile explains that there was a reduction in the turning point for the impact of age on the average real wage which increases at a decreasing rate with age. In 1994 the turning point was 51.2 years but this declines to 44.6 years in 2015. Whether an individual is married or not seems to play a contributing role to our overall observations. In 2015, marital status help to close the gap between real wages in the White Male cohort. Those in the 10th quantile who were married had an average real wage which was 25.8 percent higher than that of an unmarried individual. This higher average real wage of 25.8 percent exceeded that of the 50th and 90th quantiles which were not significantly different from 0. Furthermore the 2015 union coefficient for the 50th quantile is positive, representing the presence of a union premium of 14.7 percent.

Those in a semi-skilled & unskilled occupation in the 10th quantile look to have the biggest difference in average real wages when compared to those in high skilled occupations. It can be seen that in 1994 those in high skilled occupations had an average real wage which was 97.4 percent higher than that of semi-skilled & unskilled workers, while in 2015 this number increased by more than 100 percent to an average real wage that was 207.7 percent higher. However, in Table 1B it was observed that only 7 percent of the White Male cohort work in a semi-skilled & unskilled occupation which could help explain our finding. As the second largest proportion of the White Male cohort is in skilled occupations, the increase in proportion of individuals to high skilled occupations in 2015 has resulted in an increase in the average real wage gap experienced between 1994 and 2015 notably so for the 10th and 50th quantiles. In 1994 those in skilled occupations had an average real wage which was 19.0 percent, 38.7 percent and 42.5 percent lower than the high skilled occupations. This changed to 82.9 percent, 76.7 percent and 67.8 percent lower average real wage in 2015 for the 10th, 50th and 90th quantiles respectively.

An industry analysis shows that in 2015 those in the Agriculture, Hunting, Forestry and Fishing industry among individuals in the 10th and 50th quantiles had the highest average real wage, when the Utilities industry is disregarded due to few observations. The Mining and Quarrying industry had the highest average real wages for the 90th quantile. It is surprising to see that the Trade, Finance and Services industries for the 50th quantile had wages which were lower than those in the Agriculture, Hunting, Forestry and Fishing industry as these are two industries which have grown in recent time and have seen increased gross value added.

Table 7.7: White Male quantile regression, 1994 and 2015. Dependent variable lnwage

Years	1994			2015		
Quantiles	10	50	90	10	50	90
Age	0.0449	0.0783***	0.0487***	-0.00605	0.0811***	0.0462**
	(0.0294)	(0.0210)	(0.0158)	(0.0263)	(0.0160)	(0.0213)
Age Squared	-0.000426	-0.000765***	-0.000371*	-9.06e-05	-0.000910***	-0.000393
	(0.000375)	(0.000278)	(0.000194)	(0.000316)	(0.000190)	(0.000270)
Educational Attainment						
Incomplete Primary	-1.177	0.755	0.760	-	-	-
	(1.517)	(0)	(0.716)			
Primary	-0.356	0.393	-0.0118	2.495***	0.693	0.386
	(0)	(0)	(0)	(0.904)	(1.317)	(0)
Incomplete Secondary	-0.920	0.360***	0.924	0.218	0.0963	-0.503
	(1.000)	(0.119)	(0.619)	(0.815)	(1.260)	(3.359)
Matric/Secondary	-0.389	0.695***	1.261**	-0.0356	0.268	-0.356
	(0.969)	(0.115)	(0.607)	(0.801)	(1.260)	(3.361)
Certificate/Diploma	0.0276	0.528***	1.020*	0.199	0.278	-0.246
	(0.937)	(0.137)	(0.615)	(0.805)	(1.262)	(3.359)
Degree	0.0405	0.856***	1.512**	0.833	0.663	0.218
	(0.977)	(0.155)	(0.614)	(0.804)	(1.261)	(3.364)
Urban	0.255***	-0.0640	0.131**	-0.0774	-0.242***	-0.387***
	(0.0771)	(0.116)	(0.0556)	(0.329)	(0.0700)	(0.133)
Married	0.174	0.0510	0.244***	0.258**	0.0995	-0.0638
	(0.144)	(0.0714)	(0.0707)	(0.109)	(0.0653)	(0.0825)
Member of Union	0.0640	0.0747	0.0614	0.198*	0.147**	-0.0899
	(0.0642)	(0.0664)	(0.0494)	(0.118)	(0.0638)	(0.0672)
Province						
Eastern Cape	0.191	0.261**	0.0842	-1.049***	-0.357**	-0.123
	(0.120)	(0.125)	(0.144)	(0.154)	(0.141)	(0.160)
Northern Cape	-0.0142	0.125	-0.0369	0.156	-0.290**	-0.775***
	(0.128)	(0.142)	(0.112)	(0.228)	(0.129)	(0.192)
Free State	-0.0842	0.173	0.0418	0.688***	0.0864	-0.339***
	(0.103)	(0.140)	(0.109)	(0.190)	(0.0771)	(0.118)
KwaZulu-Natal	0.213*	0.435***	0.242**	-0.201	-0.628***	-0.358***
	(0.113)	(0.127)	(0.117)	(0.150)	(0.161)	(0.130)

North West	0.225	0.166	0.262	0.344	0.0454	0.0491
	(0.187)	(0.161)	(0.383)	(0.354)	(0.148)	(0.347)
Gauteng	0.208**	0.324***	0.0694	0.150	0.0372	0.0818
	(0.0897)	(0.119)	(0.106)	(0.119)	(0.0687)	(0.109)
Mpumalanga	-0.205	0.216	0.542***	0.286	0.367***	0.0659
	(0.182)	(0.174)	(0.154)	(0.182)	(0.0922)	(0.120)
Limpopo	0.120	0.312	0.242*	-0.240	-0.0314	-0.442*
	(0.122)	(0.225)	(0.137)	(0.219)	(0.104)	(0.245)
Log Hours Worked	0.410**	0.479***	0.493***	0.252	-0.116	-0.442**
	(0.191)	(0.121)	(0.123)	(0.227)	(0.142)	(0.187)
Job Type						
Skilled	-0.190***	-0.387***	-0.425***	-0.829***	-0.767***	-0.678***
	(0.0614)	(0.0684)	(0.0432)	(0.157)	(0.0740)	(0.0791)
Semi-skilled & unskilled	-0.974***	-0.488***	-0.500**	-2.077***	-1.098***	-0.986***
	(0.227)	(0.110)	(0.194)	(0.205)	(0.173)	(0.101)
Self-Employed	-	-	-	-	-	-
Industry						
Mining and Quarrying	0.189	0.291	0.401***	-0.779**	-0.0598	0.655***
	(0.304)	(0.204)	(0.116)	(0.362)	(0.211)	(0.202)
Manufacturing	0.0106	0.123	0.178*	-0.384	-0.0191	0.464*
	(0.264)	(0.175)	(0.0965)	(0.267)	(0.109)	(0.272)
Utilities	-2.389	0.0697	0.244**	0.634*	0.665***	0.690***
	(2.200)	(0.301)	(0.0985)	(0.379)	(0.105)	(0.215)
Construction	-0.175	0.143	0.0873	-0.574*	-0.0805	0.147
	(0.287)	(0.165)	(0.145)	(0.297)	(0.147)	(0.183)
Trade	-0.121	-0.0325	0.0661	-0.293	-0.0529	0.176
	(0.231)	(0.169)	(0.0954)	(0.295)	(0.0838)	(0.186)
Transport	-0.301	0.143	0.0142	-0.502	-0.180	0.158
	(0.300)	(0.177)	(0.156)	(0.308)	(0.115)	(0.199)
Finance	0.171	0.197	0.360***	-0.836***	-0.172*	0.218
	(0.256)	(0.179)	(0.119)	(0.225)	(0.0904)	(0.204)
Services	-0.370	-0.0985	-0.0167	-0.592**	-0.165	0.0516
	(0.242)	(0.162)	(0.100)	(0.291)	(0.104)	(0.200)
Domestic Services	0.498	0.0647	-0.294	-0.124	-0.892	-1.916***
	(1.409)	(0.300)	(2.127)	(0)	(1.790)	(0.659)
Constant	6.053	4.830***	5.100	7.802***	8.512***	12.04***
	(0)	(0.600)	(0)	(1.364)	(1.410)	(3.459)
Observations	685	685	685	2,113	2,113	2,113

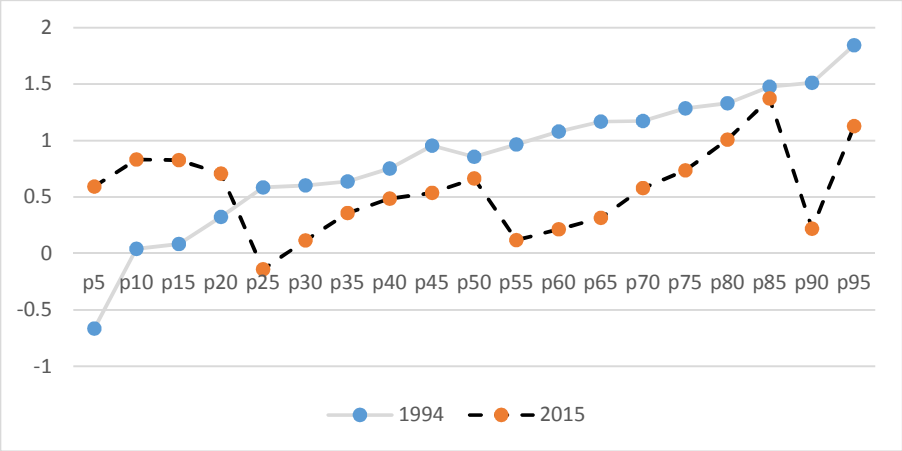
Source: PALMS 1994 and 2015.

Notes: No Primary base category for Educational Attainment. Western Cape base category for Province. Agriculture, Hunting, Forestry and Fishing base category for Industry. Standard errors in parenthesis; * p<0.10, ** p<0.05, *** p<0.01; Standard errors adjusted using sample weights.

Highly skilled workers: managers, professionals, semi-professionals and technicians. Skilled workers: Clerks, salesperson and skilled service workers, skilled agricultural workers and artisans. Semi-skilled and unskilled: Operators, routine workers and domestic workers.

From Figure 6.7 it is clear to see that having a degree is not rewarded as much in 2015 as it was in 1994. It is evident from the 1994 line that in 1994 is was the case that the higher the percentile individuals with a degree found themselves in, the higher their difference in average real wages relative to individual with no primary education. It can also be observed that for the 5th percentile individuals with no primary education earned an average real wage which was higher than individuals with a degree. In 2015 the coefficients are mostly below their 1994 level. This shows that the difference in average real wages in each percentile between those with a degree and those with no primary education decreased. It must also be noted that the White Male cohort is the only cohort of which the 2015 coefficient for the 5th percentile was higher than its 1994 level.

Figure 6.7: White Male Degree Coefficients by Percentile, 1994 and 2015



Source: own calculations using PALMS; adjusted using sampling weights.

Lastly Table 7.8 presents our quantile regression results for the White Female Cohort. In 2015 it can be seen that for the 50th quantile, married individuals received an average real wage which was 15.0 percent lower than those who were not married. A look at union membership shows that the 50th quantile experienced a 19.7 percent union premium. The 90th quantile exhibits a drastic change in the impact of semi-skilled and unskilled occupations over the period of interest. In 1994 individuals with semi-skilled & unskilled occupations had average real wage which were 127.3 percent higher than that of high skilled individuals and in 2015 this changed to an average real wage which was 115.1 percent lower than that of individuals in high skilled occupations. This finding can be explained with the aid of Table 1A, which shows that in 1994 63 percent of individuals in the White Female cohort were in skilled positions accounting for the majority while in 2015 57 percent of individuals in the cohort were in high skilled occupations. The gap in average real wage did not only increase between semi-skilled & unskilled occupations, it also changed between skilled and high skilled occupations. In 2015 the 10th and 50th quantiles had average real wages which were 48.2 percent and 45.2 percent lower than the average

real wage of individuals in high skilled occupations when in 1994 they were only 46.2 percent and 22.4 percent lower.

The industry data shows in 2015 Domestic Services in the 90th quantile had the highest average real wages relative to the Agriculture, Hunting, Forestry and Fishing industry. This finding can however be disregarded due to the number of observations in the sample. With this adjustment the Mining and Quarrying industry is the industry with the highest average real wages relative to the Agriculture, Hunting, Forestry and Fishing however it can also be disregarded as it also only has a handful of observations. The Manufacturing industry had the highest average real wages relative to the Agriculture, Hunting, Forestry and Fishing industry for the 50th quantile.

The degree coefficients presented in Figure 6.8 for the White Female cohort show no clear pattern. The 1994 coefficients for all the percentiles below the 65th percentile appear to be higher than their 2015 level. This shows that the gap between those with a degree and those with no primary education has decreased between 1994 and 2015. 2015 exhibited no clear pattern as the coefficients increased between the 10th and 40th percentiles before drastically decreasing between the 40th and 45th percentiles. From the figure it can be noted that once again the 5th percentile coefficient in 1994 was higher than in 2015, signifying that the gap in real wages between those with a degree and no primary education closed at this lower end of the distribution.

From the quantile regressions some key findings can be arrived at. Firstly, a union premium does exist, not only for Black union members as was Azam and Rospabe's (2007) finding but also for the other races. Although a union premium was found it must also be stated that those in the 10th quantile saw this premium decrease while those in the 50th and 90th quantiles experienced increases. This finding is in line with Bhorat et al. (2018) who identified that unions were failing to protect the most vulnerable workers at the bottom of the distribution as they noticed there was elite capture which resulted in increasing premia at the top end of the distribution. Furthermore, where results were significant, individuals with a Certificate/Diploma and Degree had the two highest relative average real wages when compared to individuals with no primary education of the educational attainment groups in both 1994 and 2015. This result is in line with what Jacob Mincer (1974) found, in that increased investment in human capital results in higher wages and that educational attainment had explanatory power. Lastly across the cohorts, the Agriculture, Hunting, Forestry and Fishing industry was an important industry for the 10th quantile as it paid the highest average real wage relative to the other industries. This is not surprising as this industry employees most of the unskilled labour who make up the 10th quantile and is an industry protected highly by sectoral determinants aimed at helping those on the lower end of the income distribution.

These key findings appear to each be driving inequality for each of the cohorts as individuals in the lower quantiles have exhibited smaller coefficients relative to those in the higher quantiles. The union premium

favouring those in the higher quantiles at the expense of those on the lower end of the distribution has clearly contributed to inequality. Tertiary education provides access to highly skilled and skilled occupations and as seen in the tables yielded the highest average real wages relative to individuals with no primary education. As shown by the figures, the lower percentiles did not experience the same effect for having a degree in most cases having lower coefficients. Certificates/Diplomas and Degree therefore increase inequality through these two avenues. The Agriculture, Hunting, Forestry and Fishing industry has helped reduce inequality as for the lower quantiles and in some cases the 50th quantile has yielded the highest average real wages relative to all the other industries.

Table 7.8: White Female quantile regression, 1994 and 2015. Dependent variable lnwage

Years	1994			2015		
Quantiles	10	50	90	10	50	90
Age	-0.00197	0.0332*	0.0932***	0.0438	0.0421***	0.0355**
	(0.0293)	(0.0183)	(0.0340)	(0.0378)	(0.0131)	(0.0141)
Age Squared	0.000197	-0.000242	-0.00106**	-0.000534	-0.000410***	-0.000319*
	(0.000409)	(0.000245)	(0.000431)	(0.000449)	(0.000156)	(0.000177)
Educational Attainment						
Incomplete Primary	-	-	-			
Primary	-0.240	-0.516	-0.633	1.032	-0.219	-1.449
	(0)	(0)	(0)	(0)	(0)	(0)
Incomplete Secondary	0.634***	0.181	-0.211	-0.319	0.0470	0.0382
	(0.171)	(1.173)	(1.073)	(1.408)	(0.613)	(1.271)
Matric/Secondary	1.120***	1.017	0.590	-0.372	0.316	0.204
	(0.261)	(1.294)	(1.103)	(1.397)	(0.611)	(1.270)
Certificate/Diploma	1.954	1.283	0.360	-0.328	0.476	0.187
	(1.726)	(0)	(28.95)	(1.400)	(0.613)	(1.271)
Degree	1.313***	1.303	1.286	0.330	0.834	0.500
	(0.289)	(1.289)	(1.115)	(1.394)	(0.610)	(1.273)
Urban	0.0710	0.273***	0.244	0.267**	-0.0471	-0.00660
	(0.0947)	(0.0911)	(0.184)	(0.112)	(0.0652)	(0.130)
Married	0.173*	0.00441	0.0128	-0.0230	-0.150***	0.0178
	(0.0883)	(0.0611)	(0.118)	(0.117)	(0.0409)	(0.0487)
Member of Union	-0.132	0.0354	0.0183	0.194	0.197***	-0.0181
	(0.101)	(0.0870)	(0.150)	(0.131)	(0.0507)	(0.0588)
Log Hours Worked	0.352	0.200	0.340**	0.392**	0.519***	0.360***
	(0.248)	(0.175)	(0.170)	(0.155)	(0.0973)	(0.0617)
Province						
Eastern Cape	-0.301**	-0.182*	-0.0590	-0.474***	-0.242***	-0.439***
	(0.132)	(0.0958)	(0.127)	(0.174)	(0.0839)	(0.116)
Northern Cape	-0.111	-0.200**	-0.0842	0.428**	-0.0424	-0.363**

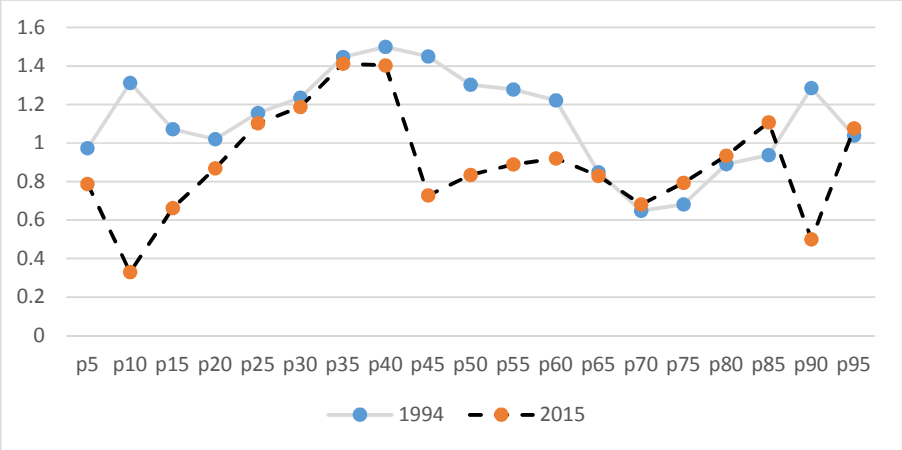
	(0.111)	(0.0991)	(0.157)	(0.215)	(0.0923)	(0.166)
Free State	-0.0184	-0.136	0.241**	0.0959	-0.113	0.0923
	(0.129)	(0.0906)	(0.119)	(0.682)	(0.0897)	(0.103)
KwaZulu-Natal	-0.291**	-0.222**	-0.0400	0.184	-0.471***	-0.411
	(0.140)	(0.106)	(0.126)	(0.145)	(0.118)	(0.273)
North West	-0.149	-0.296**	0.0727	0.641	0.0461	-0.449***
	(0.120)	(0.122)	(0.154)	(0.417)	(0.109)	(0.173)
Gauteng	0.00562	0.00908	0.393*	0.427***	0.0842	0.0694
	(0.104)	(0.103)	(0.213)	(0.163)	(0.0758)	(0.101)
Mpumalanga	-1.362	-0.397**	-0.320*	0.456*	0.145*	-0.368***
	(1.687)	(0.165)	(0.175)	(0.252)	(0.0877)	(0.106)
Limpopo	-0.566**	0.166	0.218	1.588***	0.250*	-0.360***
	(0.239)	(0.161)	(0.195)	(0.194)	(0.135)	(0.119)
Job Type						
Skilled	-0.462***	-0.224***	-0.129	-0.482***	-0.452***	-0.359***
	(0.0903)	(0.0527)	(0.104)	(0.131)	(0.0592)	(0.0567)
Semi-skilled & unskilled	-0.462	-0.0801	1.273***	-0.715	-1.636***	-1.151***
	(0.454)	(0.388)	(0.350)	(1.250)	(0.259)	(0.192)
Self-Employed	-0.268	-0.648	-2.398***	-	-	-
	(0.373)	(0.487)	(0.547)			
Industry						
Mining and Quarrying	0.568*	0.364**	-0.402	1.276*	0.277	0.789***
	(0.320)	(0.183)	(1.773)	(0.742)	(0.688)	(0.197)
Manufacturing	-0.338	0.234	-0.363	1.157	0.668***	0.116
	(0.543)	(0.155)	(1.684)	(0.711)	(0.121)	(0.212)
Utilities	0.330	-0.144	-0.739	1.678	0.924	0.589
	(0.469)	(0.211)	(1.771)	(1.352)	(1.317)	(1.592)
Construction	0.0332	-0.223	-0.191	1.402*	0.419***	0.0739
	(0.358)	(0.480)	(0)	(0.769)	(0.0912)	(0.220)
Trade	-0.264	0.0798	-0.236	0.973	0.465***	0.156
	(0.341)	(0.169)	(1.670)	(0.693)	(0.0897)	(0.194)
Transport	-0.00751	0.114	-0.167	1.250	0.472***	0.162
	(0.322)	(0.172)	(1.688)	(0.839)	(0.0964)	(0.226)
Finance	0.161	0.194	-0.299	1.198*	0.639***	0.230
	(0.340)	(0.154)	(1.670)	(0.696)	(0.0900)	(0.198)
Services	-0.240	0.0805	-0.211	1.064	0.493***	0.317
	(0.317)	(0.153)	(1.664)	(0.689)	(0.0889)	(0.200)
Domestic Services	0.188	0.293	-0.285	1.769	1.311***	1.245**
	(0.288)	(0.899)	(1.603)	(1.298)	(0.127)	(0.508)
Constant	5.824***	6.012***	5.525***	4.084**	5.672***	7.836***
	(1.208)	(1.719)	(1.203)	(1.807)	(0.778)	(1.340)
Observations	472	472	472	2,145	2,145	2,145

Source: PALMS 1994 and 2015.

Notes: No Primary base category for Educational Attainment. Western Cape base category for Province. Agriculture, Hunting, Forestry and Fishing base category for Industry. Standard errors in parenthesis; * p<0.10, ** p<0.05, *** p<0.01; Standard errors adjusted using sample weights.

Highly skilled workers: managers, professionals, semi-professionals and technicians. Skilled workers: Clerks, salesperson and skilled service workers, skilled agricultural workers and artisans. Semi-skilled and unskilled: Operators, routine workers and domestic workers.

Figure 6.8: White Female Degree Coefficients by Percentile, 1994 and 2015



Source: own calculations using PALMS; adjusted using sampling weights.

6.3 Oaxaca-Blinder Decomposition

The Oaxaca-Blinder decomposition was run with the log wage specified as the dependent variable and age, age squared, years of education, whether one lives in an urban or rural area, marital status, union membership, skill level required to do job and whether they were self-employed given as the explanatory variables. This set of explanatory variables was chosen to best show factors that influence and reflect levels of human capital which is a key determinant when it comes to explaining the job which people have and the wages which they receive.

The decomposition results for the cohorts are presented in Table 8. Column one below gives the difference in the mean values of our outcome variable, log real wage in 2015, for each cohort of interest and all those not in the cohort. It further shows the contribution attributable to the gaps in endowments, xs, (E), the coefficients, βs, (C), and the interaction (CE) in columns 2 through to 4 respectively. The last 4 columns show how the explained and unexplained portions of the log real wage gap vary depending on the decomposition used. Columns 5 and 7 correspond to the Oaxaca decomposition in equation (11) and columns 6 and 8 to equation (12), where D=0 and D=1, respectively. The letter L and H next to each cohort signify whether the cohort had a higher mean, H, or lower mean, L, in comparison to those not included in the cohort.

In the Appendix, three further tables are provided. The first table shows the Oaxaca-Blinder decomposition for 1994. The second table shows how far gaps in individual x's contribute to the overall explained gap for each

cohort. Columns 2 and 3 of this table allow for identification of the gap in each of the βs contributes to the overall unexplained gap. The third table of output results gives the coefficient estimates, means, and predictions for each x for each group.

In table 8 for the Black/African Female cohort in column one, it can be observed that there is a difference in the mean log of real wages of 0.483 and that the gap in coefficients accounts for the bulk of the gap in outcomes. In other words, had the Black/African Female cohort had the same characteristics as those not in the cohort, their mean log real wage would have been 0.36 higher. Examining the two decompositions similar results are found. In each case the difference in the mean values of the $\beta' s$ account for most of the difference in log real wages between the Black/African Female cohort and the rest of the population. The unexplained portion under each decomposition makes up close to 75 percent of the gap with only 25 percent of the difference being attributed to differences in individual's characteristics.

Reviewing the Coloured Female cohort in comparison to the rest of the population there is a difference in mean log real wages of 0.142. Differences in endowments and coefficients both contributed to the gap, with differences in coefficients playing a bigger role in widening the log real wage gap. Looking at the two decompositions, two conflicting results based on the decomposition used are found. For D=0, given by equation 11, we see that 50.7 percent of the differences between the Coloured Female cohort and the rest of the population can be explained by our chosen explanatory variables. However, for D=1, given by equation 12, 88.3 percent of the differences between our two groups cannot be explained.

Table 8: Oaxaca-Blinder Decomposition, 2015

	Difference in Mean (R)	due to endowments (E)	due to coefficients (C)	due to interactions (CE)	% Unexplained [(C+(1-D)CE)/R]		% Explained [(E+D*CE)/R]	
					D=0	D=1	D=0	D=1
Black/African Female (L)	0.483	0.121	0.36	0.002	74.9	74.5	25.1	25.5
Coloured Female (L)	0.142	0.072	0.126	-0.055	49.3	88.3	50.7	11.7
Asian/Indian Female (H)	0.501	0.546	0.229	-0.273	-9.0	45.6	109.0	54.4
White Female (H)	0.938	0.641	0.254	0.043	31.7	27.1	68.3	72.9
Black/African Male (L)	0.073	0.146	-0.171	0.098	-100.4	-235.4	200.4	335.4
Coloured Male (L)	0.008	0.086	-0.094	0.016	-952.7	-1153.6	1052.7	1253.6
Asian/Indian Male (H)	0.577	0.474	-0.098	0.202	17.9	-17.1	82.1	117.1
White Male (H)	1.269	0.623	0.474	0.172	50.9	37.3	49.1	62.7

Source: own calculations using PALMS; adjusted using sampling weights

When trying to understand the Asian/Indian Female cohort it is important to note that it experienced a higher mean log real wage relative to the rest of the population. As can be seen in the table the difference in log real wage was 0.501 which was mostly due to differences in characteristics between the two groups. In other words, had the rest of the population had the same characteristics as the Asian/Indian Female cohort their mean log real wage would have been 0.546 higher. Had the coefficients of the Asian/Indian Female cohort been used with the characteristics of the rest of the population, the rest of the population would have a mean log real wage that was 0.229 higher.

It can further be observed that there was no consensus between our two decompositions regarding the explanatory power of our choice variables. The results in column seven suggest that the gap in log real wage between the Asian/Indian Female cohort and the rest of the population is adequately explained by the difference in the mean values of the x's. However, in the second decomposition given by D=1, which places the interaction of the coefficient and endowments in the explained portion, finds that only 54.4 percent of the difference in the log real wage can be explained with the aid of explanatory variables.

The White Female cohort had a mean log real wage which was 0.938 higher than the rest of the population as shown in Table 8. Differences in characteristics between the two groups were the main explanation for the gap, although differences in coefficients also played a big role. It can then be seen that 68.3 percent and 72.9 percent of the difference in mean log real wages between the two groups can be explained by the differences in the mean values of the x's.

The Black/African Male cohort yielded a mean log of real wages which was 0.073 lower than that of the rest of the population. The analysis found that had the individuals in the Black/African Male cohort had the same characteristics as those in the non-Black/African Male cohort their mean log real wage would have been 0.146 higher. Furthermore, had the non-Black/African Male cohort coefficients been applied to the Black/African Male cohort characteristics the Black/African Male cohort wages would have been 0.171 lower. The simultaneous effect of differences in endowments and coefficients was found to be 0.098. 200.4 percent of the wage gap between the Black/African Male cohort and the other cohorts is explained by differences in age, years of education, whether one lives in an urban area or not, whether they are married or union members or self-employed and the skill set required for their occupation between the two groups. Therefore, negative 100.4 percent of the gap is unexplained when D=0.

The breakdown of the mean differential and causes of the observed log real wage gap for the Coloured Male cohort relative to the rest of the population show that the mean log real wage of the Coloured Male cohort was very close to that of the rest of the population with a differential of only 0.008. The result in the gap due to coefficients of negative 0.094 shows that had the Coloured Male cohort characteristics been applied to the rest of the population's coefficients they would face a lower log real wage. Notably an increase of 0.086 would have

been experienced by the Coloured Male cohort had they had the same characteristics as those attributed to the rest of the population. As shown in the table a larger portion of the difference in log real wage can be explained by the x's with a smaller portion remaining unexplained.

For the Asian/Indian Male cohort and those not in the cohort we discover that the Asian/Indian Male cohort had a higher mean log real wage which resulted in a 0.577 gap in comparison to that of those not in the Asian/Indian Male cohort. The gap in log real wage of 0.577 which is observed is mainly driven by differences in characteristics of individuals in the two group. The decompositions find that 82.1 percent of the gap in log real wages can be explained by the x's chosen to analyse the two groups.

Unsurprisingly for the White Male cohort the mean log real wage was higher than the mean of the rest of the population with a differential of 1.269. This differential was driven mostly by the difference in endowments, but the difference due to the coefficients and the interaction further increased the gap. The gap in the log real wages between the White Male cohort and the rest of the population cannot be fully explained by the explanatory variables as 50.9 percent of the gap remains unexplained in the first decomposition and only 62.7 percent of the gap can be explained in the second decomposition.

The Oaxaca-Blinder decompositions show several key things. Firstly, as expected the White Male cohort had the highest mean differential as seen in Table 1B on average they had the highest average real wage and it was by a big margin. Secondly, for all the cohorts which experienced a higher mean log real wage compared to the rest of the population, the differential was mostly due to endowment differences. This makes sense as it was observed that between these cohorts they had an average of at least 12.3 years or more of years of education, with at least 79 percent of the individuals within each cohort with Matric/Secondary or higher and at least 84 percent of the individuals within each cohort working in a skilled or highly skilled occupation. Lastly, it must be noted that a large part of the differences in mean log real wage remain unexplained. Except for the Asian/Indian cohort, the other cohorts exhibit large percentages in the wage differential that cannot be explained. In the absence of an explanation Neumark (1988) suggests that the unexplained differences that were discovered represent discrimination or favouritism towards the group with the higher mean. This explanation allows for the conclusion that the Black/African Female and the Coloured Female cohorts were the most discriminated against groups in 2015 while the White Male and Asian/Indian Female cohorts were the most favoured cohorts. These results are due to the factors identified by Casale (2004) and Rospabé (2001) namely occupational segregation, job discrimination and hiring discrimination that is facing these cohorts. Caution however must be exercised in this conclusion as there could be other possible explanations beyond the factors identified above that be causing the unexplained differences.

7 Conclusion

This paper analysed how inequality has changed for the eight race and gender intersections in South Africa between 1994 and 2015. The descriptive statistics looked at the characteristics of individuals in the eight groups, but also their educational, employment and occupational profiles, wage distribution across real wage percentiles and inequality in 1994 and 2015 with the aid of Lorenz curves. They showed significant rural-urban migration notably for Black/African Male and Coloured Female cohorts, and an increase in the average years of education attained. This could be seen to have stemmed from the increase in the share of individuals in each cohort with more than a Primary education, which further translated to a shift in occupations with higher portions of each cohort undertaking skilled and high skill occupations and a reduction in semi-skilled & unskilled occupations. Real monthly wages for all the cohorts increased substantially especially the real monthly wages of the White Female and Coloured Female cohorts. These two cohorts saw their real wages grow at a faster rate than the Asian/Indian Male and Black/African Male cohorts, who earned more than them respectively in 1994 but who they each on average earned more than in 2015. The wage distribution kernels showed a reduction in the proportion of individuals in each cohort earning real wages in the lower wage percentiles. The Lorenz curves illustrated that in 1994 the Asian/Indian Female cohort had the lowest inequality and that in 2015 the Coloured Female cohort was the most unequal cohort. Overall the Lorenz curves showed an increase in total inequality but also inequality within each cohort.

By using General Entropy and Atkinson decompositions the levels of between group and within group inequality for the population were reviewed, before analysing the levels of inequality for each cohort. The decompositions showed that in both 1994 and 2015 the share of within group inequality was higher than between group inequality. Between 1994 and 2015 the share of within group inequality increased across all decompositions, highlighting that inequality between 1994 and 2015 wasn't being driven by differences in real wages between the eight groups but differences in real wages within the eight groups.

The analysis of inequality for each cohort with the use of the Gini coefficient gave the same results as the Lorenz curves with the Asian/Indian Female and the Coloured Female cohorts found to be the most equal and most unequal cohorts in 1994 and 2015 respectively. The Gini coefficient analysis also revealed that the Asian/Indian Male cohort had the most equal income distribution among the 8 cohorts in 2015. Under the Atkinson class of measures for $\varepsilon = 0 \text{ and } \varepsilon = 1$ similar results to the Gini coefficient were attained, with the exception that the Black/African Male cohort had the lowest inequality in 2015 for $\varepsilon = 1$. For $\varepsilon = 2$ the White Female cohort was found to be the most unequal in 1994, with the White Male and Black/African Female cohorts representing the cohorts with the highest and lowest inequality respectively in 2015. The General Entropy class of indices agreed with the other two inequality measures as they found that in 2015 when equal weighting or more weighting was placed on the upper tail of the wage distribution the Coloured Female cohort was the most unequal.

Overall, the different inequality measures showed that there was a substantial increase in inequality within each cohort.

The use of ratio analysis and cumulative distributions of the cohorts bring to light the extent of the inequality faced in each cohort. The gap between the 10th percentile wage and the 90th percentile wage increased for each cohort in some cases by more than 250 percent. This increase for most of the cohorts was driven by the widening gap between the 90th percentile wage and the median wage, showing that wages at the top end of the distribution are growing a lot faster than the median wage faced by the cohort. The cumulative distributions of the cohorts highlight this as the wage share of the top five percent of the distribution increased by at least 29.8 percent and accounting for at least 37 percent of each cohort's wage share. In 2015, the bottom 50 percent only contributed 11.6 percent of the wage share at most, as their share decreased significantly from what it was in 1994. The cohorts are fast approaching the 80/20 rule where the top 20 percent have 80 percent of the wage share. As of 2015, on average the top 20 percent contribute 69.05 percent of the wage share.

The Oaxaca-Blinder decomposition and quantile regressions finalize the analysis. The quantile regression showed that a union premium exists in most of the cohorts although it was decreasing for the 10th quantile while it increased for the 50th and 90th quantiles. It also found that tertiary education in the form of either a Certificate/Diploma and Degree received the highest two returns relative to individuals with no primary education. It further showed that the Agriculture, Hunting, Forestry and Fishing industry was very important for individuals in the 10th quantile of each cohort as it paid them the highest real wage across all the industries in the country. The Oaxaca-Blinder decomposition found that for the cohorts that earned a wage above the mean wage of the rest of the remaining population, the difference could be justified by their characteristics as per the explanatory variables. The decomposition also discovered that there is still a lot of discrimination in the labour market with the Black/African Female and Coloured Female cohorts experiencing the most wage discrimination while the White Male and Asian/Indian Female cohorts receive the most favouritism.

This research paper was not exhaustive and limited in several areas. Firstly, there was limited availability in survey respondents therefore the sample size was not very big. Weights were used to account for this smaller sample. This problem is evident in the quantile regressions carried out where the 1994 and 2015 data were very thin across the non-Black/African cohorts. This can result to small sample bias which one needs to be cautious of. Secondly, there was limited availability of explanatory variables. The dataset used was limited in explanatory variables as some variables available in 2015 were not available in 1994. As a result, these variables could not be included in the analysis for comparison reasons. This limitation impacted the quantile regressions and Oaxaca-Blinder decompositions the most as these tried to explain differences within the cohorts and between the cohorts. Furthermore, the inequality measures used fall short due to the data used and as a result no single measure is fully reliable. However, given the wage distribution in South Africa the General Entropy

class of indices would be the advised inequality measure to reasonably rely on. It must be noted that the 1994 data was heavily imputed, but the data used came from a process of reverse-engineering which may impact the results obtained. Lastly outliers were removed with a process of studentised residuals which was carried out using the mincer equation. As there is no clear way of identifying who gave misleading responses it must be noted that individuals who earn higher or lower real wages may have been removed, once again impacting the outcomes achieved.

The results presented in this paper bring to light several policy implications where winners and losers can be identified. The labour market reforms implemented by the post-apartheid government are working. From these results, it is evident that women across the cohorts have benefited from affirmative action policy as there was an increased number of women in highly skilled occupations. However, as much as this is the case the White Female and Asian/Female cohorts look to be the winners as they experienced significant increases in real wages closing the gap with their male counterparts and experiencing favouritism from the labour market. The Black/African Female cohort was the biggest loser as they continue to experience discrimination in the labour market with a majority of them in semi-skilled and unskilled occupations. Trade unions, which are set in place to protect the most vulnerable workers at the bottom of the distribution, appear to be failing to do just that from the analysis. In 1994 the results showed that union members that fell in the 10^{th} quantile of their cohort had a higher union premium than those in the 50^{th} and 90^{th} quantile. This was not the case in 2015 as union members in the 10^{th} quantile saw their premium decrease below its 1994 level while those in the 50^{th} and 90^{th} quantile saw their premiums increased. This clearly shows that the policy is failing those it was intended to help as the premiums of those at the lower end of the distribution have decreased while the premiums of those at the top end of the distribution have increased.

There is scope for further research on this topic. Firstly, as highlighted, the paper was limited to the availability of data, which when carrying out an analysis of this magnitude is important to get results which are more representative of the country. Secondly, more explanatory variables could be identified to try and explain the differences observed. General explanatory variables were used but the inclusion of country specific explanatory variables may be incorporated to give better context. Thirdly, a different set of inequality measures may be used as the ones used in this paper were not exhaustive and do not paint the inequality picture in its entirety. These areas would be a good start for further research and the preliminary results contained in this paper could be a base for the research.

References

Atkinson, A.B. 1970. On the measurement of inequality. Journal of economic theory. 2(3):244-263.

Azam, J.-P. & Rospabé, S. 2007. Trade unions vs. statistical discrimination: Theory and application to post-apartheid South Africa. *Journal of Development Economics.* 84(1):417-444.

Bhorat, H., Leibbrandt, M.V. & Maziya, M. 2001. *Fighting poverty: Labour markets and inequality in South Africa*. Juta and Company Ltd.

Bhorat, H., Van der Westhuizen, C. & Jacobs, T. 2009. Income and non-income inequality in post-apartheid South Africa: What are the drivers and possible policy interventions?

Branson, N. & Wittenberg, M. 2014. Reweighting S outh A frican National Household Survey Data to Create a Consistent Series Over Time: A Cross-Entropy Estimation Approach. *South African Journal of Economics*. 82(1):19-38.

Buchinsky, M. 1994. Changes in the US wage structure 1963-1987: Application of quantile regression. *Econometrica: Journal of the Econometric Society*. 405-458.

Casale, D. 1998. Gender Discrimination and the Determination of Wages in the South African Labour Market||. Honours Thesis, University of Natal, Durban.

Casale, D. 2004. What has the feminisation of the labour market 'bought'women in South Africa? Trends in labour force participation, employment and earnings, 1995–2001. *Journal of Interdisciplinary Economics.* 15(3-4):251-275.

Cowell, F.A. 1995. Measurement of inequality. 2nd. Hemel Hempstead: Harvester Whearsheaf.

Hoogeveen, J. & Özler, B. 2005. Not separate, not equal: poverty and inequality in post-apartheid South Africa. William Davidson Institute Working Paper No. 739.

Hoogeveen, J.G. & Özler, B. 2006. Poverty and inequality in post-apartheid South Africa: 1995–2000. *Poverty policy in post-apartheid South Africa*.59-94.

Horton, S. 1999. 'Marginalization Revisited: Women's Market Work and Pay, and Economic Development'. *World Development*. 27(3):571-582.

Isemonger, A.G. & Roberts, N. 1999. Post-entry gender discrimination in the South African labour market. *JOURNAL FOR STUDIES IN ECONOMIC ECONOMETRICS*. 23:1-25.

Kerr, A., Lam, D. & Wittenberg, M. 2013. Post-Apartheid Labour Market Series 1994-2012.[Dataset]. Version 2.1:1994-2012.

Lam, D. & Leibbrandt, M. 2003. What's Happened to Inequality in South Africa Since the End of Apartheid?

Leibbrandt, M., Levinsohn, J. & McCrary, J. 2005. Incomes in South Africa since the fall of apartheid.

Leibbrandt, M., Finn, A. & Woolard, I. 2012. Describing and decomposing post-apartheid income inequality in South Africa. *Development Southern Africa*. 29(1):19-34.

Leibbrandt, M., Woolard, I., Finn, A. & Argen, J. 2010. Trends in South African income distribution and poverty since the fall of apartheid.

Leibbrandt, M., Woolard, I., & Bhorat, H. 2001. Understanding contemporary household inequality in South Africa, Chapter 1. In Bhorat, H., et al., Fighting Poverty: Labour Markets and Inequality in South Africa. Cape Town: UCT Press, 21-40.

Leite, P.G., McKinley, T. & Osorio, R.G. 2006. The post-apartheid evolution of earnings inequality in South Africa, 1995-2004.

Litchfield, J.A. 1999. Inequality: methods and tools. *World Bank*. 4.

Mehra, R. & Gammage, S. 1999. Trends, countertrends, and gaps in women's employment. *World Development*. 27(3):533-550.

Milanovic, B. 2005. Worlds Apart: Measuring Global and International Inequality. Princeton University Press.

Mincer, J. 1974. Schooling, Experience, and Earnings. Human Behavior & Social Institutions No. 2.

Neumark, D., 1988. Employers' discriminatory behavior and the estimation of wage discrimination. *Journal of Human Resources*. 23 (3), 279–295.

Ntuli, M. & Kwenda, P. 2014. Labour unions and wage inequality among African men in South Africa. *Development Southern Africa*. 31(2):322-346.

O'donnell, O., Van Doorslaer, E., Wagstaff, W. & Lindelow, M. 2008. Analyzing health equity using household survey data. *The World Bank*.

Pereira, P. & Martins, P. 2000. Does education reduce wage inequality? Quantile regressions evidence from fifteen European countries.

Rospabé, S. Ed. 2001. An empirical evaluation of gender discrimination in employment, occupation attainment and wage in South Africa in the late 1990s.

Standing, G., Sender, J. & Weeks, J. 1996. Restructuring the labour market: the South African challenge. International Labour Organization.

Van der Berg, S. & Bhorat, H. 1999. The present as a legacy of the Past: The labour market, Inequality and Poverty in South Africa.

Winter, C. 1999. Women Workers in South Africa: Participation, Pay and Prejudice in the Formal Labor Market.

Wittenberg, M. 2014. Wages and wage inequality in South Africa 1994-2011: The evidence from household survey data.

Wittenberg, M. 2015. Wages in Post-apartheid South Africa. *The Journal of the Helen Suzman Foundation.* 75: 27-32

Wittenberg, M. 2017a. Wages and Wage Inequality in South Africa 1994–2011: Part 1–Wage Measurement and Trends. *South African Journal of Economics.* 85(2):279-297.

Wittenberg, M. 2017b. Wages and Wage Inequality in South Africa 1994–2011: Part 2–Inequality Measurement and Trends. *South African Journal of Economics*. 85(2):298-318.

Appendix

Table 1A.1: Change in real wages between 1994 and 2015

	Real Wage Changes	percentage point difference, Female - Male
Black/African Female	109%	2
Coloured Female	210%	53
Asian/Indian Female	227%	132
White Female	196%	69
Black/African Male	107%	
Coloured Male	157%	
Asian/Indian Male	95%	
White Male	127%	
Overall	130%	

Source: own calculations using PALMS; adjusted using sampling weights

Table1A.2: Female to Male Average Earnings ratio

	Female to Male Average Earnings ratio		% change
	1994	2015	
Black/African	0.728	0.733	0.8%
Coloured	0.771	0.931	20.7%
Asian/Indian	0.530	0.890	67.7%
White	0.537	0.699	30.2%
Overall	0.676	0.730	8.0%

Source: own calculations using PALMS; adjusted using sampling weights

Table 1A.3: Highest Level of School and Occupational Attainment

Highest Level of School	Black/African Female		Coloured Female		Asian/Indian Female		White Female		Black/African Male		Coloured Male		Asian/Indian Male		White Male		Overall	
	1994	2015	1994	2015	1994	2015	1994	2015	1994	2015	1994	2015	1994	2015	1994	2015	1994	2015
No Schooling	0.16	0.04	0.1	0.02	0	0	0	0	0.2	0.03	0.12	0.02	0	0	0	0	0.16	0.03
Incomplete Primary	0.3	0.09	0.34	0.07	0.17	0.01	0.02	0	0.33	0.11	0.33	0.09	0.06	0.02	0.01	0	0.29	0.08
Primary	0.12	0.05	0.15	0.06	0.06	0.01	0	0	0.11	0.05	0.14	0.07	0.07	0.03	0	0	0.11	0.05
Incomplete Secondary	0.25	0.36	0.26	0.39	0.2	0.12	0.06	0.07	0.21	0.4	0.3	0.41	0.31	0.15	0.11	0.11	0.22	0.34
Matric/Secondary	0.13	0.28	0.13	0.33	0.56	0.45	0.81	0.42	0.12	0.29	0.11	0.3	0.46	0.5	0.66	0.42	0.18	0.31
Certificate/Diploma	0.02	0.12	0.01	0.09	0.01	0.18	0.01	0.22	0.01	0.08	0	0.07	0.01	0.13	0.03	0.21	0.01	0.11
Degree	0.01	0.06	0.01	0.05	0.01	0.24	0.1	0.29	0.01	0.04	0	0.04	0.09	0.16	0.19	0.26	0.03	0.08
Occupational Attainment																		
High skilled	0.12	0.16	0.08	0.18	0.16	0.49	0.31	0.57	0.07	0.13	0.05	0.16	0.21	0.48	0.39	0.62	0.12	0.22
Skilled	0.23	0.36	0.27	0.41	0.5	0.44	0.63	0.42	0.28	0.42	0.35	0.38	0.49	0.36	0.5	0.31	0.3	0.39
Semi-skilled & unskilled	0.65	0.48	0.65	0.41	0.35	0.06	0.05	0.01	0.65	0.44	0.6	0.47	0.3	0.1611	0.12	0.07	0.58	0.4

Source: own calculations using PALMS; adjusted using sampling weights

Table 3A: Gini Coefficient, Atkinson and General Entropy, 1994 and 2015

Inequality Measure	Black/African Female		Coloured Female		Asian/Indian Female		White Female		Black/African Male		Coloured Male		Asian/Indian Male		White Male		Overall	
	1994	2015	1994	2015	1994	2015	1994	2015	1994	2015	1994	2015	1994	2015	1994	2015	1994	2015
Gini Coefficient	0.488	0.641	0.444	0.702	0.331	0.635	0.377	0.658	0.489	0.637	0.41	0.677	0.449	0.629	0.459	0.662	0.531	0.693
Atkinson Family																		
ε=0.5	0.197	0.351	0.163	0.439	0.098	0.347	0.125	0.38	0.203	0.353	0.139	0.414	0.177	0.336	0.186	0.379	0.240	0.415
ε=1	0.36	0.545	0.308	0.622	0.205	0.559	0.227	0.593	0.359	0.544	0.261	0.599	0.303	0.557	0.317	0.607	0.413	0.621
ε=2	0.601	0.758	0.546	0.813	0.459	0.799	0.433	0.838	0.591	0.789	0.469	0.842	0.578	0.821	0.546	0.868	0.651	0.830
General Entropy																		
Theil L Index (α=0)	0.447	0.788	0.368	0.972	0.229	0.819	0.258	0.898	0.445	0.786	0.302	0.915	0.361	0.815	0.381	0.933	0.532	0.969
Theil T Index (α=1)	0.438	0.978	0.347	1.391	0.192	0.91	0.286	1.031	0.485	1.007	0.3	1.299	0.433	0.84	0.467	0.981	0.587	1.204
Coefficient of Variation (α=2)	0.791	4.651	0.529	7.703	0.215	2.736	0.492	3.12	1.32	4.753	0.478	6.945	0.846	2.15	1.102	2.532	1.667	5.362

Source: own calculations using PALMS; adjusted using sampling weights

Table 5A: Wage Shares for the richest 5 percent, poorest 50 percent and poorest 5 percent, 1994 and 2015

	Richest 5%'s Wage Share		Poorest 50%'s Wage Share		Poorest 5%'s Wage Share	
	1994	2015	1994	2015	1994	2015
Black/African Female	22.1	38.2	16.6	11.0	0.5	0.3
Coloured Female	19.3	50.1	18.4	9.6	0.6	0.2
Asian/Indian Female	14.6	39.7	28.2	10.4	0.4	0.2
White Female	21.1	45.6	25.6	10.1	0.8	0.1
Black/African Male	24.4	41.1	17.0	11.6	0.5	0.2
Coloured Male	18.8	49.3	21.7	11.0	0.8	0.1
Asian/Indian Male	28.5	37.0	22.2	10.4	0.7	0.1
White Male	26.8	44.7	21.1	9.6	0.6	0.1
Overall	28.4	46.3	15.2	8.7	0.4	0.2

Source*:* own calculations using PALMS; adjusted using sampling weights

Table 6A: Wage Share of the richest 20 percent, 1994 and 2015

	Richest 20% 's Wage Share	
	1994	2015
Black/African Female	52.1%	69.1%
Coloured Female	47.4%	75.0%
Asian/Indian Female	40.6%	65.6%
White Female	44.5%	68.0%
Black/African Male	51.9%	67.7%
Coloured Male	45.5%	72.1%
Asian/Indian Male	51.8%	66.0%
White Male	51.9%	68.9%
Overall	56.1%	73.1%

Source*:* own calculations using PALMS; adjusted using sampling weights

Quantile Regressions

A review of Table 7.3 shows the impact of our variables on the Coloured Male cohort at the various quantiles. Different from the Black/African Male and Black/African Female cohorts it is observed that the 50th and 90th quantiles saw larger percent increases in average real wage than the 10th quantile across all educational attainment levels when compared to individuals with no primary education in 1994. Those with a Matric/Secondary educational attainment saw a huge decrease in the relative impact on average real wages in 2015 especially for the 90th quantile. The 90th quantile faced a decrease in impact from an average real wage which was 102.2 percent higher than that of individuals with no primary education in 1994 to an average real wage 42.4 percent higher in 2015.

In 2015 only individuals in the 90th quantile who lived in urban areas earned a significantly higher average real wage than individuals who lived in non-urban areas. For the 10th and 50th quantiles those living in an urban area earned 5.6 percent and 1 percent lower average real wages than those living in non-urban areas respectively. These levels for all 3 quantiles are lower than the levels experienced in 1994 especially for the 10th and 50th quantiles.

For the gap between the average real wage for highly skilled occupations and semi-skilled & unskilled jobs for the 90th quantile it can be made out that between 1994 and 2015 the gap increased by 6.1 times. The increase for the other quantiles was not as prominent but saw the smallest difference between these two occupation types of 71.6 percent as shown by the 50th quantile result. The difference in average real wages between highly skilled occupations and skilled occupations in 2015 is materially big. Those in the 10th quantile a with a skilled occupation have average real wages which are 81.9 percent below those of individuals with a highly skilled occupation. Similarly, those in the 50th and 90th quantiles with skilled occupations have average real wages which at 58.4 and 79.8 percent lower than those with highly skilled occupations respectively.

From the industry section the Manufacturing and Finance industries brought about the highest average real wage relative to that of individuals working in the Agriculture, Hunting, Forestry and Fishing industry in 1994 for individuals in the 10th and 50th quantile in the Coloured Male cohort respectively. In 2015 for the 10th quantile the Agriculture, Hunting, Forestry and Fishing industry was the industry with the highest average real wage relative to the other industries. The Manufacturing industry was highest earner for individuals in the 50th quantile, as the Utilities and Mining industries present thin data. For the 90th quantile it is observed that the Transport industry has the highest average real wage compared to the Agriculture, Hunting, Forestry and Fishing industry.

Table 7.3: Coloured Male quantile regression, 1994 and 2015. Dependent variable lnwage

Years	1994			2015		
Quantiles	10	50	90	10	50	90
Age	0.0479***	0.0369***	0.0545***	-0.00683	-0.00806	-0.0268***
	(0.0140)	(0.00860)	(0.0181)	(0.0172)	(0.00561)	(0.00748)
Age Squared	-0.000552***	-0.000410***	-0.000544**	7.40e-05	0.000180**	0.000452***

	(0.000172)	(0.000110)	(0.000228)	(0.000233)	(7.32e-05)	(9.30e-05)
Educational Attainment						
Incomplete Primary	0.0279	0.0917**	0.500***	-0.0681	0.126***	0.140*
	(0.0827)	(0.0403)	(0.0768)	(0.0826)	(0.0250)	(0.0846)
Primary	0.0423	0.210***	0.548***	-0.133*	0.215***	0.226***
	(0.121)	(0.0481)	(0.0694)	(0.0807)	(0.0276)	(0.0807)
Incomplete Secondary	0.129	0.192***	0.583***	-0.177**	0.240***	0.223***
	(0.0917)	(0.0491)	(0.0761)	(0.0830)	(0.0273)	(0.0770)
Matric/Secondary	0.309***	0.513***	1.022***	-0.0941	0.361***	0.424***
	(0.113)	(0.0801)	(0.124)	(0.174)	(0.0427)	(0.0819)
Certificate/Diploma	0.333	0.231	0.757*	-1.030**	0.489***	0.681***
	(1.934)	(0.576)	(0.455)	(0.423)	(0.0913)	(0.0920)
Degree	0.836	1.265***	1.484	0.845	1.306***	1.200***
	(0.638)	(0.263)	(2.264)	(0.537)	(0.0918)	(0.230)
Urban	0.277***	0.227***	0.243***	-0.0561	-0.00974	0.148**
	(0.0778)	(0.0568)	(0.0753)	(0.0772)	(0.0231)	(0.0585)
Married	0.248***	0.182***	0.279***	-0.00353	0.139***	0.239***
	(0.0661)	(0.0402)	(0.0606)	(0.0714)	(0.0195)	(0.0320)
Member of Union	0.313***	0.0137	0.00116	-0.514***	0.292***	0.307***
	(0.0656)	(0.0443)	(0.0580)	(0.171)	(0.0495)	(0.0328)
Province						
Eastern Cape	-0.206***	-0.181***	-0.130**	-0.641***	-0.136***	0.0630*
	(0.0433)	(0.0348)	(0.0569)	(0.134)	(0.0384)	(0.0349)
Northern Cape	-0.620***	-0.278***	-0.154***	-0.168**	-0.102***	0.0408
	(0.112)	(0.0627)	(0.0505)	(0.0693)	(0.0238)	(0.0845)
Free State	0.161	-0.106	-0.474	0.0125	0.0734	1.774*
	(0.521)	(0.164)	(0)	(0.330)	(0.173)	(0.955)
KwaZulu-Natal	0.364***	0.230***	0.191	0.0424	-0.0788	0.0557
	(0.102)	(0.0505)	(0.153)	(0.529)	(0.0816)	(0.190)
North West	-0.236	-0.197	0.222	0.475**	0.671**	0.134
	(8.519)	(0.158)	(0.511)	(0.226)	(0.288)	(0.0966)
Gauteng	0.228*	0.0465	0.255***	0.292	0.308***	0.477***
	(0.121)	(0.0904)	(0.0822)	(0.294)	(0.0552)	(0.0726)
Mpumalanga	-0.747	-1.489	-1.752	0.512	0.0564	0.844
	(0)	(0)	(0)	(1.133)	(0.0656)	(1.115)
Limpopo				0.353	0.700***	0.420
				(1.168)	(0.0952)	(1.362)
Log Hours Worked	0.470***	0.0800	-0.0268	0.761***	0.684***	0.376***
	(0.174)	(0.0674)	(0.148)	(0.151)	(0.0517)	(0.0434)
Job Type						
Skilled	-0.665***	-0.477**	-0.0629	-0.819***	-0.584***	-0.798***
	(0.148)	(0.202)	(0.0949)	(0.183)	(0.0723)	(0.133)
Semi-skilled & unskilled	-0.822***	-0.640***	-0.198*	-1.094***	-0.716***	-1.211***
	(0.155)	(0.202)	(0.105)	(0.190)	(0.0722)	(0.135)
Self-Employed	0.417	-0.528**	-0.934**	-	-	-
	(4.459)	(0.245)	(0.466)			

Industry						
Mining and Quarrying	0.316	0.852***	-0.173	-0.00805	0.324***	0.136
	(4.898)	(0.115)	(0.265)	(0.206)	(0.0445)	(0.201)
Manufacturing	0.482***	0.634***	0.288***	-0.459**	0.234***	0.553***
	(0.0955)	(0.0645)	(0.0956)	(0.190)	(0.0421)	(0.0908)
Utilities	0.0760	0.473***	-0.461***	-2.515***	0.742***	0.794***
	(0.185)	(0.0725)	(0.174)	(0.271)	(0.0874)	(0.180)
Construction	0.463***	0.518***	0.132	-0.451*	0.114**	0.325***
	(0.0923)	(0.0859)	(0.117)	(0.232)	(0.0450)	(0.124)
Trade	0.140	0.526***	0.0888	-0.242	0.106***	0.265***
	(0.134)	(0.0658)	(0.0996)	(0.307)	(0.0387)	(0.0908)
Transport	0.244**	0.582***	0.122	-0.235	0.186***	0.586***
	(0.121)	(0.0801)	(0.0992)	(0.334)	(0.0411)	(0.0655)
Finance	0.401**	0.687***	0.455*	-1.827***	0.111*	0.389**
	(0.176)	(0.242)	(0.248)	(0.543)	(0.0655)	(0.166)
Services	-0.0291	0.333***	-0.0773	-0.637***	0.0632	0.382***
	(0.0968)	(0.0721)	(0.0866)	(0.169)	(0.0830)	(0.0642)
Domestic Services	-0.904	0.281	0.134	-0.685***	-0.221***	-0.0844
	(1.282)	(0.220)	(0.303)	(0.220)	(0.0435)	(0.0864)
Constant	4.714***	6.661***	6.659***	6.128***	5.795***	7.932***
	(0.728)	(0.351)	(0.681)	(0.681)	(0.230)	(0.268)
Observations	1,626	1,626	1,626	2,892	2,892	2,892

Source: PALMS 1994 and 2015.

Notes: No Primary base category for Educational Attainment. Western Cape base category for Province. Agriculture, Hunting, Forestry and Fishing base category for Industry. Standard errors in parenthesis; * p<0.10, ** p<0.05, *** p<0.01; Standard errors adjusted using sample weights.

Highly skilled workers: managers, professionals, semi-professionals and technicians. Skilled workers: Clerks, salesperson and skilled service workers, skilled agricultural workers and artisans. Semi-skilled and unskilled: Operators, routine workers and domestic workers.

Table 7.4 reveals our results for the Coloured Female cohort. From the age variable the average real wage increases at a decreasing rate with age, with turning points of 42.1 years and 46.6 years for the 50th and 90th quantiles in 2015. For the 50th and 90th quantiles these turning points are higher than their 1994 turning points of 40.0 years and 45.0 years respectively. This shows that their average real wages continue to increase for just over a year and a half in 2015 than they did in 1994 before they start to decrease and that the difference between when the different quantiles start to experience decreasing average real wages due to age isn't too far apart staying roughly the same between the two years.

For the educational attainment section, the highest average real wage relative to individuals with no primary in 1994 was by individuals in the 10th quantile with a Degree. In 2015, the highest average real wages relative to individuals with no primary education come from individuals in the 90th quantile with a Degree. Individuals with no primary education earned an average real wage which was 5.3 percent higher than those with Incomplete Primary though insignificant. These findings highlight the decline in importance of the 10th quantile in terms of educational attainment's impact on average real wages.

Table 7.4 further shows that in 1994 the Manufacturing industry brought about the highest average real wages relative to the Agriculture, Hunting, Forestry and Fishing industry for the 10th quantile and 50th quantile while the Transport industry for brought about the highest average real wages relative to the Agriculture, Hunting, Forestry and Fishing industry for the 90th quantile. This changed for the 90th quantile with the Manufacturing industry gaining significantly in 2015 relative to the Agriculture, Hunting, Forestry and Fishing industry as once again the dataset had a very small sample of Utilities industry employees. For the 10th quantile the Agriculture, Hunting, Forestry and Fishing industry was dominant with all significant sectors reporting average real wages lower than those in the industry as shown by the negative coefficients.

Table 7.4: Coloured Female quantile regression, 1994 and 2015. Dependent variable lnwage

Years	1994			2015		
Quantiles	10	50	90	10	50	90
Age	0.0540***	0.0337***	0.0458***	0.0262	0.0170**	0.0301***
	(0.00891)	(0.00965)	(0.0132)	(0.0160)	(0.00681)	(0.0113)
Age Squared	-0.000664***	-0.000421***	-0.000509***	-0.000357*	-0.000202**	-0.000323**
	(0.000140)	(0.000128)	(0.000182)	(0.000188)	(8.88e-05)	(0.000132)
Educational Attainment						
Incomplete Primary	0.252***	0.132**	0.607***	-0.0534	0.0531	0.0323
	(0.0620)	(0.0561)	(0.135)	(0.199)	(0.0400)	(0.0928)
Primary	0.447***	0.255***	0.786***	0.110	0.0878*	0.0347
	(0.0601)	(0.0664)	(0.124)	(0.141)	(0.0495)	(0.0887)
Incomplete Secondary	0.414***	0.309***	0.619***	0.171	0.0686**	0.0993
	(0.116)	(0.0632)	(0.124)	(0.121)	(0.0326)	(0.0852)
Matric/Secondary	0.665***	0.542***	0.991***	0.284**	0.272***	0.430***
	(0.124)	(0.0777)	(0.162)	(0.138)	(0.0452)	(0.113)
Certificate/Diploma	1.057***	1.031***	1.190***	-0.309	0.412***	0.597***
	(0.363)	(0.147)	(0.357)	(0.278)	(0.103)	(0.126)
Degree	1.329***	1.026***	1.278***	0.514	0.890***	0.899***
	(0.475)	(0.165)	(0.193)	(0.433)	(0.0778)	(0.263)
Urban	0.562***	0.332***	0.0647	-0.159*	0.0129	0.0514
	(0.0728)	(0.0553)	(0.109)	(0.0818)	(0.0272)	(0.0546)
Married	0.00669	0.00319	-0.133***	0.0443	0.0219	-0.00507
	(0.0418)	(0.0347)	(0.0355)	(0.0664)	(0.0224)	(0.0374)
Member of Union	0.311***	0.0359	-0.0677*	0.163	0.225***	0.121***
	(0.0857)	(0.0484)	(0.0361)	(0.106)	(0.0346)	(0.0439)
Province						
Eastern Cape	-0.394***	-0.194***	-0.142**	-0.514***	-0.237***	-0.108
	(0.0729)	(0.0410)	(0.0619)	(0.100)	(0.0410)	(0.0939)
Northern Cape	-0.688***	-0.346***	-0.0596	-0.306***	-0.159***	-0.202***
	(0.129)	(0.0731)	(0.168)	(0.104)	(0.0359)	(0.0694)
Free State	0.166	-0.570*	-0.0101	-0.210	-0.262*	-0.264***
	(0.242)	(0.345)	(0.393)	(0.294)	(0.152)	(0.0598)
KwaZulu-Natal	-0.413	-0.144	-0.0229	-0.775***	-0.484	-0.201**

	(0.306)	(0.180)	(0.0659)	(0.216)	(0.466)	(0.0838)
North West	-0.334	-0.191***	0.0958	0.671	0.338***	-0.407***
	(0.319)	(0.0739)	(0.198)	(1.162)	(0.0601)	(0.148)
Gauteng	0.229*	0.202***	0.146***	-0.0724	0.134*	0.147***
	(0.136)	(0.0640)	(0.0352)	(0.125)	(0.0790)	(0.0493)
Mpumalanga	0.763	0.743	-0.111	0.0889	0.149	0.862**
	(0)	(1.646)	(2.114)	(9.086)	(1.087)	(0.395)
Limpopo				-0.768	0.0827*	0.0604
				(4.484)	(0.0456)	(0.627)
Log Hours Worked	0.276***	0.237**	0.178***	0.618***	0.849***	0.782***
	(0.0679)	(0.111)	(0.0597)	(0.0640)	(0.0347)	(0.0495)
Job Type						
Skilled	-0.334	-0.345***	-0.409***	-0.463***	-0.868***	-0.548***
	(0.272)	(0.0745)	(0.117)	(0.104)	(0.0621)	(0.0623)
Semi-skilled & unskilled	-0.526*	-0.522***	-0.617***	-0.442***	-1.008***	-1.405***
	(0.272)	(0.0841)	(0.124)	(0.121)	(0.0689)	(0.0917)
Self-Employed	-0.360***	-0.437***	-0.114**	-	-	-
	(0.0942)	(0.0740)	(0.0569)			
Industry						
Mining and Quarrying	-0.193	-0.652	-0.285	0.127	0.195	0.570**
	(0)	(0)	(0)	(4.711)	(0)	(0.256)
Manufacturing	0.206**	0.677***	0.113	-0.177	0.141***	0.649***
	(0.103)	(0.0709)	(0.203)	(0.145)	(0.0473)	(0.101)
Utilities	1.057	1.098	0.255	0.949	1.428**	0.908***
	(0)	(0)	(0)	(0.832)	(0.699)	(0.136)
Construction	-0.327	0.971***	0.412	-0.663***	0.190	0.614
	(0.710)	(0.171)	(0.668)	(0.255)	(0.206)	(0.391)
Trade	-0.221	0.382***	-0.118	-0.227	0.00175	0.226**
	(0.140)	(0.0933)	(0.215)	(0.194)	(0.0429)	(0.0945)
Transport	0.301	0.378	0.577**	-0.419	0.173	0.388***
	(0.373)	(0.702)	(0.235)	(0.676)	(0.175)	(0.128)
Finance	0.198	0.600***	-0.0579	-0.413***	0.0676	0.165*
	(0.274)	(0.0937)	(0.215)	(0.132)	(0.0561)	(0.0939)
Services	-0.0328	0.334***	-0.306	-0.422***	-0.0404	0.397***
	(0.141)	(0.0683)	(0.211)	(0.133)	(0.0515)	(0.0924)
Domestic Services	-0.0287	0.348***	-0.353*	-0.168	0.0111	0.188***
	(0.0856)	(0.0718)	(0.204)	(0.130)	(0.0346)	(0.0669)
Constant	4.775***	5.838***	6.804***	5.021***	5.233***	5.801***
	(0.370)	(0.459)	(0.337)	(0.459)	(0.196)	(0.299)
Observations	1,246	1,246	1,246	2,938	2,938	2,938

Source: PALMS 1994 and 2015.

Notes: No Primary base category for Educational Attainment. Western Cape base category for Province. Agriculture, Hunting, Forestry and Fishing base category for Industry. Standard errors in parenthesis; * p<0.10, ** p<0.05, *** p<0.01; Standard errors adjusted using sample weights.

Highly skilled workers: managers, professionals, semi-professionals and technicians. Skilled workers: Clerks, salesperson and skilled service workers, skilled agricultural workers and artisans. Semi-skilled and unskilled: Operators, routine workers and domestic workers.

The results for the Asian/Indian Male cohort are presented in Table 7.5. Looking at educational attainment it can be seen that the 50th quantile experienced the largest percent changes in average real wage for each category relative to those with no primary education each being at least 93.6 percent higher in 2015. For individuals with a Degree, an average real wage which is 149.6 percent higher than that of individuals with no primary education for the 50th quantiles can be observed. The table shows us that in 2015 the province in which an individual lived played a role in the wage they received, as can be seen by the coefficients of those in the 10th quantile were most impacted by which province they lived in. Those living in the Eastern Cape, Northern Cape, Gauteng Mpumalanga and Limpopo all appear to earn at least 100 percent more than those in the 10th quantile living in the Western Cape.

The table further shows that when the skill levels required for each occupation in 2015 are compared, the gap between the highly skilled occupations and the skilled occupations, and the highly skilled occupations and semi-skilled and unskilled occupations is not that big. Individuals in the 90th quantile with in a skilled occupation earned an average real wage which was 87.6 percent lower than those in a highly skilled occupation and those in a semi-skilled and unskilled occupation earned 99.5 percent lower than those in a highly skilled occupation. This shows that on average the wages of individuals in a skilled occupations and semi-skilled & unskilled occupations aren't too different. Apart from the 50th quantile, the gap between the quantiles at each job type was very small in 2015.

Table 7.5: Asian/Indian Male quantile regression, 1994 and 2015. Dependent variable lnwage

Years	1994			2015		
Quantiles	10	50	90	10	50	90
Age	0.0723	0.0887***	0.102**	-0.00244	0.0490***	0.0704*
	(0.0466)	(0.0187)	(0.0459)	(0.0376)	(0.0152)	(0.0382)
Age Squared	-0.000764	-0.00100***	-0.00116**	8.55e-05	-0.000395**	-0.000820*
	(0.000582)	(0.000261)	(0.000531)	(0.000464)	(0.000182)	(0.000438)
Educational Attainment						
Incomplete Primary	-1.282	-0.0599	-0.154	1.032*	0.936***	-0.316
	(0.857)	(0.504)	(1.049)	(0.618)	(0.117)	(3.698)
Primary	-0.240	0.293	0.641	-0.979	0.577*	-0.151
	(0.832)	(0.497)	(0.983)	(1.819)	(0.350)	(3.567)
Incomplete Secondary	-0.0591	0.193	0.609	0.554	1.045***	0.191
	(0.801)	(0.466)	(1.038)	(0.553)	(0.122)	(3.527)
Matric/Secondary	0.376	0.359	1.027	0.623	1.004***	0.196
	(0.798)	(0.475)	(1.122)	(0.554)	(0.133)	(3.510)
Certificate/Diploma	0.932	0.649	1.135	0.742	1.465***	0.849
	(0.873)	(0.586)	(0)	(0.588)	(0.142)	(3.524)
Degree	0.571	0.323	2.007	0.958	1.496***	0.522
	(0.837)	(0.520)	(1.384)	(0.599)	(0.155)	(3.499)
Urban	0.460**	0.260***	0.0953	0.764	0.410***	0.248
	(0.219)	(0.0821)	(0.226)	(0.610)	(0.0966)	(0.428)
Married	-0.0598	0.0128	0.147	-0.231	0.0674	0.201

	(0.229)	(0.0929)	(0.180)	(0.143)	(0.0680)	(0.234)
Member of Union	0.00383	-0.00751	-0.0945	0.244	-0.0212	0.0490
	(0.142)	(0.0863)	(0.190)	(0.164)	(0.114)	(0.200)
Province						
Eastern Cape	-0.977	-0.318	-0.225	1.431***	-0.166	0.00516
	(1.681)	(0.771)	(1.366)	(0.462)	(0.324)	(1.786)
Northern Cape	-	-	-	1.509***	-0.257	-0.0824
				(0.425)	(0.353)	(0)
Free State	0.470	-0.370	-0.529	1.267*	-0.170	-0.104
	(0)	(0)	(0)	(0.662)	(0.748)	(1.273)
KwaZulu-Natal	-0.110	-0.378	-0.0606	0.816*	-0.164	0.518
	(1.679)	(0.754)	(1.437)	(0.456)	(0.323)	(0.628)
North West	-	-	-	1.734	0.156	0.633
				(5.715)	(0.399)	(0.644)
Gauteng	0.114	-0.126	0.219	1.080**	0.239	0.767
	(1.653)	(0.773)	(1.443)	(0.425)	(0.323)	(0.630)
Mpumalanga	-	-	-	1.397***	-0.610*	-0.407
				(0.530)	(0.335)	(0.702)
Limpopo	0.313	-0.256	0.00510	1.996**	1.292	1.157
	(1.700)	(0.815)	(1.588)	(0.970)	(2.440)	(1.953)
Log Hours Worked	-0.259	0.0279	-0.102	-0.426***	-0.315***	-0.685**
	(0.615)	(0.298)	(0.425)	(0.159)	(0.0727)	(0.342)
Job Type						
Skilled	-0.217	-0.268*	-0.0969	-0.823***	-0.599***	-0.876***
	(0.209)	(0.145)	(0.272)	(0.206)	(0.0802)	(0.234)
Semi-skilled & unskilled	-0.476**	-0.482***	-0.454	-1.003***	-0.790***	-0.995**
	(0.241)	(0.151)	(0.316)	(0.174)	(0.106)	(0.414)
Self-Employed	0.919	0.255	-0.215	-	-	-
	(0)	(0)	(0)			
Industry						
Mining and Quarrying	0.671	1.100	-0.463	-3.353	1.271	1.514
	(0)	(0)	(0)	(3.222)	(0)	(0)
Manufacturing	0.135	0.914	0.139	-2.498	0.303	0.196
	(2.291)	(0.615)	(0.609)	(1.941)	(4.146)	(2.357)
Utilities	0.128	0.805	-0.394	-2.087	0.640	-0.0176
	(3.176)	(0)	(1.997)	(2.054)	(4.164)	(2.466)
Construction	0.667	0.866	0.102	-1.629	0.0353	-0.133
	(2.168)	(0.714)	(1.302)	(1.886)	(4.145)	(2.356)
Trade	-0.0820	0.812	0.0361	-2.278	0.359	0.0869
	(2.339)	(0.637)	(0.644)	(1.840)	(4.146)	(2.382)
Transport	0.139	0.761	-0.330	-3.410*	-0.0688	0.174
	(2.348)	(0.623)	(0.692)	(1.883)	(4.144)	(2.362)
Finance	-0.00228	0.793	-0.385	-2.836	0.350	0.480
	(2.276)	(0.652)	(0.806)	(1.870)	(4.147)	(2.392)
Services	-0.218	0.920	-0.115	-2.741	0.559	0.618
	(2.344)	(0.633)	(0.664)	(1.881)	(4.146)	(2.372)

Domestic Services	0.453	0.721	-0.275	-	-	-
	(0)	(0.629)	(0.748)			
Constant	7.341***	5.967***	6.727***	9.622	7.417*	10.14
	(2.600)	(1.269)	(2.308)	(0)	(4.240)	(0)
Observations	312	312	312	709	709	709

Source: PALMS 1994 and 2015.

Notes: No Primary base category for Educational Attainment. Western Cape base category for Province. Agriculture, Hunting, Forestry and Fishing base category for Industry. Standard errors in parenthesis; * p<0.10, ** p<0.05, *** p<0.01; Standard errors adjusted using sample weights.

Highly skilled workers: managers, professionals, semi-professionals and technicians. Skilled workers: Clerks, salesperson and skilled service workers, skilled agricultural workers and artisans. Semi-skilled and unskilled: Operators, routine workers and domestic workers.

In Table 7.6 there are not many significant coefficients from our regression for the Asian/Indian Female cohort. It is observed that for the 50th quantile individuals with a Degree are rewarded by more when compared to individuals with a Certificate/Diploma relative to those with no primary education in 2015. Those with a Degree earn an average real wage which is 140.8 percent higher than those with no primary education while those with only a Diploma/Certificate earn 106.7 percent more than those with no primary education. Furthermore in 2015 individuals in the 50th quantile who were in unions earned an average real wage which was 36.1 percent lower than non-union members. This is an interesting result as union members usually experience a union premium which is absent here.

The results also find that those in the 50th quantile who live in an urban earn an average real wage which is 121.4 percent less than those living in non-urban areas. This result follows from 1994, when individuals living in urban areas earned an average wage which was 45.9 percent higher than those in non-urban areas. This finding could be due to the negative impact of rural-urban migration that we noticed in Table 1A and 1B. In 2015, the 50th and 90th quantiles skilled occupations and 90th quantile semi-skilled & unskilled occupations paid an average real wage which were lower than the average real wage received by individuals in highly skilled occupations which was to be expected.

Table 7.6: Asian/Indian Female quantile regression, 1994 and 2015. Dependant lnwage

Years	1994			2015		
Quantiles	10	50	90	10	50	90
Age	0.0462	0.150***	-0.0230	0.0112	0.0559*	-0.0131
	(0.0804)	(0.0369)	(0.220)	(0.0905)	(0.0321)	(0.0503)
Age Squared	-0.000476	-0.00197***	0.000511	0.000116	-0.000455	0.000305
	(0.00128)	(0.000556)	(0.00370)	(0.00110)	(0.000396)	(0.000650)
Educational Attainment						
Incomplete Primary	-1.849	-0.783	-0.194	-	-	-
	(5.407)	(0.940)	(0)			
Primary	-0.362	-0.636	0.0703	-0.294	-0.283	0.609
	(5.311)	(0.922)	(1.251)	(2.980)	(0.663)	(0)
Incomplete Secondary	-0.181	-0.526	0.0682	-0.424	0.611	0.706

	(5.249)	(0.932)	(1.030)	(2.328)	(0.643)	(2.048)
Matric/Secondary	-0.0382	-0.402	0.00542	0.0102	0.656	0.350
	(5.173)	(0.882)	(1.030)	(2.254)	(0.620)	(2.066)
Certificate/Diploma	0.989	-0.339	-0.390	0.0411	1.067*	0.596
	(0)	(0)	(0)	(2.260)	(0.621)	(2.056)
Degree	2.616	0.386	0.355	0.627	1.408**	0.579
	(0)	(0)	(2.135)	(2.266)	(0.620)	(2.074)
Urban	-0.0803	0.459**	0.351	-2.772	-1.214***	-0.0224
	(0.550)	(0.220)	(1.974)	(0)	(0.195)	(3.852)
Married	-0.197	-0.0549	-0.0854	-0.316	-0.216*	0.0867
	(0.328)	(0.102)	(0.338)	(0.299)	(0.122)	(0.0973)
Member of Union	-0.202	0.0388	0.0506	-0.107	-0.361**	-0.0367
	(0.273)	(0.101)	(0.585)	(0.305)	(0.145)	(0.135)
Province						
Eastern Cape	-0.622	0.126	0.379	0.0526	-0.446	-0.440
	(45.30)	(0.661)	(39.96)	(1.961)	(0.402)	(2.384)
Northern Cape	-	-	-	-	-	-
Free State	-0.941	-1.249	-1.448	0.992	-0.166	-1.042
	(0)	(1.957)	(0)	(0)	(0)	(0)
KwaZulu-Natal	-0.602	-0.250	-0.217	-1.344	-0.464	-0.335
	(43.68)	(0.561)	(39.64)	(1.564)	(0.328)	(2.401)
North West	-	-	-	-1.176	-0.812	-0.788
				(0)	(0.780)	(0)
Gauteng	-0.111	0.269	0.334	-1.071	-0.149	0.310
	(43.84)	(0.567)	(39.44)	(1.608)	(0.334)	(2.415)
Mpumalanga	-	-	-	0.446	0.418	0.0495
				(2.038)	(1.614)	(2.374)
Limpopo	-1.558	-0.347	-0.136	-	-	-
	(44.84)	(2.456)	(41.01)			
Log Hours Worked	-0.0161	0.225	0.312	0.471	0.803***	0.948***
	(1.866)	(0.209)	(0.891)	(1.031)	(0.113)	(0.199)
Job Type						
Skilled	0.945*	-0.176	0.196	-0.313	-0.347***	-0.596***
	(0.500)	(0.277)	(0.485)	(0.330)	(0.101)	(0.0976)
Semi-skilled & unskilled	1.553*	-0.405	0.0167	0.154	-0.890*	-0.767***
	(0.889)	(0.308)	(2.254)	(0.573)	(0.516)	(0.234)
Self-Employed	-0.497	-0.391	-1.010	-	-	-
	(5.593)	(1.493)	(0)			
Industry						
Mining and Quarrying	-	-	-	0.723	-0.407	-2.633
				(0)	(0.429)	(0)
Manufacturing	0.184	-0.459	-0.0891	0.439	1.042**	-0.493
	(3.808)	(1.633)	(2.905)	(1.696)	(0.448)	(0.307)
Utilities	-	-	-	1.469	1.720***	0.0496
				(0)	(0.594)	(0.807)

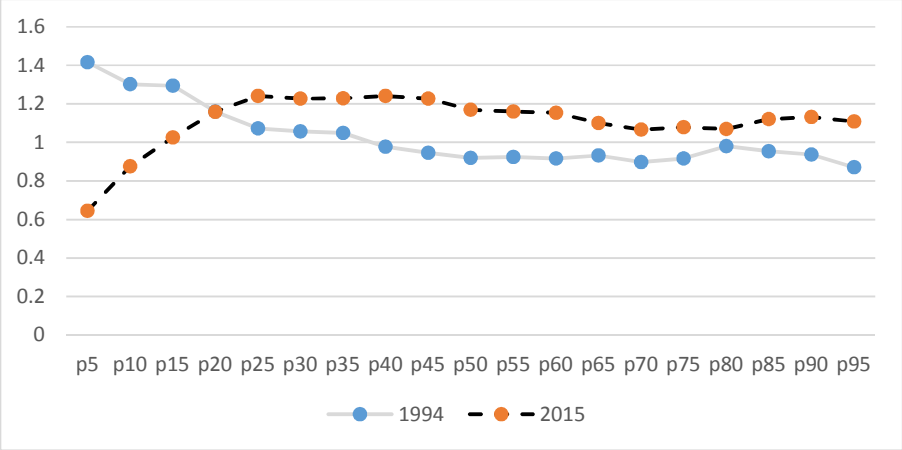
Construction	0.710	-0.626	-0.608	1.511	0.323	-1.959
	(0)	(1.668)	(0)	(0)	(0)	(0)
Trade	0.0707	-0.652	0.137	-0.189	0.714*	-0.405**
	(4.064)	(1.622)	(1.424)	(1.643)	(0.373)	(0.183)
Transport	0.635	-0.977	-0.108	1.277	1.375***	-0.0740
	(4.130)	(1.775)	(1.750)	(1.601)	(0.415)	(0.429)
Finance	0.768	-0.550	0.00107	1.025	1.077***	-0.0825
	(3.998)	(1.642)	(1.502)	(1.638)	(0.389)	(0.194)
Services	0.641	-0.512	0.701	0.199	0.631	-0.217
	(4.025)	(1.637)	(1.461)	(1.677)	(0.387)	(0.220)
Domestic Services	0.419	-0.541	0.118	-0.0144	0.372	-1.707
	(3.473)	(1.698)	(2.301)	(0)	(3.571)	(2.109)
Constant	6.353	5.836	7.329	8.782*	4.637***	6.518
	(53.38)	(0)	(43.22)	(5.304)	(1.188)	(0)
Observations	164	164	164	502	502	502

Source: PALMS 1994 and 2015.

Notes: No Primary base category for Educational Attainment. Western Cape base category for Province. Agriculture, Hunting, Forestry and Fishing base category for Industry. Standard errors in parenthesis; * p<0.10, ** p<0.05, *** p<0.01; Standard errors adjusted using sample weights.

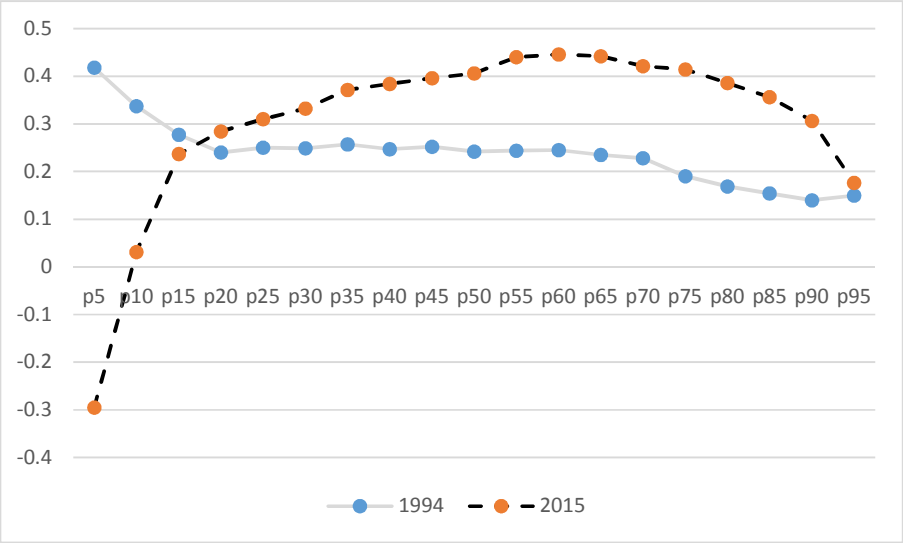
Highly skilled workers: managers, professionals, semi-professionals and technicians. Skilled workers: Clerks, salesperson and skilled service workers, skilled agricultural workers and artisans. Semi-skilled and unskilled: Operators, routine workers and domestic workers.

Figure 6A.0: Overall Degree Coefficients by Percentile, 1994 and 2015



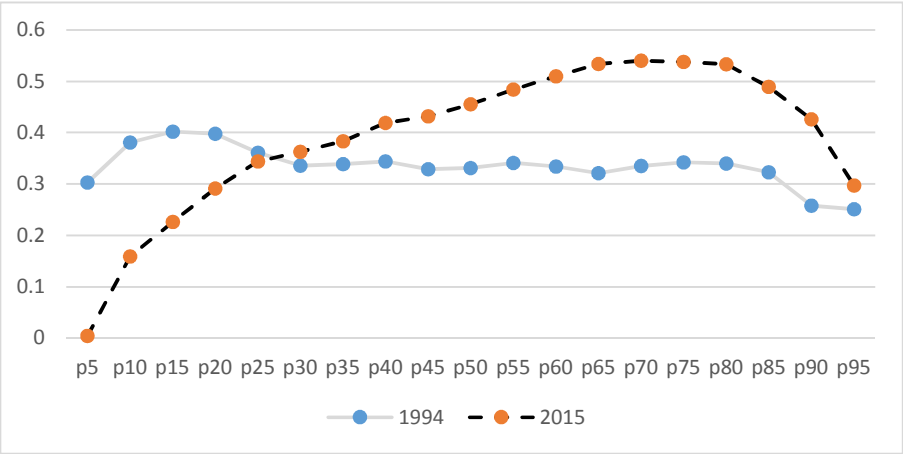
Source: own calculations using PALMS; adjusted using sampling weights

Figure 6A.1: Black/African Male Union Coefficients by Percentile, 1994 and 2015



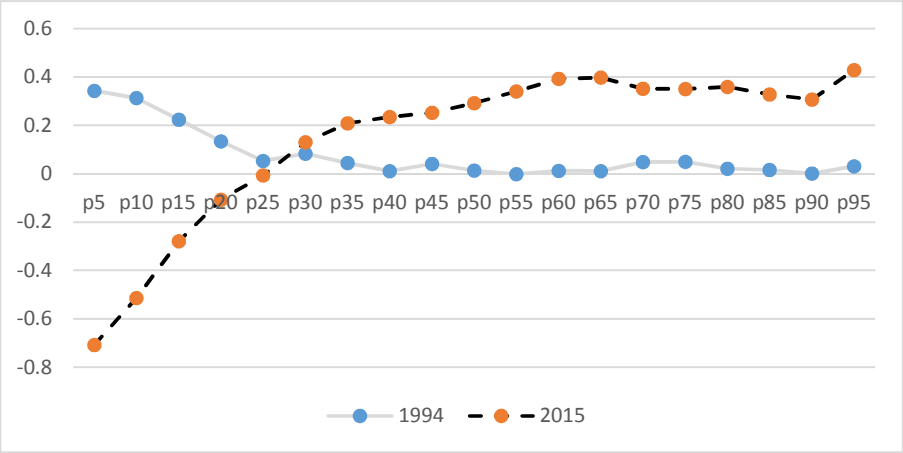
Source: own calculations using PALMS; adjusted using sampling weights

Figure 6A.2: Black/African Female Union Coefficients by Percentile, 1994 and 2015



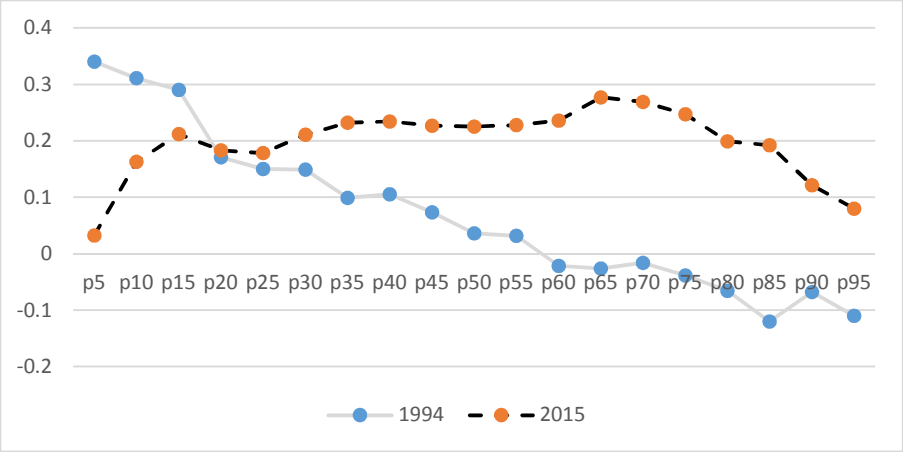
Source: own calculations using PALMS; adjusted using sampling weights

Figure 6A.3: Coloured Male Union Coefficients by Percentile, 1994 and 2015



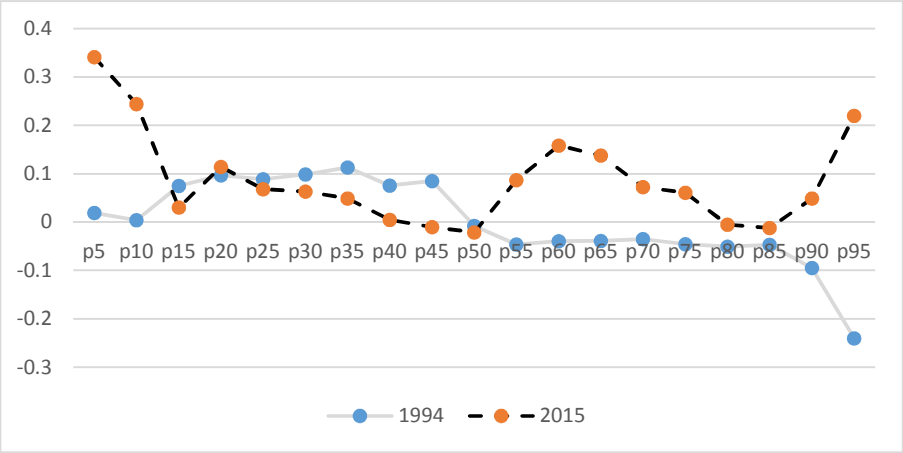
Source: own calculations using PALMS; adjusted using sampling weights

Figure 6A.4: Coloured Female Union Coefficients by Percentile, 1994 and 2015



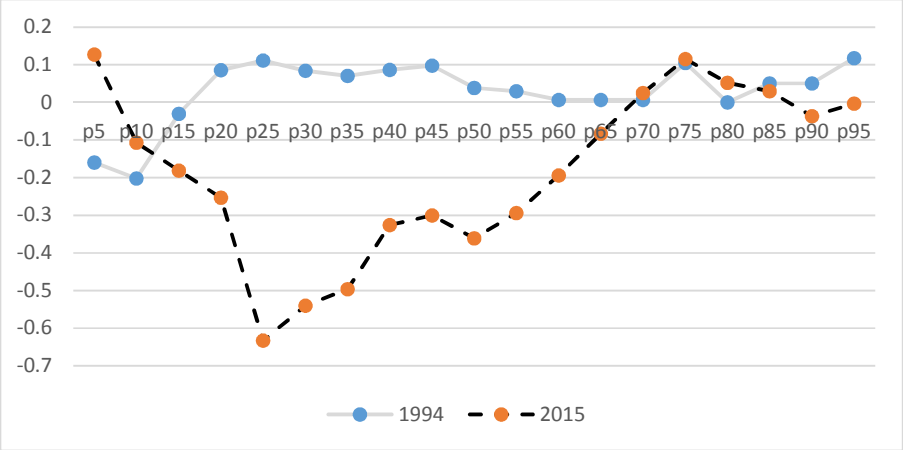
Source: own calculations using PALMS; adjusted using sampling weights

Figure 6A.5: Asian/Indian Male Union Coefficients by Percentile, 1994 and 2015



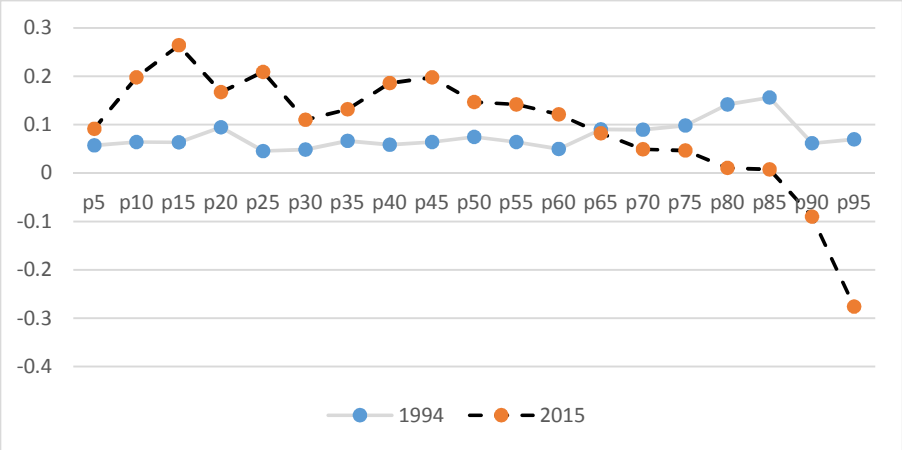
Source: own calculations using PALMS; adjusted using sampling weights

Figure 6A.6: Asian/Indian Female Union Coefficients by Percentile, 1994 and 2015



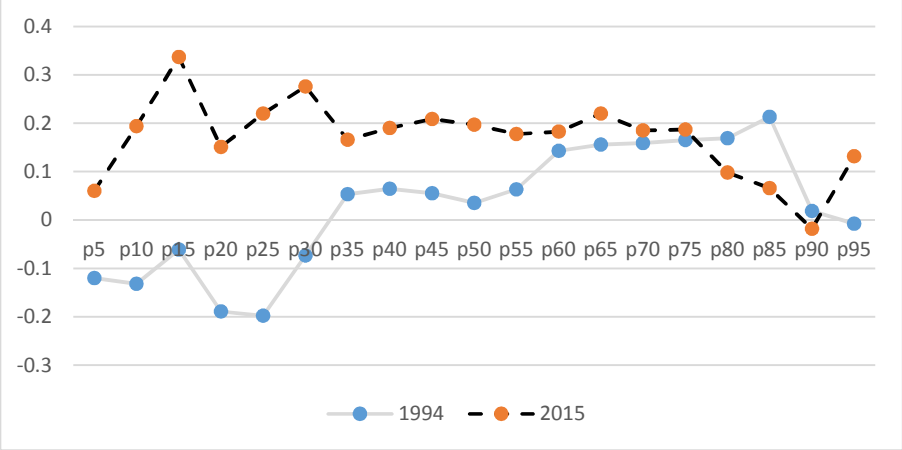
Source: own calculations using PALMS; adjusted using sampling weights

Figure 6A.7: White Male Union Coefficients by Percentile, 1994 and 2015



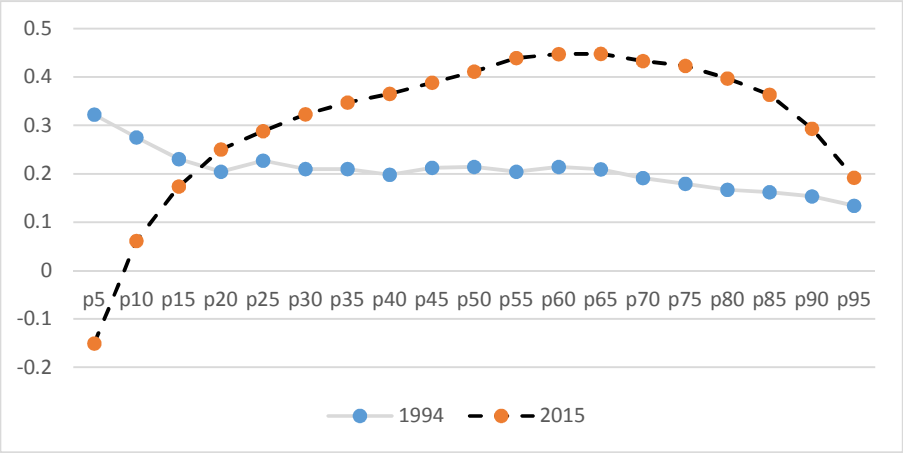
Source: own calculations using PALMS; adjusted using sampling weights

Figure 6A.8: White Female Union Coefficients by Percentile, 1994 and 2015



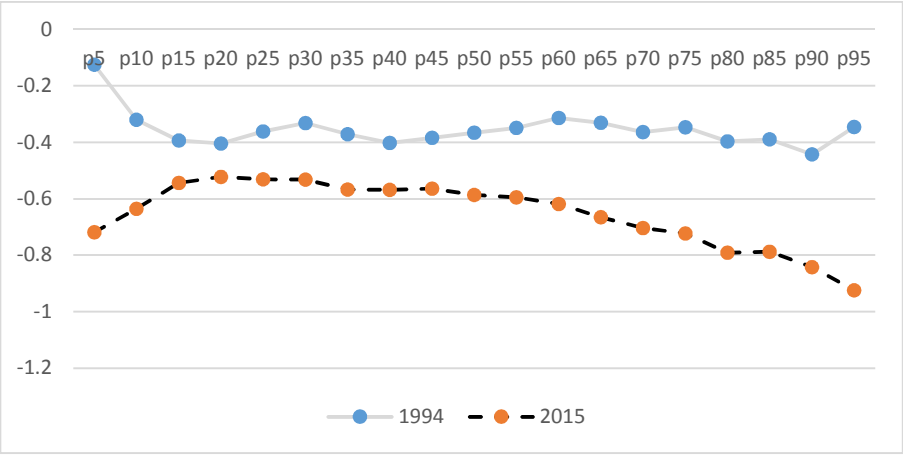
Source: own calculations using PALMS; adjusted using sampling weights

Figure 6A.9: Overall Union Coefficients by Percentile, 1994 and 2015



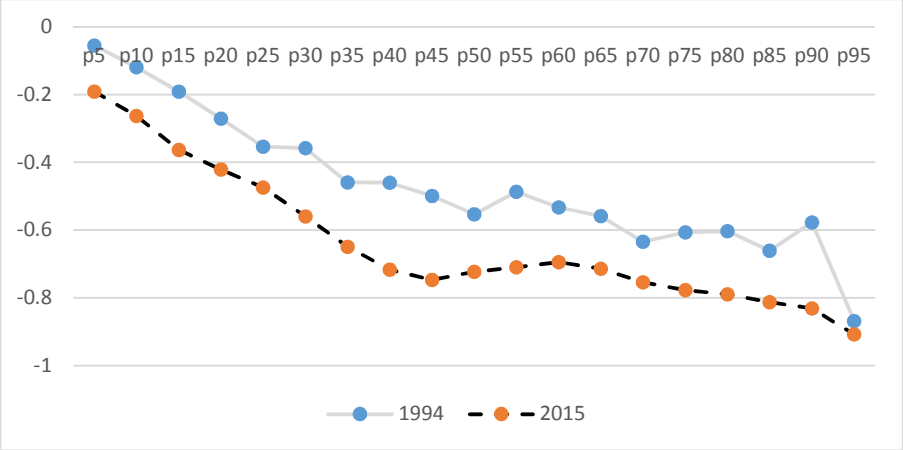
Source: own calculations using PALMS; adjusted using sampling weights

Figure 7A.1: Black/African Male Semi-Skilled and Unskilled Relative to High Skilled Coefficients by Percentile, 1994 and 2015



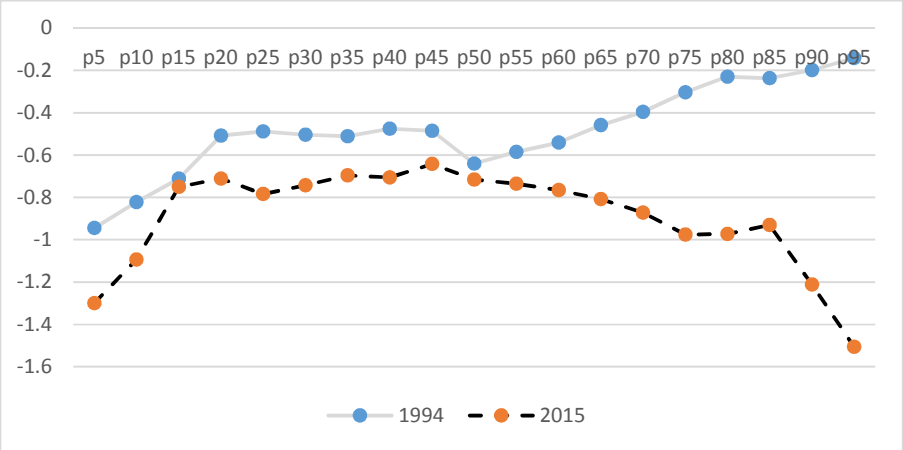
Source: own calculations using PALMS; adjusted using sampling weights

Figure 7A.2: Black/African Female Semi-Skilled and Unskilled Relative to High Skilled Coefficients by Percentile, 1994 and 2015



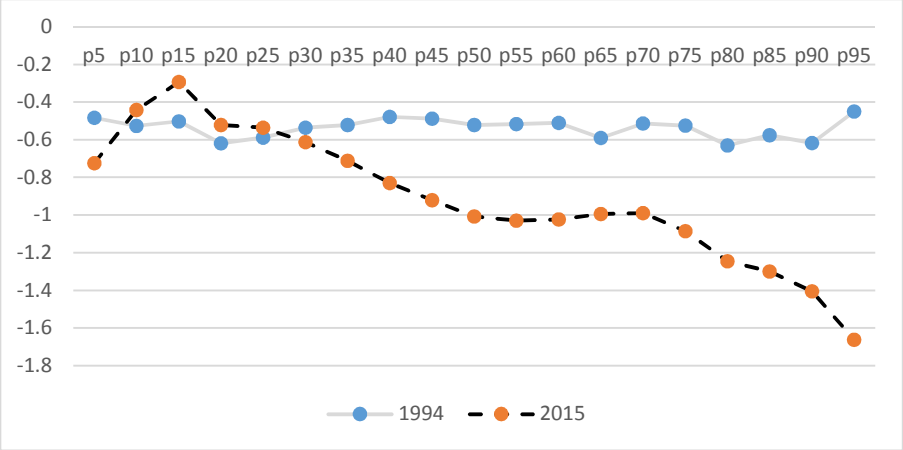
Source: own calculations using PALMS; adjusted using sampling weights

Figure 7A.3: Coloured Male Semi-Skilled and Unskilled Relative to High Skilled Coefficients by Percentile, 1994 and 2015



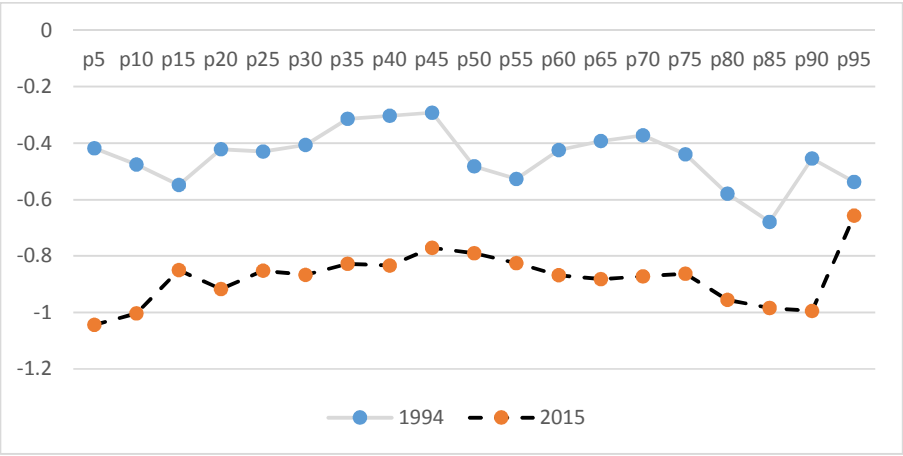
Source: own calculations using PALMS; adjusted using sampling weights

Figure 7A.4: Coloured Female Semi-Skilled and Unskilled Relative to High Skilled Coefficients by Percentile, 1994 and 2015



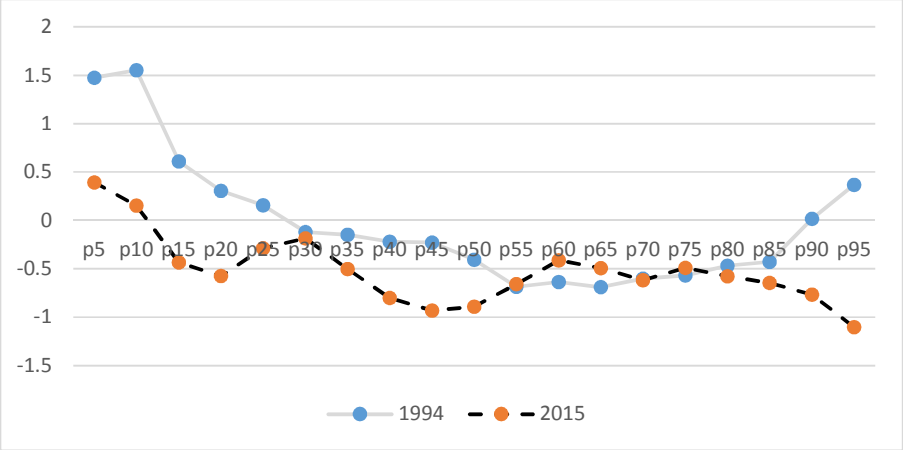
Source: own calculations using PALMS; adjusted using sampling weights

Figure 7A.5: Asian/Indian Male Semi-Skilled and Unskilled Relative to High Skilled Coefficients by Percentile, 1994 and 2015



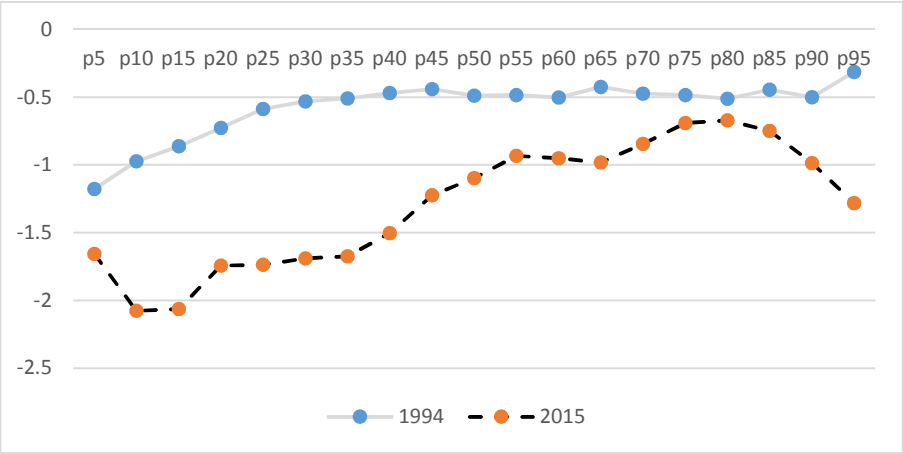
Source: own calculations using PALMS; adjusted using sampling weights

Figure 7A.6: Asian/Indian Female Semi-Skilled and Unskilled Relative to High Skilled Coefficients by Percentile, 1994 and 2015



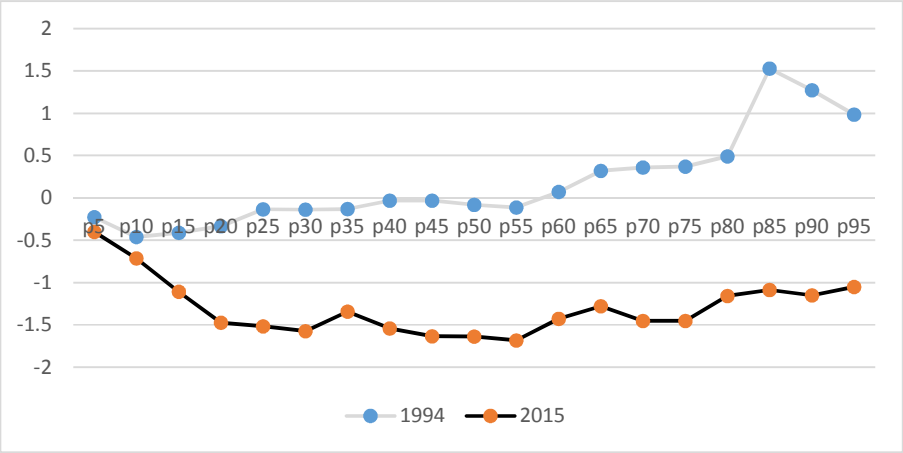
Source: own calculations using PALMS; adjusted using sampling weights

Figure 7A.7: White Male Semi-Skilled and Unskilled Relative to High Skilled Coefficients by Percentile, 1994 and 2015



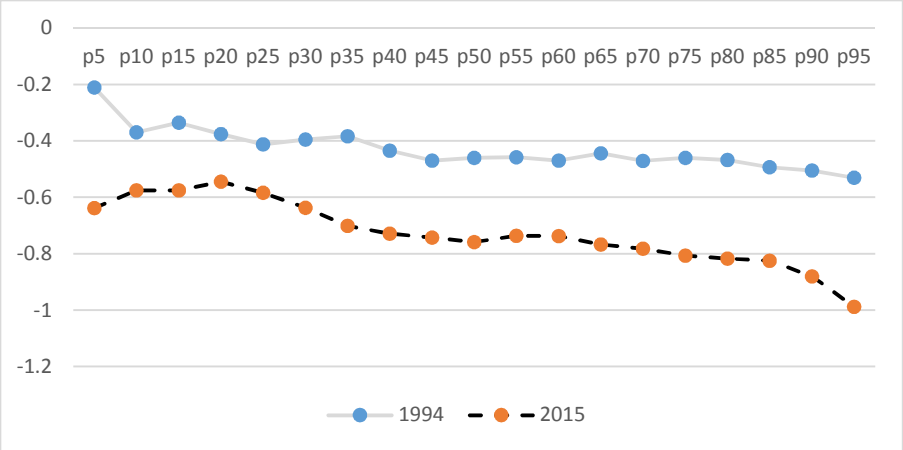
Source: own calculations using PALMS; adjusted using sampling weights

Figure 7A.8: White Female Semi-Skilled and Unskilled Relative to High Skilled Coefficients by Percentile, 1994 and 2015



Source: own calculations using PALMS; adjusted using sampling weights

Figure 7A.9: Overall Semi-Skilled and Unskilled Relative to High Skilled Coefficients by Percentile, 1994 and 2015



Source: own calculations using PALMS; adjusted using sampling weights

Table 8A.1.0: Oaxaca-Blinder Decomposition, 1994

	Difference in Mean (R)	due to endowments (E)	due to coefficients (C)	due to interactions (CE)	% Unexplained [(C+(1-D)CE)/R] D=0	% Unexplained [(C+(1-D)CE)/R] D=1	% Explained [(E+D*CE)/R] D=0	% Explained [(E+D*CE)/R] D=1
Black/African Female (L)	0.439	0.166	0.186	0.087	62.1	42.4	37.9	57.6
Coloured Female (L)	0.269	0.086	0.15	0.033	68.2	55.8	31.8	44.2
Asian/Indian Female (H)	0.302	0.447	-0.144	0	-47.8	-47.7	147.8	147.7
White Female (H)	0.837	0.763	0.013	0.061	8.9	1.6	91.1	98.4
Black/African Male (L)	0.152	0.211	-0.059	0	-38.6	-38.7	138.6	138.7
Coloured Male (L)	0.072	-0.017	0.056	0.033	123.8	77.6	-23.8	22.4
Asian/Indian Male (H)	0.747	0.576	0.306	-0.135	22.8	41	77.2	59
White Male (H)	1.342	0.835	0.525	-0.017	37.8	39.1	62.2	60.9

Source*:* own calculations using PALMS; adjusted using sampling weights

Table 8A.1.1: Oaxaca-Blinder Black/African Female (L) Decomposition Output, 2015

explained: D =				
Variables	E(D=0)	C	CE	1
Age	0.001	0.889	-0.027	-0.026
Age Squared	-0.007	-0.391	0.02	0.013
Years of Education Completed	0.02	0.013	0	0.02
Urban	0.022	-0.107	-0.013	0.009
Married	0.011	0.043	0.018	0.029
Member of Union	0.012	0.396	-0.006	0.006
Job Type by Skill	0.063	-0.156	0.009	0.072
Self-Employed	0	0	0	0
Constant	0	-0.328	0	0
Total	0.121	0.36	0.002	0.123

Source*:* own calculations using PALMS; adjusted using sampling weights

Table 8A.1.2: Oaxaca-Blinder Black/African Female (L) Decomposition Output, 2015

	High Model			Low Model			Pooled
Variables	Coef.	Mean	Pred.	Coef.	Mean	Pred.	Coef.
Age	0.022	37.542	0.837	-0.001	38.702	-0.026	0.006
Age Squared	-0.0001525200	-0.245	0.0001607293	0.132	0		
Years of Education Completed	0.071	10.748	0.758	0.069	10.462	0.725	0.068
Urban	0.101	0.767	0.078	0.258	0.681	0.176	0.199
Married	0.176	0.555	0.098	0.066	0.393	0.026	0.203
Member of Union	-0.242	1.713	-0.415	-0.47	1.739	-0.817	-0.318
Job Type by Skill	-0.523	2.175	-1.137	-0.455	2.313	-1.053	-0.524
Self-Employed	0	0	0	0	0	0	0
Constant	8.437	1	8.437	8.765	1	8.765	8.742
Total			8.41			7.927	

Source*:* own calculations using PALMS; adjusted using sampling weights

Table 8A.2.1: Oaxaca-Blinder Coloured Female (L) Decomposition Output, 2015

explained: D =				
Variables	E(D=0)	C	CE	1
Age	0.016	-0.94	-0.014	0.003
Age Squared	-0.013	0.595	0.014	0.001
Years of Education Completed	0.016	0.082	0.002	0.018
Urban	0.024	0.333	-0.056	-0.032
Married	-0.001	0.079	-0.004	-0.005
Member of Union	0.012	-0.092	0.002	0.014
Job Type by Skill	0.018	0.05	-0.001	0.017
Self-Employed	0	0	0	0
Constant	0	0.017	0	0
Total	0.072	0.126	-0.055	0.017

Source*:* own calculations using PALMS; adjusted using sampling weights

Table 8A.2.2: Oaxaca-Blinder Coloured Female (L) Decomposition Output, 2015

	High Model			Low Model			Pooled
Variables	Coef.	Mean	Pred.	Coef.	Mean	Pred.	Coef.
Age	0.005	37.973	0.196	0.03	37.435	1.133	0.006
Age Squared	0.0001555642	0.037	-0.0001519324	-0.559	0		
Years of Education Completed	0.068	10.663	0.729	0.06	10.399	0.628	0.068
Urban	0.215	0.729	0.157	-0.165	0.877	-0.145	0.199
Married	0.208	0.497	0.103	0.056	0.521	0.029	0.203
Member of Union	-0.32	1.72	-0.55	-0.268	1.764	-0.472	-0.318
Job Type by Skill	-0.524	2.221	-1.164	-0.546	2.254	-1.231	-0.524
Self-Employed	0	0	0	0	0	0	0
Constant	8.742	1	8.742	8.724	1	8.724	8.742
Total			8.25			8.108	

Source*:* own calculations using PALMS; adjusted using sampling weights

Table 8A.3.1: Oaxaca-Blinder Asian/Indian Female H) Decomposition Output, 2015

explained: D =				
Variables	E(D=0)	C	CE	1
Age	-0.007	0.882	-0.028	-0.034
Age Squared	-0.001	-0.33	0.022	0.021
Years of Education Completed	0.156	0.936	0.203	0.359
Urban	0.053	-0.949	-0.34	-0.287
Married	0.025	-0.168	-0.042	-0.016
Member of Union	-0.007	1.158	0.015	0.008
Job Type by Skill	0.327	0.373	-0.104	0.223
Self-Employed	0	0	0	0
Constant	0	-1.673	0	0
Total	0.546	0.229	-0.273	0.272

Source*:* own calculations using PALMS; adjusted using sampling weights

Table 8A.3.2: Oaxaca-Blinder Asian/Indian Female H) Decomposition Output, 2015

	High Model			Low Model			Pooled
Variables	Coef.	Mean	Pred.	Coef.	Mean	Pred.	Coef.
Age	0.029	36.77	1.066	0.006	37.957	0.218	0.006
Age Squared	-0.0001451002	-0.291	0.0001554786	0.018	0		
Years of Education Completed	0.156	12.928	2.016	0.068	10.624	0.721	0.068
Urban	-1.093	0.997	-1.09	0.2	0.734	0.147	0.199
Married	-0.132	0.621	-0.082	0.205	0.497	0.102	0.203
Member of Union	0.349	1.744	0.608	-0.324	1.722	-0.557	-0.318
Job Type by Skill	-0.357	1.607	-0.574	-0.525	2.229	-1.17	-0.524
Self-Employed	0	0	0	0	0	0	
Constant	7.086	1	7.086	8.759	1	8.759	8.742
Total			8.738			8.237	

Source*:* own calculations using PALMS; adjusted using sampling weights

Table 8A.4.1: Oaxaca-Blinder White Female (H) Decomposition Output, 2015

explained: D =				
Variables	E(D=0)	C	CE	1
Age	0.01	1.784	0.11	0.121
Age Squared	0.004	-0.89	-0.119	-0.115
Years of Education Completed	0.18	0.498	0.132	0.312
Urban	0.044	-0.124	-0.039	0.005
Married	0.036	-0.145	-0.051	-0.015
Member of Union	-0.031	0.344	0.018	-0.013
Job Type by Skill	0.397	0.021	-0.007	0.39
Self-Employed	0	0	0	0
Constant	0	-1.233	0	0
Total	0.641	0.254	0.043	0.684

Source*:* own calculations using PALMS; adjusted using sampling weights

Table 8A.4.2: Oaxaca-Blinder White Female (H) Decomposition Output, 2015

	High Model			Low Model			Pooled
Variables	Coef.	Mean	Pred.	Coef.	Mean	Pred.	Coef.
Age	0.052	40.154	2.07	0.004	37.814	0.165	0.006
Age Squared	-0.0011748652	-0.972	0.0001542200	0.033	0		
Years of Education Completed	0.112	13.272	1.489	0.065	10.494	0.679	0.068
Urban	0.022	0.95	0.021	0.194	0.725	0.14	0.199
Married	-0.087	0.662	-0.057	0.211	0.489	0.103	0.203
Member of Union	-0.145	1.807	-0.263	-0.346	1.717	-0.594	-0.318
Job Type by Skill	-0.496	1.481	-0.735	-0.506	2.266	-1.146	-0.524
Self-Employed	0	0	0	0	0	0	0
Constant	7.576	1	7.576	8.809	1	8.809	8.742
Total			9.129			8.19	

Source*:* own calculations using PALMS; adjusted using sampling weights

Table 8A.5.1: Oaxaca-Blinder Black/African Male (L) Decomposition Output, 2015

explained: D =				
Variables	E(D=0)	C	CE	1
Age	0.061	-1.38	-0.072	-0.011
Age Squared	-0.044	0.644	0.069	0.025
Years of Education Completed	0.053	0.225	0.021	0.074
Urban	0.015	0.077	0.011	0.026
Married	-0.002	0.011	0	-0.002
Member of Union	-0.026	0.351	0.013	-0.013
Job Type by Skill	0.09	-0.553	0.055	0.145
Self-Employed	0	0	0	0
Constant	0	0.454	0	0
Total	0.146	-0.171	0.098	0.244

Source*:* own calculations using PALMS; adjusted using sampling weights

Table 8A.5.2: Oaxaca-Blinder Black/African Male (L) Decomposition Output, 2015

	High model			Low model			Pooled
Variables	Coef.	Mean	Pred.	Coef.	Mean	Pred.	Coef.
Age	-0.006	38.706	-0.223	0.032	36.799	1.168	0.006
Age Squared	0.0001616076	0.254	-0.0001459917	-0.414	0		
Years of Education Completed	0.078	11.027	0.862	0.056	10.08	0.563	0.068
Urban	0.261	0.776	0.202	0.148	0.678	0.1	0.199
Married	0.179	0.495	0.089	0.158	0.505	0.08	0.203
Member of Union	-0.204	1.747	-0.357	-0.413	1.684	-0.695	-0.318
Job Type by Skill	-0.611	2.128	-1.301	-0.378	2.365	-0.893	-0.524
Self-Employed	0	0	0	0	0	0	0
Constant	8.745	1	8.745	8.291	1	8.291	8.742
Total			8.272			8.199	

Source: own calculations using PALMS; adjusted using sampling weights

Table 8A.6.1: Oaxaca-Blinder Coloured Male (L) Decomposition Output, 2015

explained: D =				
Variables	E(D=0)	C	CE	1
Age	-0.027	1.72	0.033	0.007
Age Squared	0.024	-0.832	-0.025	-0.001
Years of Education Completed	0.027	0.31	0.021	0.048
Urban	0.011	0.274	-0.033	-0.021
Married	-0.026	-0.023	0.004	-0.022
Member of Union	0.003	-0.361	0.004	0.007
Job Type by Skill	0.074	-0.167	0.011	0.085
Self-Employed	0	0	0	0
Constant	0	-1.014	0	0
Total	0.086	-0.094	0.016	0.102

Source: own calculations using PALMS; adjusted using sampling weights

Table 8A.6.2: Oaxaca-Blinder Coloured Male (L) Decomposition Output, 2015

	High Model			Low Model			Pooled
Variables	Coef.	Mean	Pred.	Coef.	Mean	Pred.	Coef.
Age	0.01	37.988	0.364	-0.037	37.262	-1.362	0.006
Age Squared	-0.0001556419	-0.049	0.0011510622	0.784	0		
Years of Education Completed	0.07	10.689	0.75	0.039	10.004	0.392	0.068
Urban	0.214	0.731	0.157	-0.115	0.831	-0.096	0.199
Married	0.198	0.492	0.097	0.235	0.603	0.142	0.203
Member of Union	-0.332	1.721	-0.571	-0.124	1.741	-0.217	-0.318
Job Type by Skill	-0.529	2.213	-1.171	-0.459	2.374	-1.089	-0.524
Self-Employed	0	0	0	0	0	0	
Constant	8.666	1	8.666	9.68	1	9.68	8.742
Total			8.243			8.235	

Source*:* own calculations using PALMS; adjusted using sampling weights

Table 8A.7.1: Oaxaca-Blinder Asian/Indian Male (H) Decomposition Output, 2015

explained: D =				
Variables	E(D=0)	C	CE	1
Age	0.005	1.986	0.054	0.059
Age Squared	0.002	-0.96	-0.058	-0.056
Years of Education Completed	0.122	0.455	0.077	0.199
Urban	0.049	0.361	0.122	0.171
Married	0.052	-0.033	-0.017	0.035
Member of Union	-0.012	0.679	0.015	0.003
Job Type by Skill	0.256	-0.042	0.009	0.265
Self-Employed	0	0	0	0
Constant	0	-2.544	0	0
Total	0.474	-0.098	0.202	0.676

Source*:* own calculations using PALMS; adjusted using sampling weights

Table 8A.7.2: Oaxaca-Blinder Asian/Indian Male (H) Decomposition Output, 2015

	High Model			Low Model			Pooled
Variables	Coef.	Mean	Pred.	Coef.	Mean	Pred.	Coef.
Age	0.057	38.959	2.23	0.005	37.93	0.185	0.006
Age Squared	-0.0011646125	-0.98	0.0001552406	0.036	0		
Years of Education Completed	0.111	12.419	1.375	0.068	10.624	0.722	0.068
Urban	0.69	0.982	0.677	0.198	0.734	0.145	0.199
Married	0.135	0.754	0.102	0.201	0.495	0.1	0.203
Member of Union	0.07	1.759	0.124	-0.324	1.722	-0.558	-0.318
Job Type by Skill	-0.54	1.739	-0.94	-0.521	2.229	-1.162	-0.524
Self-Employed	0	0	0	0	0	0	
Constant	6.224	1	6.224	8.768	1	8.768	8.742
Total			8.812			8.235	

Source*:* own calculations using PALMS; adjusted using sampling weights

Table 8A.8.1: Oaxaca-Blinder White Male Decomposition Output, 2015

explained: D =				
Variables	E(D=0)	C	CE	1
Age	0.017	1.857	0.119	0.135
Age Squared	-0.002	-0.97	-0.135	-0.137
Years of Education Completed	0.167	0.201	0.05	0.217
Urban	0.04	-0.28	-0.081	-0.041
Married	0.041	-0.023	-0.011	0.03
Member of Union	-0.004	0.577	0.003	0
Job Type by Skill	0.364	-0.657	0.227	0.591
Self-Employed	0	0	0	0
Constant	0	-0.231	0	0
Total	0.623	0.474	0.172	0.795

Source*:* own calculations using PALMS; adjusted using sampling weights

Table 8A.8.2: Oaxaca-Blinder White Male Decomposition Output, 2015

	High Model			Low Model			Pooled
Variables	Coef.	Mean	Pred.	Coef.	Mean	Pred.	Coef.
Age	0.056	40.214	2.252	0.007	37.798	0.26	0.006
Age Squared	-0.0011755043	-1.124	-0.0001540721	-0.017	0		
Years of Education Completed	0.083	13.113	1.087	0.064	10.49	0.668	0.068
Urban	-0.194	0.934	-0.181	0.192	0.724	0.139	0.199
Married	0.131	0.715	0.093	0.179	0.485	0.087	0.203
Member of Union	-0.039	1.732	-0.067	-0.374	1.721	-0.644	-0.318
Job Type by Skill	-0.755	1.488	-1.124	-0.466	2.27	-1.057	-0.524
Self-Employed	0	0	0	0	0	0	0
Constant	8.499	1	8.499	8.73	1	8.73	8.742
Total			9.435			8.166	

Source*:* own calculations using PALMS; adjusted using sampling weights