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Distributional changes in the gender wage gap in the post-apartheid South African labour market

Jacqueline Mosomi

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Distributional changes in the gender wage gap in the post-apartheid South African labour market

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March 2019

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Abstract: This paper investigates the evolution of the gender wage gap in South Africa, using the 1993–2015 Post-Apartheid Labour Market Series data set. The changes in the gap are heterogeneous across the wage distribution. There has been a substantial narrowing of the gap at the bottom of the distribution, attributable to the implementation of the minimum wage in low-paying industries However, the median gender wage gap is substantial at 23–35 per cent. This is unexplained by differences in human capital characteristics, and is not declining over time. This implies that wage-employed women in South Africa have better human capital characteristics than men. Contrary to previous literature, the wage gap at the mean narrowed from 40 per cent in 1993 to 16 per cent in 2014. The gap at the 90th percentile declined during 1993–2005, but has expanded in recent years. This is due to a continually expanding unexplained component of the wage gap, which is usually associated with discrimination.

Keywords: labour force participation, gender wage gap, discrimination, decomposition, unconditional quantile regression, post-apartheid South Africa
JEL classification: J16, J31, J71

Figures and tables: All author's own.

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1 Background and motivation of the study

1.1 Introduction

Inequality is undesirable, because not only does it hamper poverty reduction strategies, it also leads to suboptimal allocation of resources (Okojie and Shimeles 2006). In South Africa, where according to research (Bhorat et al. 2014; Leibbrandt et al. 2010b; Wittenberg 2016b) labour market income makes up more than 85 per cent of total household income, it is reported that individuals living in female-headed households are more likely to be poor compared with individuals living in male-headed households (Gelb 2003; Posel 2014; Posel and Rogan 2000). On a global scale, gender wage inequality is costly to everyone: the World Bank reports that the world loses US$160 trillion in human capital wealth due to gender wage inequality (Wodon and de la Brière 2018). More than two decades after the demise of the apartheid system, the question asked in this paper is: what has happened to the gender wage gap[1] in South Africa? The aim of this paper is to take stock of post-apartheid South African labour market performance with regard to gender equality in order to provide an evidence base for further policy and societal progress.

South Africa pre-1994 was not only characterized by racial segregation, but also displayed patriarchal attributes. Seekings and Nattrass (2008: 82) detail how the labour and welfare system developed in the 1920s and 1930s was focused on white households with a well-paid white male breadwinner. In this model, which assumed that a woman's place was in the home, the white male breadwinner was paid a 'civilized' wage, which was assumed to be a family wage (Seekings and Nattrass 2008). African households, who were not included in the welfare system, were expected to survive on peasant agriculture and remittances from migrant labour.

Although migrant laws allowed individuals to seek jobs in urban areas, it was mostly men who migrated, partly because chiefs, husbands, and fathers had the ability to prevent women and girls from migrating to towns (Posel 2004). Additionally, influx control laws and pass laws prohibited black women from migrating to towns, as one could not enter the towns without accommodation. The state allowed male dormitories in urban areas for black men, but none for black women, and men and women were not allowed to stay in the same dormitories (Landis 1975). A few female teachers and nurses were able to escape the conditions in the Bantu reserves and get employment, but most women were forced into low-wage jobs on white farms nearby, where they were either agricultural workers or domestic workers (Landis 1975). These also happened to be the lowest-paying jobs with the most precarious working conditions.

The model of the male breadwinner assumed a scenario where household resources were shared among family members, and where husbands were altruistic and would always remit money back home. This was not always the case: there were reports of inequality within households where patriarchal heads sought to monopolize resources, which meant that rural women who could not migrate for one reason or another suffered the greatest poverty (Seekings and Nattrass 2008).

The mix of patriarchy and apartheid, and their effect on the status of women in the labour market, makes South Africa an important case study for understanding the evolution of the gender wage gap over time. This is because the demise of apartheid and the introduction of anti-discrimination

[1] In this paper, the gender wage gap is defined as $logmalewage - logfemalewage$. Additionally, 'wages' and 'earnings' are used interchangeably, where wages are defined as labour market earnings for wage-employed employees.

legislation since 1994 provides an unnatural experiment with which to carry out the analysis. The focus of the post-apartheid government since 1994 has been to tackle all forms of inequality and discrimination through various policies and legislation (Burger and Jafta 2010). Internationally, while some studies find a positive link between equal employment legislation and labour force participation (Abe 2010), the effect of equal employment legislation on the gender wage gap is less clear (Abe 2010; Polachek 2014). The availability of 55 cross-sections of household survey data allows the examination of how the demise of apartheid and the introduction of equal employment legislation has affected the gender wage gap in the South African labour market, thus contributing to the literature.

This study finds that the changes in the gender wage gap are heterogeneous across the wage distribution. There has been a substantial narrowing of the gender wage gap at the bottom of the wage distribution, which is attributable to improved female human capital characteristics and minimum wage legislation. This decline has influenced the narrowing of the gender wage gap at the mean over time, even though the gap persists. On the other hand, the median wage gap, which is greater than the mean wage gap, has been stagnant and displays very little movement in the period studied, raising the concern that perhaps affirmative action has not been as successful as one would have expected at the median. There was some decline in the gap at the 90th percentile in the period between 1993 and 2005, but the gap seems to have expanded in recent years due to a continually expanding unexplained gap, implying a glass ceiling effect for women at the top of the wage distribution.

The rest of this paper is organized as follows. In section 1.2, changes in the relative position of women in the labour market are examined, while in section 2 previous studies on the gender wage gap are reviewed. I then discuss the data and methods used in this analysis in section 3. The results are presented and discussed in section 4, and the conclusions and policy implications are discussed in section 5.

1.2 Changes in the relative position of women in the South African labour market

In the South African context, several changes have taken place that may make women's labour market experience in the post-apartheid period different from that of women in the labour market during apartheid. This would in turn influence the gender wage gap over time. In this section I look at trends in labour force participation, employment, education, and trade union membership.

1.2.1 Labour force participation

Internationally, studies report an increased labour force participation of women, attributed *inter alia* to the closure of the gender gap in education (Ganguli et al. 2014), advances in medicine such as the introduction of the contraceptive pill (Goldin and Katz 2002), equal employment legislation (Abe 2010), and technological progress, both in the labour market and in the home (computers, microwave ovens) (Blau and Kahn 2000; Petrongolo and Olivetti 2006).

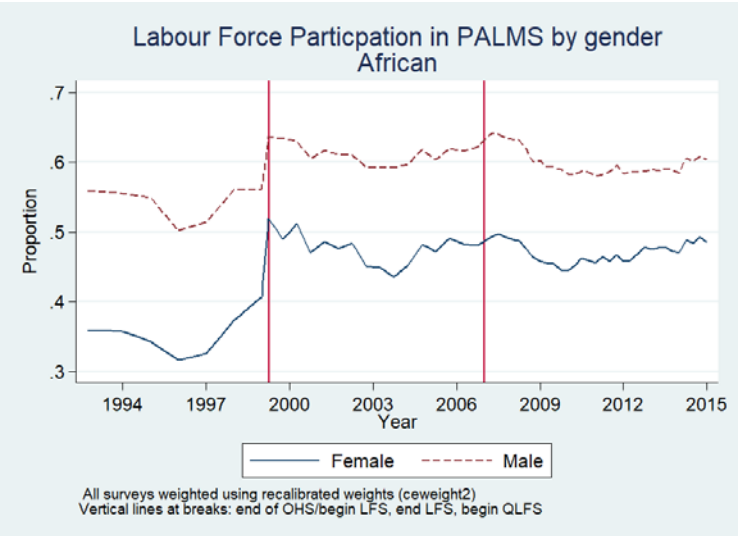
Locally, even though there is still a substantial gap in labour force participation[2] between men and women, there was an increase in labour force participation in the first decade following the demise of apartheid (see Figure 1). This increase was greatest for African women. The labour force

[2] An individual is said to be participating in the labour market if they are either employed or unemployed but seeking employment.

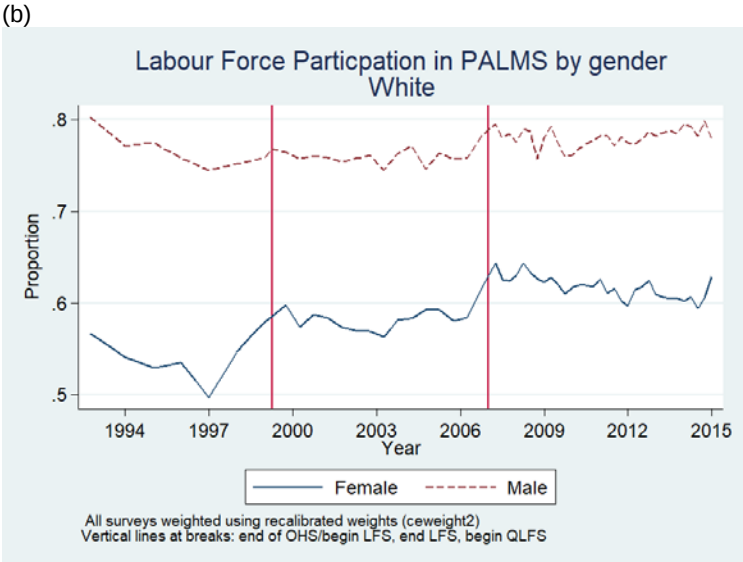
participation rate of African women increased from about 0.36 in 1993 to about 0.49 in 2015, after peaking at 0.51 in 2000.

Figure 1: Labour force participation over time

(a)



(b)



According to Casale and Posel (2002), this increase in labour force participation of women can be attributed to changes in household formation, the decline in marriage and fertility rates, and an increase in education. They report that the proportion of women living with employed men has declined over time, a finding consistent with Casale (2004), who reports that the proportion of households dependent on women's earnings increased from 14.8 per cent to 21 per cent in the period between 1995 and 2001. This suggests that the traditional notion of a male breadwinner is weakening in the South African context. Also, better access to education has increased the opportunity costs to women of being outside the labour market, and has therefore increased their probability of participation.

Ntuli and Wittenberg (2013) report that the increased labour force participation of black women is attributable to changes in social norms and women's behavioural responses towards the labour market, rather than to changes in human capital characteristics.

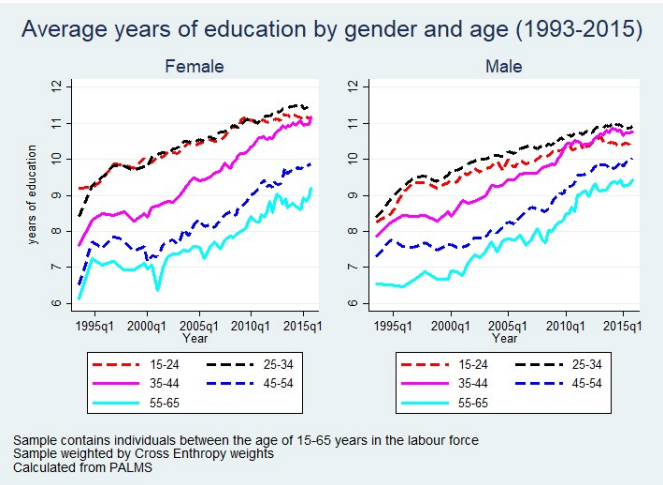
Deliberate anti-discrimination legislation by the newly elected democratic government in 1994 has also contributed to increased female labour force participation in South Africa (Burger and Jafta 2010; Posel 2014). These policies include Labour Relations Act 66 of 1995, which governs how employers and employees interact in the workplace; Basic Conditions of Employment Act 75 of 1997, which regulates working conditions including working hours, and allows the Minister of Labour to determine minimum wages for employees by sector; Employment Equity Act 55 of 1998, which aims to promote equal opportunities and fair treatment in employment through the elimination of unfair discrimination; and Black Economic Empowerment Act 53 of 2003, whose objectives were to facilitate a broad-based black economic transformation in order to enable the meaningful participation of black people in the economy (Leibbrandt et al. 2010a). These policies have contributed to the rise in women's level of participation by increasing the returns to women's labour force characteristics (Ntuli and Wittenberg 2013).

There is recent literature which shows that some of this increase, especially between 1998 and 2000, is due to improved data collection by Statistics South Africa (Casale et al. 2004; Yu 2007), especially the improved capture of informal activity in South Africa (Casale et al. 2004). However, starting from the participation rates in 1993, there is no denying that there was a substantial increase in female labour force participation after 1993.

1.2.2 Education

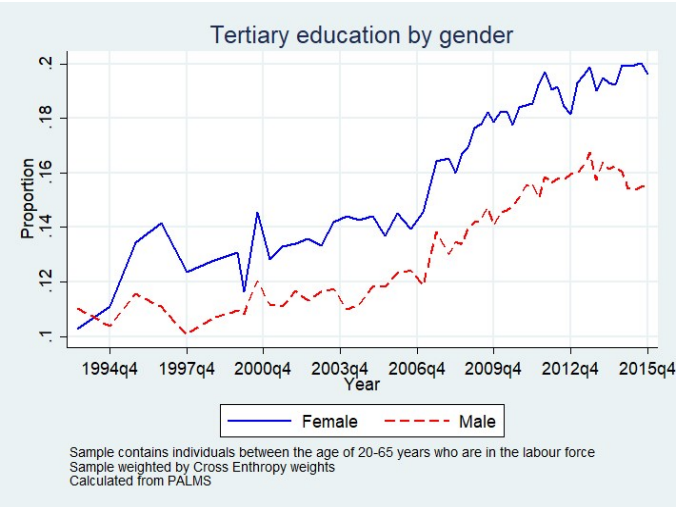
Average years of education have been rising in the South African labour market for both men and women. There is a shift in the educational attainment of the labour force, in that younger individuals on average have more education than older individuals, and women on average have more years of education than men (see Figure 2). Spaull and Van Broekhuizen (2017) report that at all levels of education, women are less likely to drop out of school and are more likely to graduate with a university degree.

Figure 2: Average years of education by gender and age group



Among individuals aged between 20 and 65, the proportion of the labour force with some tertiary education is higher for women than men. For women, the proportion of the labour force with a tertiary education rose from 10 percent in 1993 to about 20 percent in 2015, whereas that of men rose from 11 per cent in 1993 to about 15 percent (see Figure 3). With studies reporting a continued increase in returns to tertiary education (Branson and Leibbrandt 2013), the expectation is that as more women acquire tertiary education, the gender wage gap should decline, especially at the top of the wage distribution.

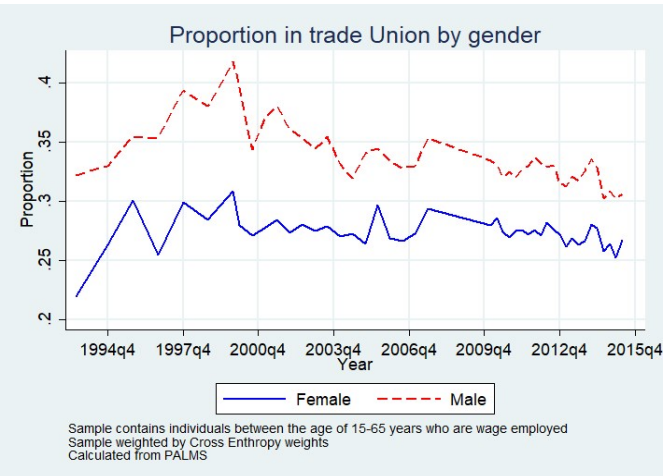
Figure 3: Proportion of the labour force with tertiary education



1.2.3 Trade union membership

Many studies report a substantial wage premium[3] for employees in trade unions (Bhorat et al. 2012; Butcher and Rouse 2001; Schultz and Mwabu 1998; Wittenberg and Kerr 2016). Also, employees in certain industries are more likely to be unionized than others. Looking at the proportion in a trade union by sector, Wittenberg and Kerr (2016) show that union rates are highest in the mining and utilities sectors, with the proportions in a union in these sectors being about 80 per cent and 50 per cent respectively in 2014. These sectors also happen to be male-dominated. The domestic work sector, where black African women are over-represented, has very low unionization rates (Bhorat et al. 2012; Budlender 2010; Dinkelman and Ranchhod 2010; Hertz 2005; Wittenberg and Kerr 2016). What this means for the gender wage gap is that due to sectoral and occupational segregation, if men are more likely to be in unionized sectors, then this may widen the gender wage gap.

Figure 4: Proportion in a trade union



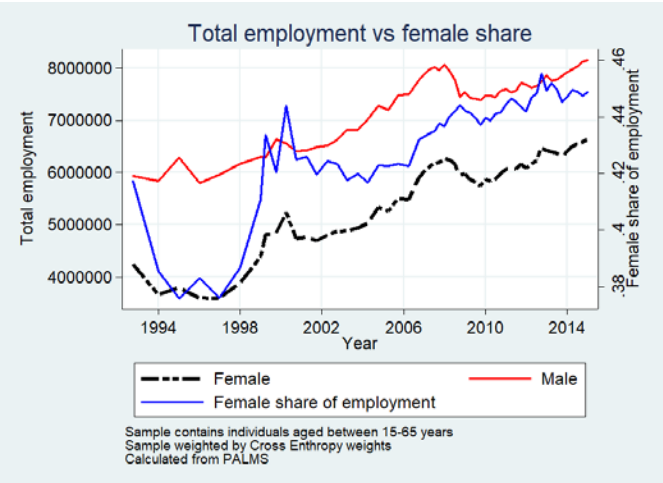
[3] Casale and Posel (2010) find that even if the gender wage gap is higher among union members, African female union members were earning three times as much as African female non-union members between 2000 and 2006; African male union members were earning twice as much as African male non-union members in the same period.

The data shows that union membership has declined in the South African labour market, but the decline is higher for men. Figure 4 shows that there are more men that report being in a union than women. However, there was a decline in the proportion of wage-employed men in a trade union in the period 1993–2015, which led to a decline in the gender gap in trade union membership. This decline is possibly due to the contraction of jobs in the mining and manufacturing sectors, where men are over-represented (Hosking 2016). Kerr and Wittenberg (2016) highlight the fact that the proportion of employees in a union has been on the decline in the manufacturing sector, dropping by about 10 per cent in the post-apartheid period. In 1997,[4] 38 per cent of employed men reported being in a union, as opposed to only 30 per cent of employed women. In 2014, this figure stood at 31 per cent for men and 26 per cent for women.

1.2.4 Employment trends

There was a continuous increase in the share of women in employment between 1993 and 2015 (see Figure 5). The female share of employment[5] increased from around 38 per cent in 1994 to about 45 per cent in 2015. Equal employment legislation and affirmative action coupled with improved education may have made women joining the labour market after apartheid attractive to employers, leading to an increase in employment for women in professional occupations (especially white women) in the formal sector (Casale and Posel 2005). However, there is still a gap in employment between men and women, and black women in particular are over-represented in part-time work and informal activities. Posel and Muller (2008), investigating the part-time and full-time wage gap, report that women are over-represented in part-time work, and that over 50 per cent of all part-time wage employees are domestic workers.

Figure 5: Employment in the Post-Apartheid Labour Market Series (PALMS)



Research shows that a consequence of increased female labour force participation has also been an increase in unemployment (Casale 2004; Casale and Posel 2002, 2005). Women are more likely to be unemployed, and if employed, they are more likely to be in low-paying and precarious occupations (Casale 2004; Casale and Posel 2002). Most of the increase in employment

[4] Kerr and Wittenberg (2016: 13) note that the levels of unionization between 1997 and 1999 may be overstated due to the under-sampling of marginal workers.

[5] There is a noticeable dip in the female share of employment in Figure 5 in the early October Household Surveys (OHS), which is linked to the under-sampling of low-income women. The figure also shows a break in the data in 2000, and another in 2008. These two periods also represent the changeover periods of survey instruments, from the OHS to the Labour Force Surveys (LFS), and from the LFS to the Quarterly Labour Force Surveys.

experienced in the early 2000s was in subsistence agriculture and domestic work (Casale et al. 2004; Posel and Casale 2001). Neyens and Wittenberg (2016) find that part of the big jump in employment in 2000 was due to a large increase in the number of self-employed agricultural workers that resulted from the change of survey instrument[6] by Statistics South Africa. Fields (2000) refers to the high unemployment rate and the increasing number of individuals in precarious employment as South Africa's 'employment problem', stressing the point that it is not enough to create employment for the unemployed, but it also matters what type of employment is created. It is important therefore to acknowledge that while there have been great strides in female labour force participation and employment, women's over-representation in low-paying occupations, and the fact that they are more likely to be unemployed, remains an important policy issue.

Figure 6: Unemployment by gender

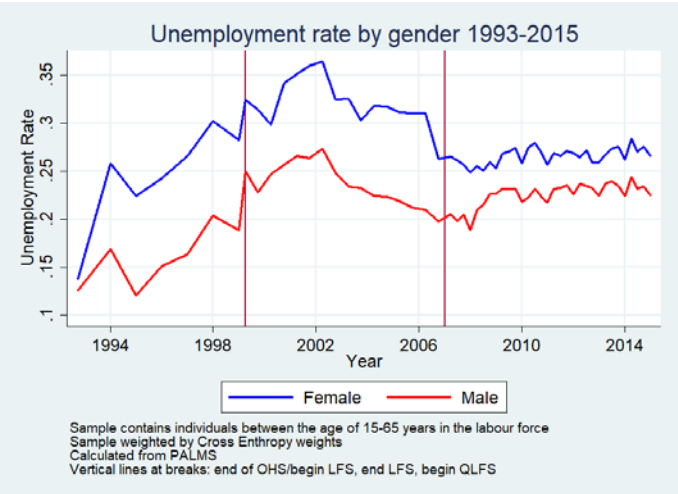


Figure 6 shows that the unemployment rates[7] for both men and women are consistent with the post-apartheid macro-economic environment, which exhibited slow growth in the early 1990s and a rise in economic growth in the 2000s (Makgetla 2004). The unemployment rate increased in the first decade post-apartheid, decreased between 2002 and 2008, and has been on an upwards trend in recent years, mostly due to the 2008 global financial crisis. Women are more likely to be unemployed than men.

1.2.5 Sector of employment

Women predominantly work in four sectors; domestic services (about 80 per cent of the waged employed in this sector is female), finance (about 44 per cent), trade (about 50 per cent), and services (about 47 per cent). Men, on the other hand, are predominant in the services, trade, finance, manufacturing, and construction sectors (see Figure 7). However, there is occupational segregation in these sectors. The majority of women in the finance sector, for example, are clerks (bank tellers, customer information clerks), whereas the majority of men in the finance sector are service workers. In the trade sector, women are more likely to be roadside traders; in the services sector, there is an increase in the number of female technical and associate professionals (teachers, nurses), mostly in the public sector. Women are also more likely to be performing elementary tasks

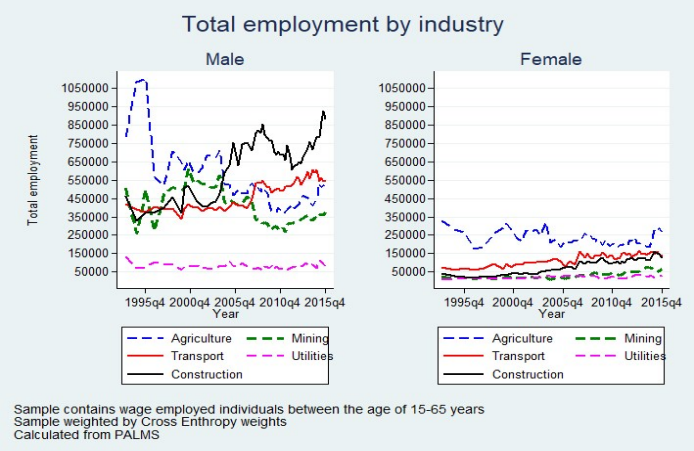
[6] There was a change in the definition of work with the shift from the OHS to the LFS. Fieldworkers were instructed to classify as employed anyone who was engaged in any informal or small-scale agricultural work, even if for only an hour in the previous week (Neyens and Wittenberg 2016).

[7] This is the official unemployment rate, which defines an individual as unemployed if they did not work in the past week but made an attempt to search for employment.

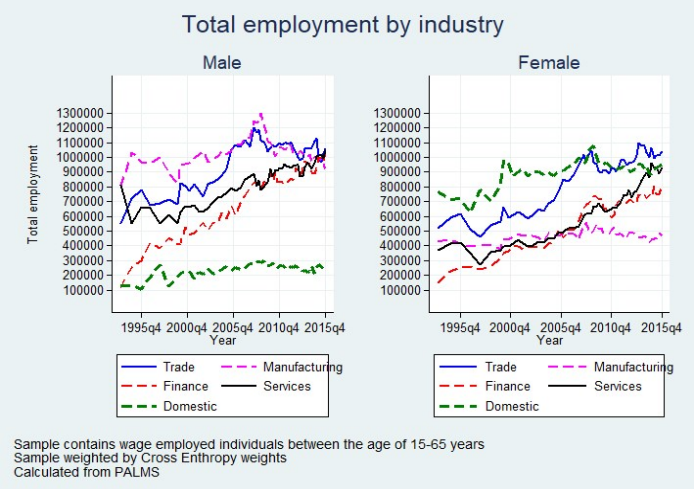
in these sectors, while men are more likely to be managers. Relative to women, men experienced a decline in employment in the manufacturing industry post-2007, which is attributable to the global financial crisis. There was also a decline in the total numbers employed for men in the primary sectors of agriculture and mining. These relative changes have an implication for the gender wage gap.

Figure 7: Total employment by industry and gender

(a) Selected industries



(b) Selected industries

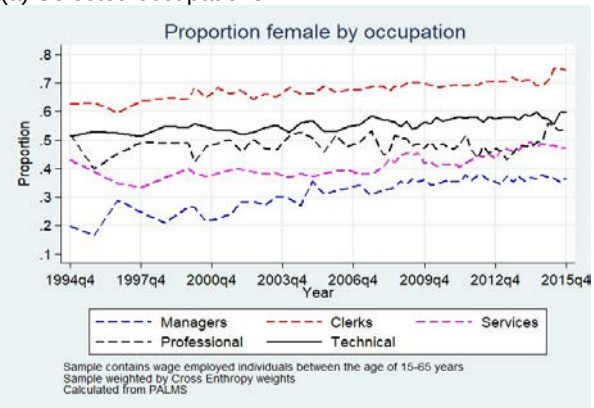


1.2.6 Type of occupation

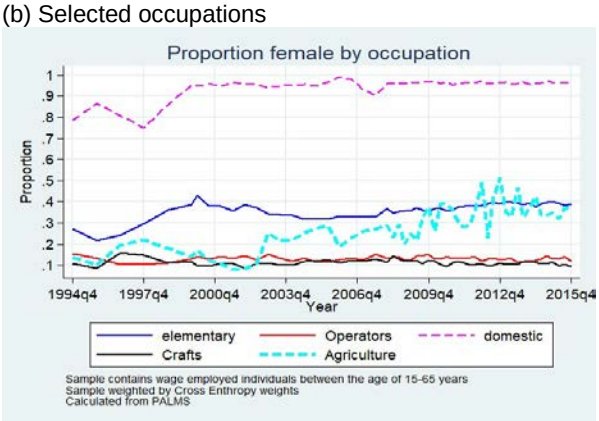
Figure 8 shows the proportions of women in different occupations. The figure shows substantial stability in the proportions since 1994. Women are over-represented in the lowest-paying occupations (domestic work) and under-represented in the highest-paying occupations (legislators, senior officials, managers). The figure shows, however, that the proportion of women in managerial occupations has been increasing over time (from 19 per cent in 1994 to 36 per cent in 2015), almost doubling. This increase is much bigger when looked at in absolute numbers. Women managers and legislators in wage employment increased from about 58,888 in 1994 to about 279,719 in 2015. The proportion of women in technical (technical and associate professionals) and service (service workers and shop and market attendants) occupations has also been rising over time. This is consistent with education trends, where women have surpassed men in terms of tertiary education.

Figure 8: Proportion female by occupation

(a) Selected occupations



(b) Selected occupations



International literature finds that industry and occupation of employment remain important in explaining the gender wage gap (Blau and Kahn 2016). If women are excluded from some types of occupation considered 'male' occupations, then this can result in overcrowding in occupations considered 'female'. The overcrowding in turn drives down wages (Bergmann 1974). Gradín (2018) finds that even though occupational segregation has been on the decline, it persists in the South African labour market, and black women and coloured women overwhelmingly fill low-paying occupations. Like Rospabé (2001), he concludes that differences in human capital characteristics cannot explain this occupational segregation in low-paying occupations.

1.2.7 Earnings

When we look at the trends in earnings by gender (see Figure 9), some features of the data stand out. One is that the average wage exceeds the median wage. This feature is consistent with the high inequality in South Africa, and reflects the fact that some employees earn extremely high wages. The earnings at the top of the wage distribution thus pull up the average wage but not the median wage. Second, for both men and women there was an increase in wages at the mean in the period 1993–2015, but earnings at the median seem to have stagnated. Several researchers analysing wage inequality in South Africa have tried to explain this puzzle (Finn and Leibbrandt 2018; Hosking 2016; Wittenberg 2016a).

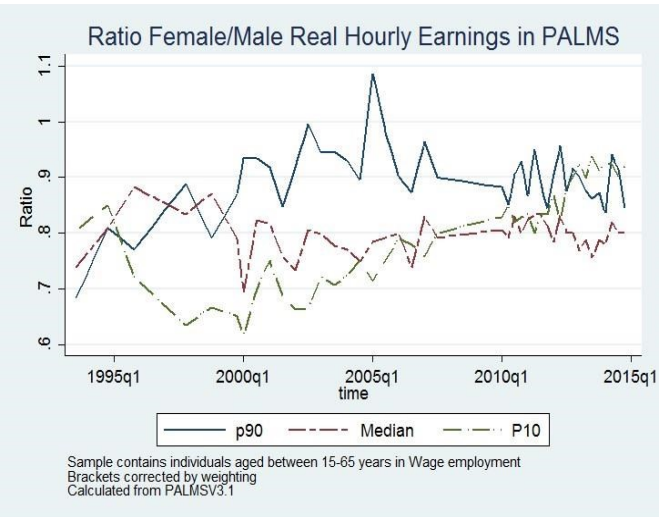
Some of the explanations include the presence of skill-biased technological change in South Africa and minimum wage legislation. From the demand side, industry seems to be shifting towards employees with tertiary education, thus boosting wages at the top of the wage distribution (Bhorat et al. 2014; Hosking 2016). On the other hand, minimum wage legislation has helped boost wages in the bottom part of the distribution (Bhorat et al. 2013; Wittenberg 2016a). The median worker,

however, is likely to have slightly more than 10 years education and is less likely to be in a trade union, and is therefore not in a position to benefit from either the high returns to tertiary education or union membership (Wittenberg 2016a).

Figure 9: Hourly wages in PALMS

Figure 10 shows that changes in the gender wage gap are heterogeneous across the wage distribution. The female-male wage ratio is highest at the 90th percentile and lowest at the 10th percentile. There has been an increase in the female-male wage ratio over time. However, the increase in the wage ratio at the median has been much more conservative. The female-male wage ratio increased from almost 0.7 in 1993 to 0.9 in 2014 at the 90th percentile (with some fluctuations in between), while the wage ratio at the median increased modestly from 0.7 in 1993 to about 0.8 in 2014 (with fluctuations in between).

Figure 10: Ratio of male to female wages by percentile



A drastic decline in female wages at the 10th percentile led to a dip in the female-male wage ratio in the October Household Survey (OHS). There is an especially sharp drop in the female-male wage ratio at the median and the 10th percentile that coincides with the changeover from the OHS to the Labour Force Survey (LFS). It is documented in the literature that the increase in women's labour force participation during this period was due not to a demand pull, but to women being pushed into the labour market because of economic need (Casale 2004; Casale and Posel 2002). As a result, there was an overcrowding of women in low-paying occupations, which may have pushed wages down even further. On the other hand, the figure shows that there was no

contraction of the female-male earnings ratio at the 90th percentile; indeed, this ratio seems to have improved during that period. The trends in the figure stress the need to analyse the changes in the wage gap across the entire wage distribution.

2 Literature review

Human capital theory attributes differences in wages between men and women to differences in educational qualifications and labour market experience (Mincer 1974; Polachek 2006). Therefore, the developments discussed above—such as increased labour force participation and the closure of the gender gap in education—imply that there should have been a convergence of earnings between men and women. However, the gender wage gap persists in many countries, and a large portion of it cannot be explained by differences in human capital characteristics (Blau and Kahn 2016; Goldin 2014).

Goldin (2014) finds that even after controls for differences in human capital characteristics, a substantial gender wage gap remains in the United States. She attributes the persistent gender wage gap to differences in time demands in different industries. She reports that the gender wage gap is higher in occupations where more face-to-face contact with clients is required, such as in finance and law. Similarly, Blau and Kahn (2016) find that although differences in human capital characteristics have become unimportant in explaining the persistent gender wage gap, industry of employment and occupation continue to be significant.

Studies that have analysed the gender wage gap in South Africa report a positive and persistent gender wage gap (Bhorat and Goga 2013; Casale and Posel 2011; Grün 2004; Ntuli 2007). However, results on the evolution of the gender wage gap over time are mixed, with some researchers finding a rise in the gender wage gap between 1995 and 2006, and others reporting a drop. Casale (2004) found that the gender wage gap in the labour market was persistent in the period 1995–2001, and that even though there was an increase in the labour force participation of women, in terms of wage equality women remained worse off. Similarly, Ntuli (2007) reported that in the period between 1995 and 2004, the counterfactual wage gap over the full wage distribution did not decline. Muller (2009), however, reports a gender wage gap of -0.02, 0.245, 0.209, and 0.172 log points in 1995, 1999, 2001, and 2006 respectively. Excluding 1995 from her analysis, she reports a declining gender gap between 1999 and 2006.

A pitfall of these studies is that due to different methodologies and different analysis periods (see Table A6 in the Appendix), the estimates are not directly comparable. This makes it difficult to track the size of the gender wage gap over time in South Africa. Therefore, the question of how the gender wage gap has evolved over time in post-apartheid South Africa remains to be answered.

Furthermore, research on the gender wage gap in South Africa has been of a snapshot nature (Bhorat and Goga 2013; Rospabé 2001; Winter 1999), rather than taking a longer comparative look at the evolving pattern. The disadvantage of snapshot studies is that they do not account for inconsistencies in the data, which can lead to misleading inferences. For instance, studies focusing only on wage employees in 1994 and 1995 reported insignificant gender wage gaps, which in another paper (Mosomi 2016) I attributed to inconsistencies in the classification of domestic workers during these two years. I showed that inconsistencies in the classification of domestic workers led to a 'missing' wage gap in 1994 and 1995 (see Figure 11).

Figure 11: Average real monthly earnings by gender

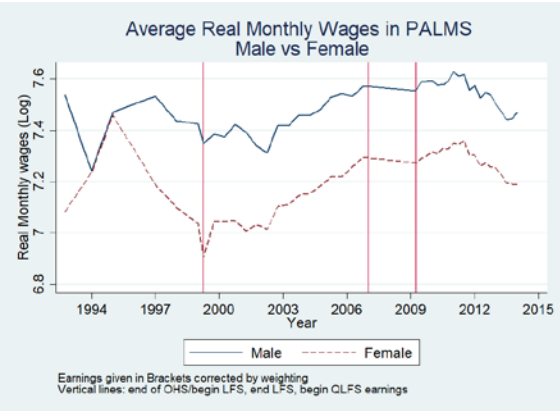


Figure 11 plots real monthly wages over time by gender (Mosomi 2016). A critical look at the figure makes it clear why a snapshot analysis may be a problem. It also shows how the choice of baseline may affect conclusions regarding the evolution of the gender wage gap or any analysis of wages: hence studies that compared other years with 1995 concluded that the gender wage gap had not declined over time.

The contribution of this analysis to the literature is to examine the evolution of the gender wage gap over time, using Post-Apartheid Labour Market Series (PALMS) data corrected for data inconsistencies in the classification of domestic work in 1994 and 1995 (Mosomi 2016). Specifically, I ask whether the unexplained[8] gender wage gap, which is usually associated with discrimination, has declined over time. If it has declined over time, what are some of the most important characteristics associated with the decline? I also assess whether affirmative action has been binding, and the implications for the gender wage gap across the wage distribution.

3 Data

For this analysis I utilize PALMS data for 1993–2015 (Kerr et al. 2016). PALMS is a data set comprising South African labour force surveys stacked together. These surveys are: the 1993 Project for Statistics on Living Standards and Development, conducted by the Southern Africa Labour and Development Research Unit; the OHS, which started in 1993[9] and was collected annually until 1999; the LFS, which was collected biannually from 2000 to 2007; and the Quarterly Labour Force Survey (QLFS), collected from 2008.

The PALMS data set contains the longest-running series of data on the post-apartheid labour market, and is therefore particularly well suited for analysing labour market outcomes. To ensure comparability, Kerr et al. (2016) have gone to great lengths to harmonize the PALMS data set variables over time. Additionally, the data set comes with recalibrated weights using a cross-entropy approach (Branson and Wittenberg 2014) to increase continuity and comparability

[8] The unexplained gender wage gap is the remaining gender wage gap after controls for human capital and individual characteristics that determine an individual's wage.

[9] The 1993 OHS, however, is not included in PALMS, as it did not cover the whole country: it excluded the former states of Transkei, Bophuthatswana, Venda, and Ciskei.

between surveys over time. PALMS also contains bracket weights to account for earnings[10] given in brackets, and an outlier variable that flags outliers in the data set (see Wittenberg 2016b for more detail).

3.1 Measures

For the gender wage gap analysis, the sample is restricted to individuals aged between 15 and 65 years and in wage employment. For this analysis, the explanatory variables include a four-category potential experience[11] variable calculated as *age - years of schooling - 6*; a four-category education[12] variable; dummy variables for married, unionized, and in the public sector; a four-category race variable (1=African, 2=coloured, 3=Indian, 4=white); and a nine-category province[13] variable. Also included are occupation and industry variables. The data set contains 10-category occupation and industry variables; however, the domestic services sector contains very few men, so to avoid common support issues, domestic work is combined with elementary occupations. For the same reason, the domestic services sector is combined with the services sector.

As in other studies looking at the gender wage gap (Bhorat and Goga 2013; Grün 2004; Muller 2009), log of hourly wage is used as the dependent variable to allow for the fact that women are more likely to work part-time. Women might spend fewer hours in labour market production (working part-time) due to family responsibilities (Weichselbaumer and Winter-Ebmer 2005). The data contains no hourly wage variable; therefore the variable was constructed by dividing real monthly earnings by monthly hours. Monthly hours are calculated by multiplying hours worked in the last week by average weeks in a month. For this analysis, average weeks in a month are taken to be 4.333.

The relationship between schooling and wages in the South African labour market has been found to be convex (Branson and Leibbrandt 2013; Keswell and Poswell 2004; Mwabu and Schultz 1996). That is, the effect is smaller at lower levels of education and increases with higher levels of education. To account for this non-linearity, a four-category education variable is used instead of years of education as a continuous variable.

Marital status is included as a control for productivity. However, while marriage might signal a potential increase in productivity for men, it may signal a potential reduction in productivity for women (Blau and Kahn 2006, 2016; Weichselbaumer and Winter-Ebmer 2005). This is because to the employer, being married for men signals 'stability, discipline and motivation' (Rospabé 2001), while for females it signals added non-work responsibilities and less productivity (Weichselbaumer

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[10] Earnings in nominal ZAR are deflated by the Consumer Price Index to obtain real earnings (in constant June 2000 ZAR).

[11] The four categories of potential experience are constructed as follows: individuals with less than 10 years of experience (0–9 years), those with between 10 and 19 years of experience (10–19 years), those with between 20 and 29 years of experience (20–29 years), and finally those with more than 30 years of experience (30–59 years).

[12] The four education categories are constructed as follows: the first category (primary) includes everyone with between zero and eight years of education; the second category (incomplete secondary) includes individuals with more than eight but less than 12 years of education; the third category (matric) includes all individuals with 12 years of education; the fourth category (tertiary) includes all individuals with more than 12 years of education.

[13] The nine provinces are Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West, and Western Cape.

and Winter-Ebmer 2005: 495). Race is an important covariate in the South African labour market given the history of apartheid.

The union status dummy accounts for the fact that union jobs tend to pay higher wages (Bhorat et al. 2012; Butcher and Rouse 2001; Schultz and Mwabu 1998; Wittenberg and Kerr 2016) and are more likely to be male-dominated; thus omitting this variable would overestimate the wage gap (Weichselbaumer and Winter-Ebmer 2005). A dummy for whether someone is employed in the public sector is included because the public sector is an important employer of women in South Africa, and studies have found a public sector premium in wage regressions (Bhorat and Goga 2013; Heintz and Posel 2008; Kerr and Wittenberg 2016). It is important to note that trying to use all the labour force surveys available is a challenge, in that not all variables are available in all cross-sections. In this case, the union status and public sector variables are not available in some surveys. Therefore, to control for the effect of these variables, separate models are estimated for surveys where these variables are available.

There is a debate to be had over whether occupation and industry dummies should be included in the regression model. If the type of occupation an individual self-selects into is purely dependent on choice and not due to pre-market discrimination, then the inclusion of occupation and industry dummies contributes important information to the model. However, if selection into occupations is due to some form of pre-labour market discrimination, then occupation dummies reduce part of the causal relationship between wages and gender, as they are themselves part of the effect (discrimination) that is being estimated, and the estimate will be biased downwards. In this case, occupation and industry is a channel through which the gender variable influences wages.

There is a second problem with the inclusion of occupation and industry dummies in the wage regression: these variables are 'bad controls'. As defined by Angrist and Pischke (2008), bad controls are variables that are themselves outcome variables, i.e. they might themselves be the dependent variables of interest. The 'bad control problem' is a different type of selection bias. To illustrate this, Angrist and Pischke (2008) look at the effect of including both education and occupation dummies in the well-known Mincerian wage regression when estimating returns to education. Education is one of the main determinants of wage; however, it is also one of the main determinants of the type of occupation one finds oneself in (white-collar or blue-collar). Highly educated individuals are more likely to be in white-collar occupations, and low-educated individuals are more likely to be in blue-collar occupations. If by chance an individual with low education is observed in a white-collar occupation, it must be the case that this individual is fundamentally different from their other low-education peers, probably because they have very high motivation and/or very high innate ability. Therefore, in this context, the inclusion of industry and occupation dummies in the wage regression introduces a selection bias component.

This study considers these two issues. However, as it is not possible to model selection into different occupations given the data, two sets of wage regressions are estimated: the first set excludes the occupation and industry dummies, and the second set includes them. The implication is that these two estimates provide lower and upper bounds (Arulampalam et al. 2007).

3.2 Methodology

3.2.1 Analysing the gender wage gap at the mean: Blinder-Oaxaca decomposition

I start with an analysis at the mean where the Blinder-Oaxaca decomposition (Blinder 1973; Oaxaca 1973) is used to decompose the overall wage gap. The Blinder-Oaxaca decomposition method is a counterfactual technique that decomposes the mean wage gap into an explained and an unexplained component. The idea is that if the labour market were fair, two groups with the

same labour market productivity would earn the same wage. The technique helps us answer the question: how much would women be paid in mean wages if they had the same productivity characteristics as men? The 'explained gap' is the difference in wages due to observable productivity characteristics between men and women—for example, education and experience. The 'unexplained gap', usually referred to as 'discrimination', is the residual due to differences in the economic return on these characteristics depending on whether an individual is male or female.

If we let lnW_f and lnW be the logged average hourly wages earned by women and men, and X_f and X_m be the average individual and geographical characteristics important for wage determination, then according to Oaxaca (1973) and Blinder (1973), the difference in mean wages can be defined as in equation 1:

$$\overline{lnW_m} - \overline{lnW_f} = \left(\bar{X}_m - \bar{X}_f\right)'\hat{\beta}_f + \bar{X}'_m(\hat{\beta}_m - \hat{\beta}_f) \qquad [1]$$

The first term on the right-hand side of equation 1 represents the composition effect, or as it is commonly known the explained wage gap, attributable to differences in quantities (covariates); the second term gives the wage structure effect or unexplained wage gap, which represents differences in returns on the characteristics (coefficients).

3.2.2 Analysing the gender wage gap across the wage distribution

While Blinder-Oaxaca remains the basic workhorse for decomposing the gender wage gap at the mean, there is a shift towards a distributional analysis of the gender wage gap, as research shows that the wage gap is not uniform over the conditional wage distribution (Albrecht et al. 2003; Arulampalam et al. 2007; Chi and Li 2008; Kee 2006).

The gender wage gap may be wider at the bottom of the wage distribution, reflecting a sticky floor effect, or it may be wider at the top of the distribution, indicating a glass ceiling effect. For example, Albrecht et al. (2003), using 1998 data from Sweden, found that the gender wage gap was wider at the top of the wage distribution, and therefore concluded that the gender wage gap in Sweden displayed a glass ceiling effect. Similarly, Arulampalam et al. (2007), using quantile regressions, analysed the gender wage gap in 11 countries in Europe, and found that in most countries the gender wage gap exhibited a glass ceiling effect, with a sticky floor effect in only two countries. In South Africa, existing studies report that the gender wage gap is wider at the bottom of the wage distribution (Bhorat and Goga 2013; Ntuli 2007). In relation to policy, analysing the gender wage gap across the wage distribution is important: the reasons for a decline in the gender wage gap at the bottom of the wage distribution may be different from the reasons for a decline at the top, meaning that policies targeting the gender wage gap must be adjusted to account for the different experiences of women in different parts of the wage distribution.

To this end, several methods that decompose the gender wage gap over the wage distribution have been suggested in the literature. These include the conditional quantile regression approach by Machado and Mata (2005), the residual imputation method by Juhn et al. (1993), and reweighting approaches such as the DiNardo, Fortin, and Lemieux (DFL) reweighting method (DiNardo et al. 1996). All these methods have been applied widely in the literature, and they each have their advantages and limitations (see Fortin et al. 2011 for a review). In this paper, I utilize the DFL approach to perform the aggregate decomposition over the conditional wage distribution, and the Firpo, Fortin, and Lemieux (FFL) unconditional quantile regression method (Firpo et al. 2009) to perform the detailed decomposition. I discuss each of these methods in detail below.

The DFL methodology is a generalization of the Blinder-Oaxaca decomposition, where the coefficients or returns to characteristics in the Blinder-Oaxaca decomposition are now thought of

as the conditional wage distribution. However, whereas in the Blinder-Oaxaca decomposition one constructs a mean counterfactual, in DFL one analyses the distributional counterfactual. Moreover, DFL is semi-parametric; therefore, no particular functional form of the wage distribution is assumed. From the program evaluation literature, Hirano et al. (2003) show that the reweighting estimator is asymptotically efficient. More recently, in a review of decomposition methods in the labour market, Fortin et al. (2011: 65) recommend this method for aggregate decompositions, as it provides consistent estimates of the wage structure and composition effects for any distributional statistic of interest.

In this section I follow the exposition of the method in DiNardo et al. (1996: 1010). The basic idea of DFL is to construct a counterfactual distribution of wages of one group, in this case women, by replacing the productivity characteristics with those of another group, in this case men, using a reweighting factor. The aim is to answer the question: what would the distribution of wages for men be if they were paid as women? The aggregate composition and wage structure effects over the conditional wage distribution are then computed using the counterfactual wage distribution.

DFL views each individual observation in a given wage distribution as a vector w_i (w_i, x, j) composed of the wage (w_i), a vector of individual attributes (x), and a group subscript (j), where $(j = F, M)$. The observed distribution of wages is expressed as:

$$f(w) = \int g(w|x)h(x)dx \qquad [2]$$

where $g(w|x)$ is the conditional distribution of wages given the characteristics x, and $h(x)$ is the marginal distribution of x (observed productive characteristics). The observed distribution for the female group is thus given by:

$$f(w|j = F) = \int gF(w|x)h(x|j = F)dx \qquad [3]$$

where $gF(w|x) = g(w|x, j = F)$ is the female conditional distribution of wages given the characteristics x, and $h(x)$ is the distribution of x (productive characteristics) for females. The counterfactual distribution, where the question is what the wage distribution of males would be if they were paid like women, is given by:

$$g_F^c\,(w|j = M) = \int gF(w|x)h(x|j = M)dx \qquad [4]$$

where $g_F^c\,(w|j = M)$ is the counterfactual distribution of wages observed for men if they were paid according to the female wage distribution. This is under the strong assumption that the female distribution of wages conditional on characteristics does not depend on the distribution of characteristics for females. The hypothetical density can be written as:

$$g_F^c\,(w|j = M) = \int \Psi_x(x)gF(w|x)h(x|j = F)dx \qquad [5]$$

where $\Psi_x(x)$ is the reweighting function and is defined as:

$$\Psi_x(x) = \frac{Pr(j = M|x)}{Pr(j = M)}\frac{Pr(j = F)}{Pr(j = F|x)} \qquad [6]$$

The function $\Psi_x(x)$ maps the male distribution of characteristics onto the female distribution. It reweights the female density so that observations that are more likely for males than for females are weighted up, and observations that are less likely are weighted down. It can be estimated from

the data by using a standard probability model on data where males and females are pooled together. In this analysis, $\Psi_x(x)$ is estimated using a logit model for the probability of being female relative to the probability of being male.

The remainder of the expression under the integral sign in equation 5 is the observed joint distribution of wages and characteristics for females. DFL suggests estimating $g_F^c\,(w|j = M)$ using standard non-parametric kernel density methods, using the actual female earnings distribution $gF(w|x)h(x|j\ =\ F)$ but reweighting it with $\Psi_x(x)$. However, since the interest of this analysis is simply the counterfactual earnings at each quantile, the gender wage gap at every quantile is calculated using the reweighted actual distribution of wages for females.

Finally, the overall difference in the decomposition is calculated as:

$$\Delta_O^{g(w)} = g_M(w) - g_F(w) = (g_M(w) - g_F^c(w)) - (g_F^c(w) - g_F(w)) \qquad [7]$$

The component $g_M(w) - g_F^c(w)$ of equation 7 is the wage structure effect. In this case, since men and women are made to have the same distribution of covariates, the observed difference in wages must be due to the difference in the wage structure (Fortin et al. 2011). The second component of equation 7, $(g_F^c(w) - g_F(w))$, is referred to as the explained component or composition effect. This is because the assumption is that the difference in wages is solely due to the difference in productivity characteristics between men and women, since the wage structure is identical for men and women. This component gives us the aggregate contribution of all the covariates to the overall gender wage gap at different points on the wage distribution.

A limitation of the DFL approach[14] is that there is no straightforward way to perform a detailed decomposition of the wage structure and composition effects (Fortin et al. 2011: 65). As a solution to this limitation, Firpo et al. (2009) developed the FFL methodology for estimating the effect of individual characteristics on the unconditional wage distribution using recentred influence functions (RIF). For this analysis, the interest is to attribute changes in the wage distribution (w_i) to the effect of individual covariates. FFL shows that one is able to apply the law of iterated expectations (LIE) and the result that $E[RIF(W; q_\tau)]\ =\ q_\tau$ to retrieve the unconditional distribution of the dependent variable. This result then allows one to perform Blinder-Oaxaca-type decompositions of the wage gap, where in this case the dependent variable (w_i) is replaced by the RIF of that quantile. However, unlike the Oaxaca decomposition, which only allows one to decompose the overall wage gap at the mean, the FFL decomposition allows one to decompose the overall gender wage gap across the entire wage distribution.

According to Firpo et al. (2009), for any statistic ν, a functional $\nu(F_W)$ can be defined for the unconditional distribution $F_W(W)$. Using the LIE, they show that the unconditional quantile partial effect (UQPE) is defined as:

$$UQPE = \beta\ \ (\nu) = E[\frac{\partial E[RIF(W,\nu)|X]}{\partial x}] \qquad [8]$$

[14] In the case of the composition effect, an extension of DFL which involves sequentially adding explanatory variables to the probability model used to calculate $\Psi_x(x)$ has been applied in the literature (Altonji et al. 2012; Antecol et al. 2008; Baron and Cobb-Clark 2010; Kassenboehmer and Sinning 2014). The limitation of the sequential method, however, is that the contribution of a particular variable is path-dependent, that is, the results depend on the order in which the variable was introduced (Fortin et al. 2011: 80).

where RIF is the recentred influence function defined as the sum of the original statistic and the influence function, i.e. $RIF(w; F\text{w}) = \nu(F\text{w}) + IF(w, F\text{w})$.

An influence function (IF) is a measure of the influence of an individual observation on a distributional statistic. Further, they show that if q_τ is the τth quantile of the unconditional distribution of W, then IF is defined as:

$$IF(w; q_\tau) = \frac{\tau - 1\{w \leq q_\tau\}}{f_W(q_\tau)} \qquad [9]$$

where $1\{.\}$ is an indicator function, $f\text{w}(.)$ is the density of the marginal distribution of w, and q_τ is the population $\tau - quantile$ of the unconditional distribution of w. The recentred influence function is then calculated by adding back the original statistic to the influence function. Consequently, $RIF\ (w; q_\tau)$ is equal to:

$$RIF(w; q_\tau) = q_\tau + \frac{\tau - 1\{w \leq q_\tau\}}{f_W(q_\tau)} \qquad [10]$$

Equation 10 shows that the RIF for a quantile is a function of an indicator variable $1\{w \leq q_\tau\}$ for whether the wage is smaller than or equal to the quantile q_τ. The first step in estimating the effect of a change in explanatory variables on an unconditional quantile is estimating the conditional $RIF\ (w; q_\tau)$. This is done by computing q_τ and $f\text{w}$ and then regressing the estimated $\widehat{RIF}\ (w; q_\tau)$ on the individual covariates. q_τ is estimated as the sample τ^{th} quantile, whereas $f\text{w}(q_\tau)$ can be estimated non-parametrically using kernel density estimation. Then for each observation, the $RIF\ (w_i; q_\tau)$ is estimated by plugging in the estimates $\hat{q}_\tau$ and $\hat{f}\text{w}(\hat{q}_\tau)$ into equation 10. In this study, the gender wage gap at the 10th, 50th, and 90th percentiles is reported.

For identification, as in the case in the program evaluation literature, the assumptions of ignorability and common support must hold (Fortin et al. 2011: 16). Ignorability is the assumption that after controls for observed explanatory factors, the distribution of the unobserved variables in the wage determination is the same across men and women. The common support assumption requires that there is no covariate where only members from one group have values. That is, $0 < Pr(j = M|x) < 1$. Due to the low common support in the case of domestic work, where the probability of males being domestic workers is low, domestic workers have been combined[15] with elementary occupations.

4 Results

4.1 The gender wage gap at the mean

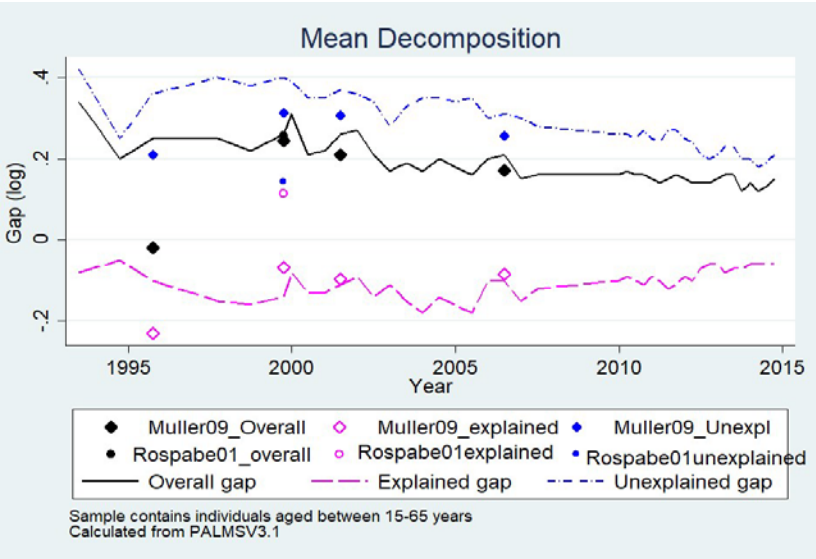
The decomposition is carried out with the user-written program Oaxaca by Jann (2008) in Stata. The program runs the earnings regressions for men and women separately, and computes the means and the elements of the decomposition, along with standard errors that reflect the fact that both the coefficients and the mean values of the covariates are estimated. Reported results are for the decomposition where the female wage structure (female coefficients) is used as the reference

[15] A repeat of the same analysis without combining elementary workers and domestic workers did not change the results qualitatively.

wage structure. However, using either the male wage structure or coefficients from the pooled model does not alter the results qualitatively.

Figure 12 shows the overall (unadjusted) gap, and the explained and unexplained gap from this analysis, and includes some results from the South African literature for comparison. The overall wage gap variable gives the average wage differential between men and women; the explained component is the mean increase in women's wages if they had the same characteristics as men, and the unexplained component is the part of the gap that cannot be explained by differences in characteristics (it is the difference in returns to observable characteristics).

Figure 12: Oaxaca decomposition results: without sector and occupation dummies



Notes: Omitted group: African, single, with primary education, from Western Cape, with less than 10 years of experience. Muller09 represents results from Muller (2009). Rospabe01 represents results from Rospabé (2001).

Overall, the results show that both the total unadjusted gap and the unexplained gap have declined since 1993, although the gaps do not go to zero. The trend in Figure 12 suggests that the decline of the overall gap at the mean is due to the decline of the unexplained gap (wage structure effects). The expectation is that given the implementation of the Employment Equity Act in 1998, which led to the enforcement of affirmative action, the unexplained gap would tend to zero. The fact that the unexplained gap shows a declining trend after 1998 suggests that labour market legislation may have had some effect on the gender wage gap.

However, there seems to be some sort of stagnation in the decline of the total unadjusted gap around 2006, where the gap seems to oscillate around 0.16 log points. The unexplained gap is positive and significant at the five per cent level of significance, whereas the explained gap is negative and significant. The negative and significant explained gap suggests that women in the South African labour market have better human capital characteristics than men. That is, if women in South Africa had similar human capital characteristics to men, the gender wage gap would be much wider.

The gender wage gap can be attributed either to differences in human capital characteristics (positive explained gap) or differences in returns to human capital characteristics (positive unexplained gap). The negative explained gap means that human capital characteristics cannot explain the gender wage gap, and therefore we must look at wage structure effects (unexplained gap). The persistent gap, and the fact that human capital characteristics cannot explain the gap,

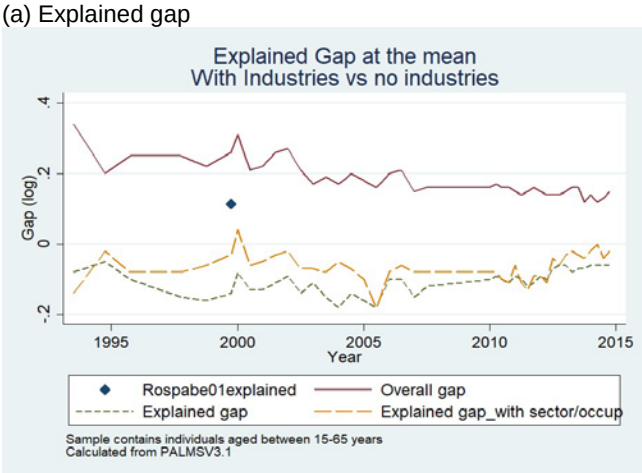
suggests that the gap at the mean may be a manifestation of what is happening in other parts of the wage distribution. It might be the case that different types of labour market legislation affect different parts of the wage distribution differently. Results from this analysis are comparable to some of the results in the literature. For example, except for OHS 1995, the overall gap is similar to findings from Muller (2009) and Rospabé (2001), as shown in Figure 12. The result for 1995 from Muller (2009), however, show that there is value addition in utilizing all available data for any trend analysis. Studies that used OHS 1995 as a baseline year reported an increase in the gender wage gap between 1995 and 2006, which is clearly not the case from Figure 12.

Additionally, contrary to Winter (1999), who reports that in 1994 women earned 87 per cent of men's wages, Figure 12 shows the estimate for the gender wage gap in 1994 to be about 0.2 log points (approximately 22 per cent), which means that according to this analysis, women earned only 78 per cent of men's wages that year. These differences are related to the sample of focus and the inconsistency in the classification of domestic workers in 1994 and 1995. This stresses the point that data quality issues are important.

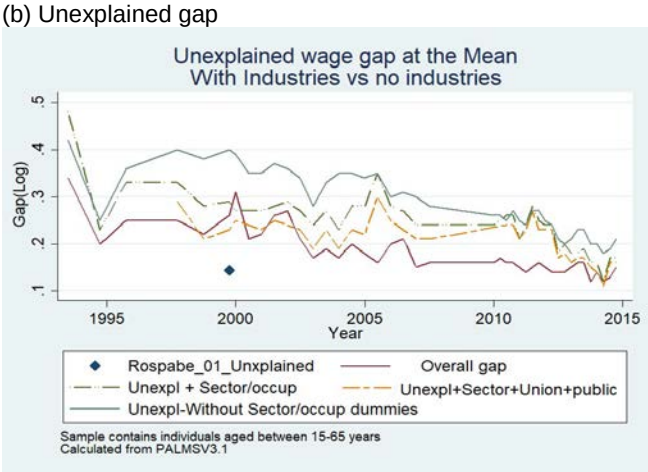
The unexplained and explained gaps from this study and Muller's (2009) seem similar, but the results from Rospabé (2001) are slightly different. This difference could be due to differences in covariates between our studies. In addition to the controls in this study, Rospabé also controlled for tenure and whether someone was employed in the formal or informal sector.

Figure 13: Oaxaca decomposition results with occupation and sector dummies

(a) Explained gap



(b) Unexplained gap



Notes: The *overall gap* series shows the estimate of the unadjusted or raw gender wage gap. *Unexpl-without sector/occup dummies* shows the unexplained wage gap after controlling for race, education, married, potential experience, and province. *Unexpl+sector/occup* shows the unexplained wage gap when industry and occupation dummies are added to the covariates mentioned previously. *Unexpl+sector+occup+union+public* is the unexplained gap when a union dummy and a public sector dummy are added to the *Unexpl+sector/occup* series. For this series, OHS 1994, OHS 1995, and OHS 1996 are excluded, as the public sector variable was not available in these surveys.

However, as shown in Figure 13 Panel b, the closest estimate to Rospabé's is from the model that includes union, public, occupation, and sector dummies. Here the explained gap is 0.03 log points against Rospabé's explained gap of 0.114 log points, and the unexplained gap is 0.22 log points against Rospabé's 0.144 log points.

Figure 13 presents results for the explained and unexplained gaps from different specifications. The explained gap is negative and mostly significant throughout the series. Inclusion of sector and occupation dummies in the decomposition leads to a reduction of the unexplained gender wage gap. However, the adjusted wage gap remains more than the unadjusted wage gap, meaning that selection into industries cannot explain the gender wage gap. The implication here is that if selection into occupations is fuelled by pre-market discrimination, then the inclusion of occupation and industry dummies underestimates the discrimination.

The inclusion of union and public sector dummies does not qualitatively change the results. The unexplained gap is less than the overall gap, but not significantly so, and only for the period between 1998 and 2003. For the rest of the period, the unexplained gap is still greater than the overall gap, although less in magnitude than the unexplained gap without these variables, showing that failure to include these variables gives an upper bound of the unexplained gap.

4.2 The gender wage gap across the wage distribution

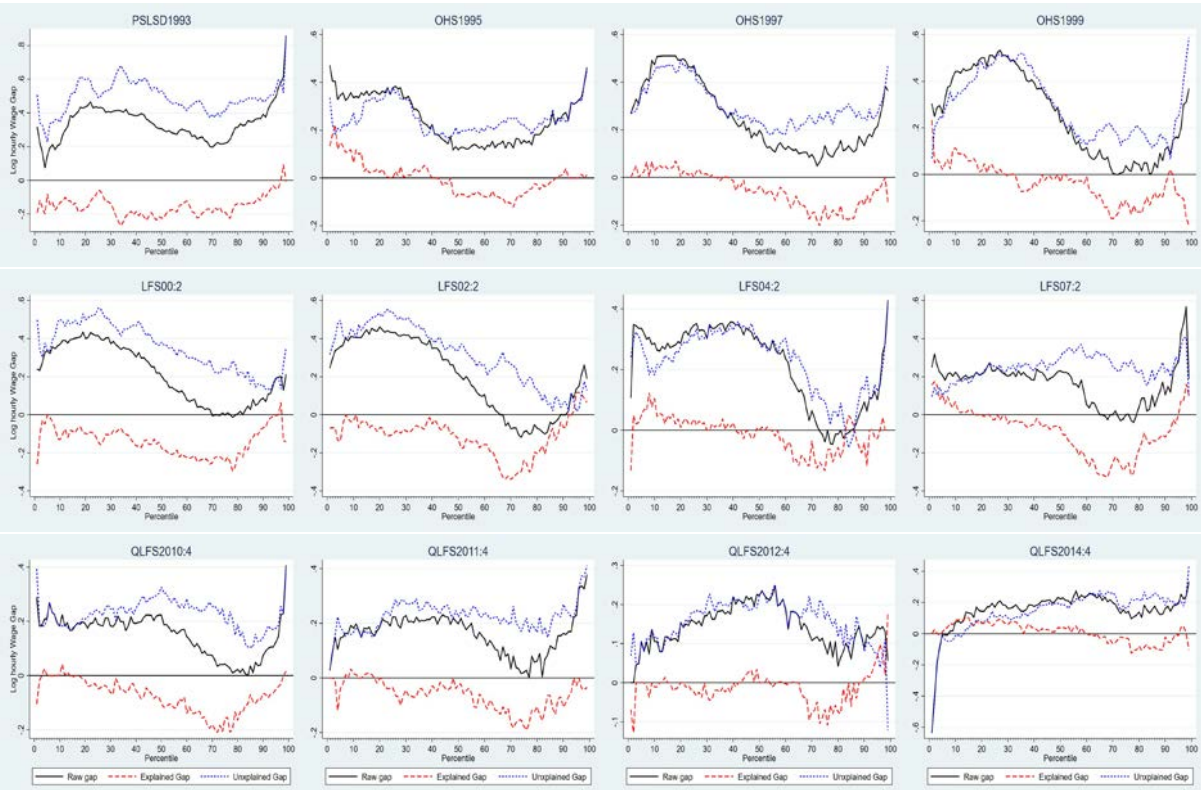
4.2.1 DFL aggregate decomposition

Results from the aggregate decomposition using the DFL methodology are presented in Figure 14. The results show that the effect of characteristics and returns to those characteristics is different at different parts of the wage distribution. For each cross-section, the figure shows that the raw gap rises in the lower part of the wage distribution, peaks between the 20th and 30th percentiles—depicting a sticky floor effect for employed women in South Africa (Bhorat and Goga 2013; Ntuli 2007)—then starts declining. The gap is lowest between the 70th and 90th percentiles, and then it rises again at the very top of the wage distribution. Over time, the peaks in the lower part of the wage distribution seem to flatten as the gender wage gap declines, in contrast with the

very top of the wage distribution, where the gap seems to expand, especially in the period after 2006, giving an indication of the presence of a glass ceiling effect in the South African labour market.

The figure shows clearly that the wage structure effect (unexplained gap) is mostly larger than the overall wage gap, especially towards the middle and upper parts of the wage distribution. Moreover, as one moves up the wage distribution, and over time, this effect becomes bigger as a percentage of the total gap. This suggests that even though the wage gap is wider at the bottom, women at the top of the distribution face more discrimination. Ntuli (2007), looking at the African subsample and using quantile regressions, arrived at the same conclusion with data from OHS 1999 and LFS 2004. This result follows from the idea that at the top of the wage distribution human capital characteristics such as higher education are more important. As I shall discuss under the detailed decomposition, in the 90th percentile men receive better rewards for education, despite the fact that women have more of it; hence the positive and expanding unexplained gap at the top. The explained gap is small and mostly negative, and it becomes more negative as one moves up the distribution and over time. The explained variables seem to have some importance at the bottom of the wage distribution, where there is a small but positive explained gap, for example, in 1999 and 2004.

Figure 14: DFL decomposition: aggregate gender wage gap across quantiles by survey



The last sample in Figure 14 (QLFS2014:4), however, looks anomalous, because it shows a very negative wage gap in favour of women at the very bottom, which does not seem plausible. The anomaly is most likely due to data quality issues regarding the earnings variable in the most recent QLFS, and requires further investigation. In a recent paper investigating public sector wages and employment, Kerr and Wittenberg (2016) report that the public sector premium seems to be anomalous after QLFS 2012. They attribute this anomaly to imputations done on the QLFS earnings variable by Statistics South Africa. Finn and Leibbrandt (2018), looking at the evolution

of earnings inequality in South Africa, also report that earnings inequality shows a steep increase between 2012 and 2014, which is puzzling.

4.2.2 RIF aggregate decomposition

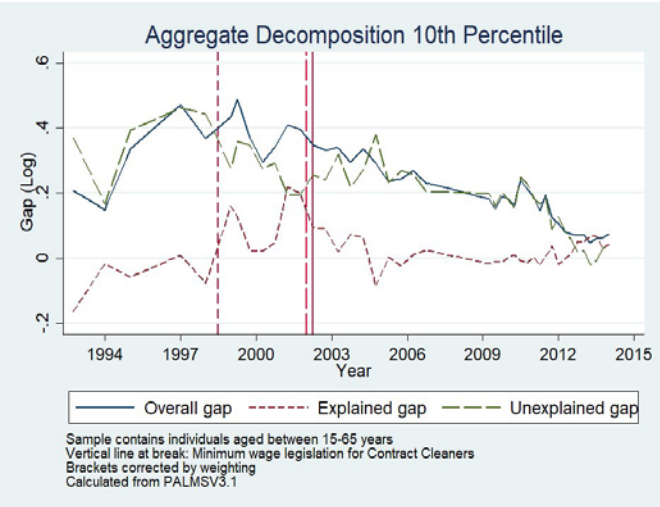
Results from the aggregate decomposition using the RIF[16] methodology are presented in Figures 15, 16, and 17. The figures plot the evolution of the gender wage gap at the 10th, 50th, and 90th percentiles. Figure 15 shows that the overall (total unadjusted) gap at the 10th percentile widened at the beginning of the series, from 0.21 log points in 1993 to 0.49 log points in 2000, and then declined to about 0.07 log points in 2014. The unexplained gap is positive throughout the series; however, it has declined over time. The explained gap is small as a percentage of the overall gap, and is positive after OHS 1997. The positive explained gap is due to women being concentrated in low-paying occupations and industries, such as domestic work and elementary occupations. These industries are also less likely to be unionized, contributing to the positive explained gap. The explained gap, however, declined to almost zero after 2006, which is an indication that differences in human capital characteristics between men and women at the bottom of the wage distribution became similar over time.

The widening of the overall gap in the early 1990s was due to a fall in women's wages during this period, possibly due to an increase in female employment in low-paying industries. The trend of the unexplained gap suggests that the decline of the gender wage gap at the 10th percentile is mostly due to wage structure effects. More so, the timing of the decline of the gap coincides with the implementation of sectoral minimum wage laws for low-earning sectors, starting with minimum wage legislation for contract cleaners in 1999, followed by sectoral minimum wages for domestic workers in November 2002 and agricultural workers in March 2003. Studies (Bhorat et al. 2013; Hertz 2005) show that there was a substantial increase in wages in the domestic service and agricultural sectors as a result of the minimum wage legislation.

The worker at the 10th percentile is more likely to be female, unskilled, in an elementary or domestic work occupation, and in the agricultural or retail industries. Therefore, increasing wages in these sectors is bound to improve the position of women. The decline in the gender wage gap exhibited in Figure 12 can be linked to this increase in wages at the bottom of the distribution. It is important to note, however, that since minimum wage legislation did not specifically target women, the trend of the wage gap at the 10th percentile suggests that an unintended outcome of the minimum wage legislation—and by extension of Basic Conditions of Employment Act 75 of 1997, which allows the Minister of Labour to determine minimum wages for vulnerable sectors—has been the narrowing of the wage gap at the bottom of the wage distribution.

[16] The analysis was carried out using Stata codes from Fortin et al. (2011).

Figure 15: RIF decomposition at the 10th percentile

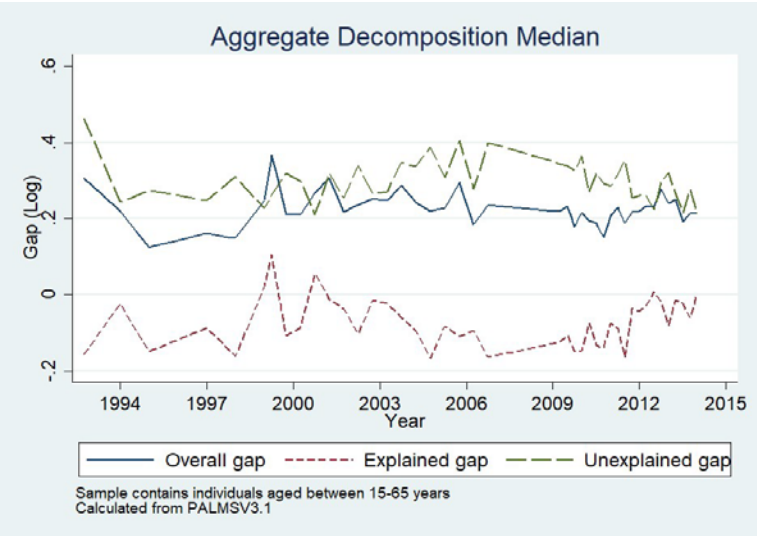


Notes: Omitted group: African, single elementary worker, with primary education, from Western Cape, in the manufacturing sector, with less than 10 years of experience.

The trend at the median differs from that seen at the 10th percentile in that the wage gap does not seem to have changed much over time. However, as in the case of the mean and the 10th percentile, the overall gap seems to mimic the trend of the unexplained gap. At the median, however, the unexplained gap does not seem to decline over time, meaning that the discrimination component is not declining. The expectation is that at the very least, anti-discrimination laws should have been more binding at the median. This is because labour market policies—such as Labour Relations Act 66 of 1995, Basic Conditions of Employment Act 75 of 1997, Employment Equity Act 55 of 1998, and Black Economic Empowerment Act 53 of 2003—specifically aimed to eliminate inequalities in the labour market, especially in formal employment in the public and private sectors, where we are most likely to locate the median worker. The Employment Equity Act required employers to enforce affirmative action, while the Labour Relations Act secured the right of workers to unionize, and the Skills Development Act compelled employers to extend training to previously disadvantaged groups, including women.

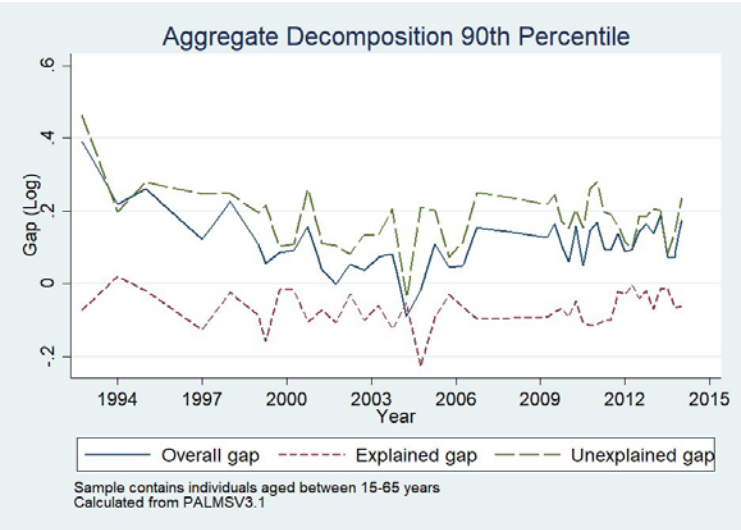
The puzzle here is that the unexplained gap at the median is persistent, suggesting that anti-discrimination laws have been less successful in reducing discrimination in the labour market. The median gap was at 0.301 log points in 1993; by 1999 it was at 0.24 log points, and it has not moved much since, recording a figure of 0.21 log points in 2014. What is visible from these trends and the descriptive analysis, however, is that the post-apartheid government has performed better at improving human capital skills for women. This can be inferred from the negative explained gap, which suggests that if women's skills were at the same level as those of men, the gender wage gap in South Africa would be much wider.

Figure 16: RIF decomposition at the median



Notes: Omitted group: African, single elementary worker, with primary education, from Western Cape, in the manufacturing sector, with less than 10 years of experience.

Figure 17: RIF decomposition at the 90th percentile



Notes: Omitted group: African, single elementary worker, with primary education, from Western Cape, in the manufacturing sector, with less than 10 years of experience.

Compared with the median, the raw gap at the 90th percentile shows a lot of fluctuations, with a modest decline overall. The gap was at 0.41 log points in 1993, dropped to 0.12 log points in 1997, was at 0.15 log points in 2007, and was at 0.18 log points in 2014. The drop in the gap suggests that highly skilled women benefited more from affirmative action in terms of accessing high-paying occupations. However, the high unexplained gap—which is always greater than the overall gap, and which seems to expand after 2005—points to greater discrimination at the top of the distribution. The high, persistent unexplained gap and the negative explained gap point to the conclusion reached above: anti-discrimination legislation has been less successful in reducing gender discrimination in the labour market. It also points towards the existence of a glass ceiling phenomenon for women in the South African labour market. It is possible that the trend exhibited at the mean of a persistent wage gap is a result of the persistent gender wage gap in the top half of the distribution.

4.2.3 Detailed decomposition: RIF and Blinder-Oaxaca decomposition

In addition to the aggregate decomposition, a detailed decomposition that shows the contribution of each explanatory variable to the explained and unexplained gap was performed. A positive contribution of a variable to an explained gap means that men have an advantage in that variable, that is, the $(\bar{X}_m - \bar{X}_f)'\hat{\beta}_f$ term is positive. A negative contribution means that women have an advantage in that variable, that is, $(\bar{X}_m - \bar{X}_f)'\hat{\beta}_f$ is negative, and therefore that variable contributes to narrowing the gender wage gap. A positive contribution of a variable to an unexplained gap means that men have an advantage in the rewards to that characteristic, meaning that $\bar{X}_m'(\hat{\beta}_m - \hat{\beta}_f)$ is positive, and therefore the variable contributes to the widening of the unexplained gap; a negative contribution means that women have better rewards for that characteristic, and therefore the characteristic contributes to narrowing the unexplained gap.

Detailed decomposition results from LFS 2007:2 are presented in Table 1. The choice of LFS 2007:2 is arbitrary, and the discussion extends to the complete results (see Tables A2, A3, A4, and A5 in the Appendix). Across the entire wage distribution and in all surveys, the explained gap is small and mostly negative, except at the 10th percentile. Contributing positively to the explained gap across the wage distribution are industry of employment, union, and marital status. Industry of employment is the most important characteristic in explaining the expansion of the wage gap across the wage distribution. Results from 2007 show that the contribution of industry to the gender wage gap declines monotonically across the wage distribution, expanding the gap by 133.26 per cent at the 10th percentile, by 52.56 per cent at the median, and by 19.71 per cent at the 90th percentile. The contribution of the industry variable to the explained gap at the mean (from the Oaxaca decomposition) is 130.72 per cent. The result is not surprising, because at the bottom of the wage distribution women are concentrated in the low-skill and low-pay industries of domestic services, agriculture, and retail trade. Although this effect is significant, results from the other waves show that it declines over time.

Union membership was found to be important across the wage distribution, increasing the gender wage gap by 45.73 per cent at the 10th percentile and by 16.81 per cent at the 90th percentile in 2007. This result is not surprising, as female employees at the 10th percentile are less likely to be unionized due to the nature of the occupations they are employed in—for example, domestic work, which happens in the private homes of employers. Marital status is important in contributing to the explained gap at the 90th percentile, expanding the gap by 32.04 per cent; but it expands the gap by only 6.74 per cent at the 10th percentile. From the Blinder-Oaxaca decomposition at the mean, marital status widens the mean wage gap by 18.43 per cent. This result may stem from the fact that on average there are more men than women who report being married in the sample.

Table 1: Detailed decomposition results

Variable	10th		Median		90th		Mean	
	LFS07:2		LFS07:2		LFS07:2		LFS07:2	
Logw_Male	1.09(0.0234)		2.25(0.0348)		3.73(0.0692)		2.31(0.0349)	
Logw_Female	0.86(0.0277)		2.03(0.0456)		3.58(0.0495)		2.16(0.0351)	
Overall_gap	0.23(0.0362)		0.23(0.0574)		0.15(0.0851)		0.16(0.0495)	
Explained	0.0457(0.0319)		-0.13(0.0628)		-0.0827(0.0534)		-0.0586(0.0455)	
	[19.53]		[-56.58]		[-56.26]		[-37.56]	
Unexplained	0.19(0.0335)		0.36(0.0473)		0.23(0.0717)		0.21(0.0285)	
	[80.34]		[156.58]		[156.46]		[137.18]	
Covariates	Explained	Un-explained	Explained	Un-explained	Explained	Un-explained	Explained	Un-explained
Experience	0.00232	-0.121	-0.00340	0.0165	0.00465	-0.118	-0.00173	-0.0158
	(0.00516)	(0.0809)	(0.00430)	(0.0796)	(0.00605)	(0.136)	(0.00418)	(0.0667)
	[5.08]	[-64.36]	[2.64]	[4.62]	[-5.62]	[-51.30]	[2.95]	[-7.38]
Married	0.00308	0.0518	0.02	0.0306	0.03	0.0321	0.01	0.07
	(0.00594)	(0.0359)	(0.00760)	(0.0416)	(0.0117)	(0.0643)	(0.00555)	(0.0296)
	[6.74]	[27.55]	[-12.02]	[8.57]	[-32.04]	[13.96]	[-18.43]	[30.70]
Province	0.00140	-0.11	-0.00579	0.28	-0.00305	0.0290	-0.00262	0.0359
	(0.0101)	(0.0604)	(0.00707)	(0.101)	(0.00551)	(0.198)	(0.00721)	(0.0669)
	[3.06]	[-57.98]	[4.49]	[77.03]	[3.69]	[12.61]	[4.47]	[16.78]
Race	-0.00344	-0.00126	-0.0214	-0.00378	-0.00854	0.13	-0.0149	0.0140
	(0.00328)	(0.0126)	(0.0188)	(0.0208)	(0.00957)	(0.0501)	(0.0123)	(0.0159)
	[-7.53]	[-0.67]	[16.59]	[-1.06]	[10.33]	[57.83]	[25.43]	[6.54]
Education	-0.04	-0.16	-0.06	0.00132	-0.06	0.115	-0.06	0.0308
	(0.0116)	(0.0884)	(0.0165)	(0.0740)	(0.0222)	(0.0756)	(0.0159)	(0.0447)
	[-91.68]	[-86.70]	[46.12]	[0.37]	[76.30]	[50.00]	[103.07]	[14.39]
Occupation	0.0131	0.0462	-0.13	-0.0361	-0.06	0.111	-0.07	0.0198
	(0.0190)	(0.0699)	(0.0371)	(0.0694)	(0.0309)	(0.0700)	(0.0195)	(0.0385)
	[28.67]	[24.57]	[100.00]	[-10.11]	[75.09]	[48.26]	[116.21]	[9.25]
Industry	0.06	-0.0560	0.07	-0.00265	0.0163	0.0639	0.08	-0.0840
	(0.0221)	(0.0632)	(0.0239)	(0.0947)	(0.0415)	(0.151)	(0.0179)	(0.0596)
	[133.26]	[-29.79]	[-52.56]	[-0.74]	[-19.71]	[27.78]	[-130.72]	[-39.25]

Union	0.02	-0.0283	0.03	-0.0452	0.01	-0.00655	0.02	-0.0269
	(0.00622)	(0.0204)	(0.0107)	(0.0323)	(0.00811)	(0.0546)	(0.00615)	(0.0182)
	[45.73]	[-15.05]	[-27.05]	[-12.66]	[-16.81]	[-2.85]	[-35.15]	[-12.57]
Public sector	-0.01	-0.00552	-0.03	0.0155	-0.00731	0.0157	-0.02	-0.0133
	(0.00432)	(0.0161)	(0.0101)	(0.0187)	(0.00725)	(0.0398)	(0.00676)	(0.0129)
	[-23.19]	[-2.94]	[22.02]	[4.34]	[8.84]	[6.83]	[32.25]	[-6.21]
Constant		0.57		0.106		-0.145		0.188
		(0.150)		(0.182)		(0.313)		(0.122)
		[305.32]		[29.69]		[-63.04]		[87.85]
Observations	15,388	15,388	15,388	15,388	15,388	15,388	15,388	15,388

Notes: Standard errors in parentheses, and percentages in squared brackets. Omitted group: African, single, from Western Cape, non-unionized, with primary education or lower, in an elementary occupation, in the manufacturing sector, in the public sector, with less than 10 years of experience.

The most important factors contributing negatively to the explained gap are public sector, occupation, and education. The most important factor in narrowing the explained gap across the entire wage distribution is education. The contribution of education is stable across the wage distribution, narrowing the gap by 91.68 per cent at the 10th percentile and by 76.30 per cent at the 90th percentile in 2007. At the mean this contribution is 103.07 per cent. The result makes sense, because from the summary statistics, on average women have more years of schooling, and in particular there are more women than men with a tertiary education in South Africa, which contributes the highest negative effect. If one looks at the entire series, the negative effect of education on the explained gap declines over time at the 10th percentile, while it is stable at the median and increases over time at the 90th percentile. This ties to the wage inequality literature, which reports declining returns to primary education and a continued increase in returns to tertiary education (Branson and Leibbrandt 2013; Hosking 2016).

The contribution of occupation is most important at the median, reducing the explained gap by 100 per cent in 2007. At the mean, occupation contributes negatively to the explained gap by 116.21 per cent. This effect is mostly contributed by a high negative effect from clerical, professional, technical, and associate professionals. Employed women dominate clerical, technical, and associate professional occupations, with women constituting over 60 per cent of clerks. The negative effect is tempered, however, by a strong positive effect from occupations where women are under-represented, such as legislators, managers, machine operators, and craftspeople. This suggests that the occupational barring referred to in Hinks (2002) and Rospabé (2001) remains strong in the post-apartheid labour market. The public sector contributed to narrowing the explained gap by 22 per cent at the median, by 23 per cent at the 10th percentile, and by only eight per cent at the 90th percentile. Descriptive statistics revealed that in the South African labour market there are more women than men employed in the public sector. Therefore, the fact that the public sector contributes negatively to the explained gap is not surprising.

If we now turn to the unexplained gap, contributing positively to the unexplained gap across the entire wage distribution are marital status and occupation. A positive contribution of the marital status variable to the unexplained gap means that across the entire wage distribution, the returns to marriage are higher for men than for women. The difference in returns to marriage, however, are greatest at the 10th percentile, increasing the unexplained gap by 27.55 per cent in 2007. From

the Blinder-Oaxaca decomposition, at the mean, marital status expands the unexplained gap by 30.7 per cent. This suggests that there is some preferential treatment in terms of pay[17] for men. It could be the case that married men are viewed as more committed and as likely to invest more time in the labour market, whereas women are viewed as likely to invest less time because their loyalty is supposedly split between the labour market and the family. This suggests that South African society is still patriarchal in nature, with women viewed as the main caregivers and men as the main breadwinners.

Occupation contributes positively to the unexplained gap at the 10th and 90th percentiles, but it contributes negatively to the unexplained gap at the median. The negative contribution of occupation to the unexplained gap is due to women receiving better rewards in most occupations, even those seemingly dominated by men, such as management. However, the reader is urged to apply caution in the interpretation of this result, as it is not invariant to the choice of omitted category.[18] For the same reason, caution is also exercised in interpreting the contribution of education and industry of employment to the unexplained gap.

Education and industry of employment contribute negatively to the unexplained gap. Women have on average more educational qualifications than men, and they receive better rewards for their educational characteristics; this has helped reduce the unexplained gap. This is only true, however, for the 10th percentile and median. Education contributes positively to the unexplained gap at the 90th percentile. This is because even though women have better educational qualifications, men receive higher returns to their education at the top of the distribution, causing an expansion of the unexplained gap. Across the wage distribution, except at the 90th percentile, the contribution of industry to the unexplained component is negative but not significant at the five per cent level. This result might be because women who are in male-dominated industries such as finance and mining receive better rewards than men. The problem is that they are too few for the effect to be significant.

Overall, results in this section show that industry of employment and type of occupation remain important for the gender wage gap, a finding consistent with international literature (Blau and Kahn 2016). The over-representation of women in precarious occupations at the bottom of the wage distribution, and their under-representation at the top, contributes to the persistent wage gap. Education continues to be important in reducing the gap, especially because women receive higher returns to their education. However, the result that men receive higher returns to their education at the 90th percentile could be a selection effect. The industry one selects into depends on one's education level, and therefore, as discussed in section 3, the inclusion of industry and occupation dummies in the regression could bias the role of education downwards.

4.3 Discussion

This paper sought to examine the evolution of the gender wage gap in the South African labour market. The inclusion of the 1993 Project for Statistics on Living Standards and Development provided an alternative baseline period, as the survey was carried out just before the installation of a new democratic government. OHS 1994 and OHS 1995 have been used before as baseline waves, but data quality issues regarding the sampling design and inconsistencies in the measurement of

[17] This result could also be a selection effect stemming from the fact that in South Africa, in the context of low marriage rates, higher-earning men are more likely to marry (see Casale and Posel 2010).

[18] In this case the omitted category is single, African, from Western Cape, not unionized, with primary school education or lower, in an elementary occupation, in the manufacturing sector, in the public sector, with less than 10 years of experience.

domestic work guided the use of an alternative baseline, if only for comparison purposes. Additionally, using a longer period helped to illuminate the breaks in the data and explain some peculiar trends of the gender wage gap raised in the literature.

Unsurprisingly, results show that the choice of baseline can determine the substantive conclusions drawn. For example, findings that the gender wage gap had not declined in the period 1995–2004 (Grün 2004; Ntuli 2007) were due to the use of OHS 1995 as the baseline year. Contrary to previous results in the literature, this analysis finds that there was a decline of the gender wage gap at the mean from about 0.34 log points (about 40 per cent) in 1993 to 0.15 log points (about 16 per cent) in 2014. It is important to note, however, that the gap declined until 2007 and was stagnant thereafter, oscillating at 16 per cent.

This study further finds several other substantive results not previously evident in the literature. Examination of the long-run trend of the gender wage gap across the wage distribution shows that there has been a substantial decline in the gender wage gap at the 10th percentile. On the other hand, there has not been much change in the gender wage gap at the median, a trend that is puzzling. At the 90th percentile, there was a decline in the gender gap between 1993 and 2005, but this trend has reversed, exhibiting a continually increasing unexplained gap in recent years. The results from this analysis are robust to different specifications, reference wage structures, and decomposition methods. What is also very clear from this study is that the trend of the overall gender wage gap is driven by the wage structure effects.

Like previous studies in the literature (Bhorat and Goga 2013; Ntuli 2007), this study finds that the wage gap in the South African labour market exhibits a sticky floor effect, with the gender wage gap being highest at the 10th percentile. However, this study adds to the evidence base by showing that since 2007, South Africa has also exhibited a glass ceiling effect, due to the large decline of the 10th percentile gap over time and the expansion of the gender wage gap at the top.

The discussion that follows tries to unpack these changes in the gender wage gap in the context of labour market changes and wage structure explanations for the narrowing of the gender wage gap.

4.3.1 Labour force participation and employment

Trends in labour force participation and employment show that women have made great strides in labour force participation. The labour force participation rate gender gap in South Africa was about 12 per cent as of 2014, down from 21 per cent in 1994; the employment rate gap was about 11 per cent as of 2014, down from 21 per cent in 1994. Proponents of human capital theory credit the decline of the gender wage gap over time in different countries to the continued labour force participation of women (Polachek 2014). This is because continued labour force participation means continued accumulation of labour market experience, which is an important component of wage growth (Mincer 1974).

Petrongolo and Olivetti (2008) find an inverse relationship between gender employment gaps and the gender wage gap across the United States and countries in Europe. That is, countries that have higher employment gaps between men and women have lower gender wage gaps, because of the positive self-selection of women into employment. If employed women have above-average earnings potential, then having only a few of them in employment relative to men increases their average wage, thus reducing the gender wage gap. If more women with average or below-average earnings potential join the labour market, then this will give an impression of a widening gap over time.

South Africa differs from developed economies in that labour force participation is not synonymous with employment. From the trends of unemployment over time, women are more likely than men to be unemployed. It is documented that with the increase in labour force participation there also came an increase in unemployment and an increase of women in precarious occupations (Casale 2004). The effect of increased participation on the gender wage gap in South Africa is therefore not straightforward.

However, descriptive statistics show that employed women have on average more education than men, and are more likely to have a tertiary education. It is possible that South African women in employment are a select group with above-average human capital characteristics. If that is the case, then the gender wage gap might be higher than is reported in this analysis.

4.3.2 Returns to human capital characteristics

Descriptive analysis of the data showed that employed women in South Africa have on average an advantage in years of schooling. Additionally, women are less likely to drop out of secondary school, are more likely to have some tertiary education, and are just as likely or more likely to have a university degree. What these trends tell us is that the post-apartheid government has been successful in improving the human capital characteristics of women. This has led to an increasing number of women in high-skilled occupations, such as professional, technical, associate professional, and clerical occupations. Human capital theory stipulates that regardless of gender, the group with better human capital characteristics will have a wage advantage. Ordinary least squares regressions by gender show that, especially for matric and above, the returns to education are higher for women (see Table A1 in the Appendix). This has contributed to the decline of the unexplained gap at the mean over time. However, the distributional analysis revealed that at the 90th percentile, women receive lower rewards than men for their educational qualifications. This has led to an increasingly negative explained gap and an expanding unexplained gap (which is usually associated with discrimination).

4.3.3 Collective bargaining and minimum wage legislation

There is an international literature that links minimum wage legislation to the narrowing of the gender wage gap. Kahn (2015) finds that since men and women are disproportionately located at different parts of the wage distribution, setting minimum wages contributes to narrowing the gender wage gap at the bottom of the wage distribution by raising female wages disproportionately to those of men. Similarly, Majchrowska and Strawinski (2017) find that the increase in the minimum wage in Poland was associated with the decline in the gender wage gap among younger workers. They conclude that minimum wage policy can be used to narrow the gender wage gap at the bottom of the wage distribution, but it may have a negative effect on employment. In South Africa, the effect of the minimum wage legislation for low-income earners, including contract cleaners, domestic workers, and agricultural workers, has been to raise the earnings of these groups (which are mostly comprised of women); according to the trend of the gender wage gap at the 10th percentile, this may have led to the narrowing of the gender wage gap at the bottom end of the wage distribution.

4.3.4 Equal pay legislation, employment equity legislation, and affirmative action

Equal pay legislation is about men and women being rewarded equally for work of equal value. It targets gender discrimination within and across similar occupations. Although studies analysing the gender wage gap in these countries report a decline over time, no country has reported a zero gap. Polachek (2014) reports that even though equal pay legislation was introduced in the United States in 1964, the gender wage gap persists at about 22 per cent. Similarly, for both the United

Kingdom and France, where equal pay legislation was enacted in 1970 and 1972 respectively, the gender wage gap remains at about 21 per cent and 17 per cent respectively (Polachek 2014). Fortin et al. (2017) explain that due to occupational segregation by gender in the labour market, equal pay legislation, which requires equal pay for individuals within the same sector or occupation, may be less effective in narrowing the gender wage gap. The persistent gender gap in top occupations and some male-dominated occupations must be addressed.

Equal employment legislation, on the other hand, is meant to promote minority representation and diversity at all levels of an organization. This includes affirmative action for groups previously marginalized due to their gender, race, ethnicity, religion, sexual orientation, or disability. Several countries have enacted equal employment legislation. Canada enacted Canadian Employment Equity in 1986 (Fortin et al. 2017), Japan enacted the Equal Employment Opportunity Law in 1986 (Abe 2010), and Sweden enacted the Discrimination Act in 2008 (Fortin et al. 2017). The challenge researchers face in analysing the impact of these laws is a lack of data. However, Abe (2010), using a cohort analysis, concludes that the Equal Employment Opportunity Law was successful in increasing employment for women, although there was no effect on the gender wage gap.

Fortin et al. (2017), analysing the relationship between top-income inequality and the gender wage gap, conclude that since employment equity addresses the issue of women's under-representation at the top of the wage distribution, it is likely to be successful in narrowing the gender wage gap. However, it faces a challenge of implementation, as it is the duty of the employers to devise ways of creating diversity. South Africa enacted the Employment Equity Act in 1998, and it led to the enforcement of affirmative action. Employment trends over time show that there has been an increase of women in occupations where they were formerly under-represented. For example, the proportion of female managers almost doubled in the period between 1993 and 2014. Also, the decline of the unexplained gap at the 10th percentile and the mean is an indication that affirmative action may have had an impact on the gender wage gap. The stagnation of the median wage gap, however, raises the question of whether affirmative action has had any impact.

The results show that occupation of employment contributes positively to the unexplained gap at the 90th percentile. This means that there is a type of ceiling for highly qualified women, and it adds to the findings of Rospabé (2001) and Hinks (2002) regarding occupational barring, which may be the reason for the persistent gender wage gap at the top of the distribution. Although over time there has been an increase of women in management, women are still under-represented at this level, and there are occupations that are still male-dominated, such as crafts and machine operation. Industry of employment is an important factor in reducing the unexplained gap, although this result is not significant. This may be because there are very few women in the most lucrative industries, such as mining. There is a need to understand the barriers to women joining these occupations, and it may require an interrogation of social norms that may not have changed over time.

4.3.5 Overall wage inequality

In addition to differences in human capital characteristics, the overall wage inequality in a country can affect the level of the gender wage gap (Blau and Kahn 1996, 1997, 2000). A pairwise comparison of 10 industrialized countries with the United States led Blau and Kahn (1996) to conclude that the higher gender wage gap in the United States is due to the higher overall wage inequality in that country. This follows from the fact that if the underlying factors behind the increase in wage inequality favour men more than women, then even if human capital characteristics or the level of discrimination stay the same, the gender wage gap will increase—a phenomenon they term 'women swimming upstream'.

South Africa's level of inequality is one of the highest in the world (Sulla and Zikhali 2018). This level of inequality has been found to be persistent, and may be increasing[19] over time (Leibbrandt et al. 2010b; Sulla and Zikhali 2018). The stagnation of the median wage gap could be a result of the high overall wage inequality in South Africa. Skill-biased technological change has been cited as one of the reasons for the increasing overall wage inequality (Hosking 2016). The continued increase in the returns to tertiary education, and the declining returns to incomplete secondary school education in South Africa (Branson and Leibbrandt 2013), implies that workers at the median who have only about 10 years of education are the losers from the technological shift.

4.4 Limitations of this study

For the analysis of the gender wage gap, the subsample of focus only includes individuals who reported positive earnings, and therefore it is likely to be non-random. Moreover, since in South Africa the rate of unemployment is high, this sample may not be a representative sample of the working-age population. Traditionally, controlling for selection bias involves estimating a probit model for labour force participation, and then including the estimates (the inverse Mills ratio, commonly referred to as lambda) from the probit model in the wage regression as covariates. This is the well-known Heckman two-stage selection model (Heckman 1979). The procedure, however, requires the presence of valid instruments that are correlated with labour force participation and with employment but not correlated with earnings. These instruments are referred to as exclusion restrictions, and are in practice hard to find, as in the case of this study. According to Puhani (2000), the lack of appropriate exclusion restrictions may generate collinearity issues, resulting in unreliable coefficients and inflated standard errors. The procedure is also valid only if the regression errors are normally distributed. Studies that have controlled for selectivity bias report that the coefficients for lambda are mostly not significant (Hinks 2002; Ntuli 2007; Shepherd 2008). In light of this, this study did not control for selectivity, but it acknowledges that the results are likely to be biased, and the direction of the bias cannot be known a priori.

Another limitation of this study is that it may suffer from omitted variable bias. O'Neill and O'Neill (2006) find that differences in schooling can no longer explain the differences in pay between men and women in the United States, and that factors that affect choices made by men and women regarding the time and energy they devote to their careers are more useful when trying to explain the gender wage gap. This finding is supported by Fortin (2008), who found that non-cognitive factors—such as the importance men and women place on money and work, and the importance of people or family—affect the gender wage gap in a small but non-trivial way among young adults in the United States. This is because such factors affect the choices men and women make regarding the time, effort, and responsibility they allocate between labour market work and home. The fact that the explained gap is negative might simply mean that we are not looking at important variables that affect wages. Future research should therefore focus on factors that determine time and effort allocation between home and labour market.

5 Conclusion

Women have made substantive progress in the post-apartheid labour market. The first decade after apartheid saw significant changes in employment and labour force participation. These changes, combined with the closure of the gender gap in education, imply the narrowing of the

[19] In a recent World Bank report on inequality in South Africa, Sulla and Zikhali (2018: xv, Figure 1) report that the Gini coefficient (a common measure of inequality) rose from 0.61 in 1996 to 0.63 in 2015, peaking at 0.64 in 2009.

gender wage gap. However, results show that the median gender wage gap—which is more important than the mean wage gap, due to the high inequality in South Africa—was stagnant over the period 1993–2015. This is interesting, because with the introduction of anti-discrimination legislation and affirmative action, one would expect the gender wage gap to have declined over time.

The stagnation of the gender wage gap at the median ties into other work on wages and wage inequality in South Africa. Wittenberg (2016a) finds that while the bottom part of the wage distribution has moved closer to the middle, and the top part of the wage distribution has moved away from the middle, earnings at the median have been stagnant. He tries to locate the median worker in the economy, and concludes that this worker is most likely African, male, with slightly more than 10 years of education, and in their late 30s. In terms of occupation and industry, the median worker is most likely to be in the trade, manufacturing, services, or finance industries, doing elementary, service, craft, or operational work. Analysis of the trends in industry and occupation by gender showed that even though women have begun to join them, these occupations and industries are still male-dominated. The gender wage gap can shift either due to changes in the labour market characteristics of individuals, or due to a shift in the returns to those characteristics. Therefore, the fact that wages have stagnated, and that occupation and industry composition has not changed much, can partially explain the stagnation of the gender wage gap at the median.

Related to this is the fact that from the demand side, industry seems to be shifting towards employees with tertiary education. The returns to having less than 12 years of education have declined over time for both men and women. While returns to completing 12 years of education (matric) are higher than not completing 12 years of education, they have also declined over time. Returns to tertiary education, on the other hand, have increased. With minimum wage legislation helping boost wages in the bottom part of the distribution, and industry's demand for tertiary-educated individuals pushing up wages at the top end of the distribution, it seems that the median worker has mainly been forgotten in the post-apartheid labour market, with similar implications for the median gender wage gap.

In sum, the size of and reasons for the gender wage gap are heterogeneous across the wage distribution in the South African labour market. The experience of women at the top end of the wage distribution is different from that of women at the bottom or at the median. The policy implication here is that efforts towards narrowing the gender wage gap will need to be specific to the challenges faced by women in different parts of the wage distribution. For example, while raising the minimum wage at the bottom of the wage distribution might narrow the gender wage gap in this part of the wage distribution, efforts to narrow the gender wage gap at the top end of the wage distribution should focus on increasing the number of women in top-paying occupations. This will require, among other things, alleviating the disproportionate burden of care work shouldered by women, to enable them to commit more time to the labour market (for example, by using childcare and providing crèche facilities).

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Appendix: Descriptive statistics by gender—female versus male

Figure A1: Proportion married by gender

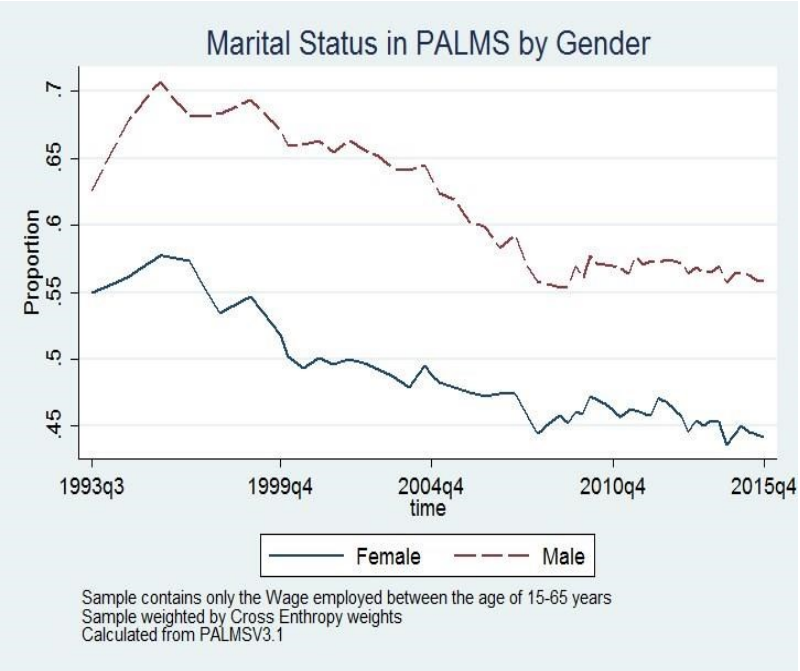

Figure A2: Average age by gender

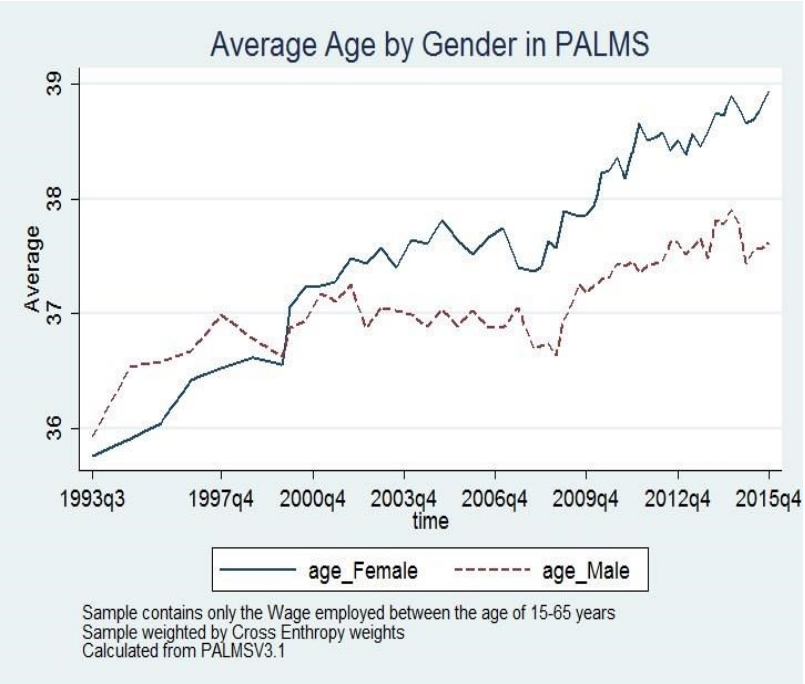

Figure A3: Proportion in public sector

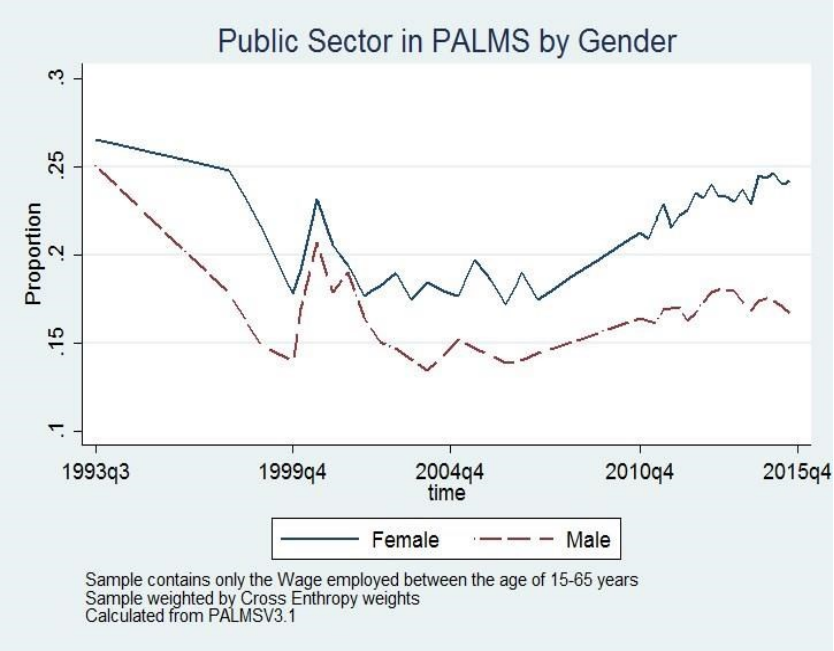

Figure A4: Wage series by gender—whites

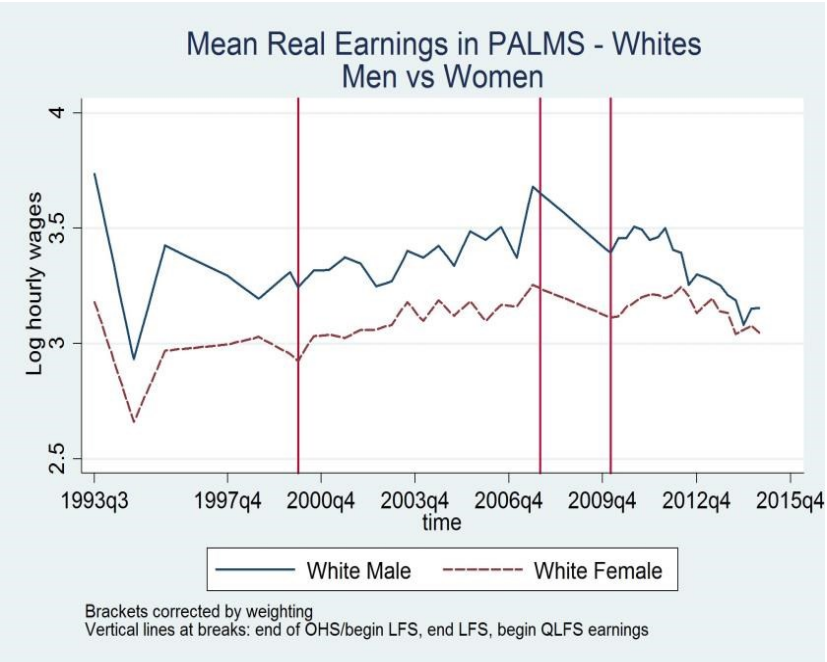

Figure A5: Wage series by gender—Asians

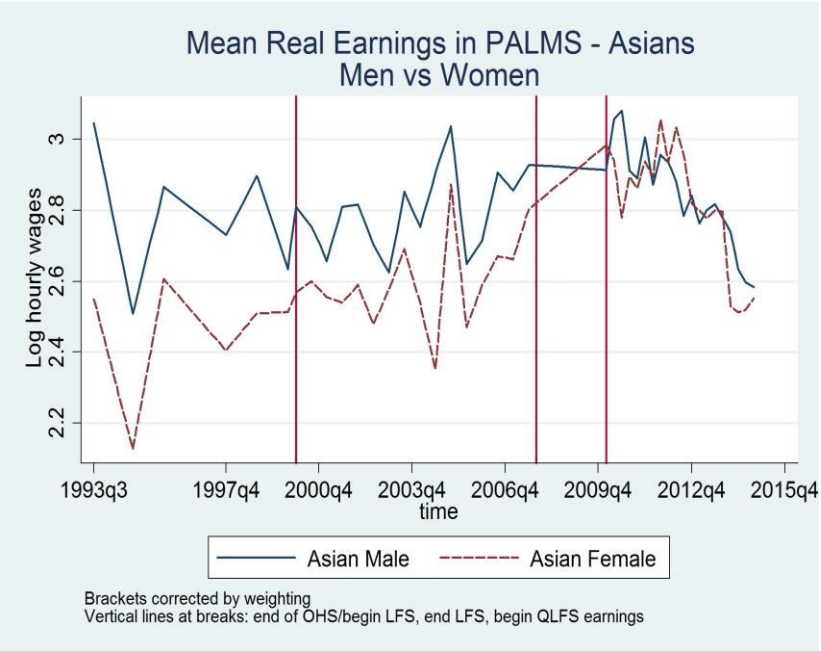

Figure A6: Wage series by gender—coloured

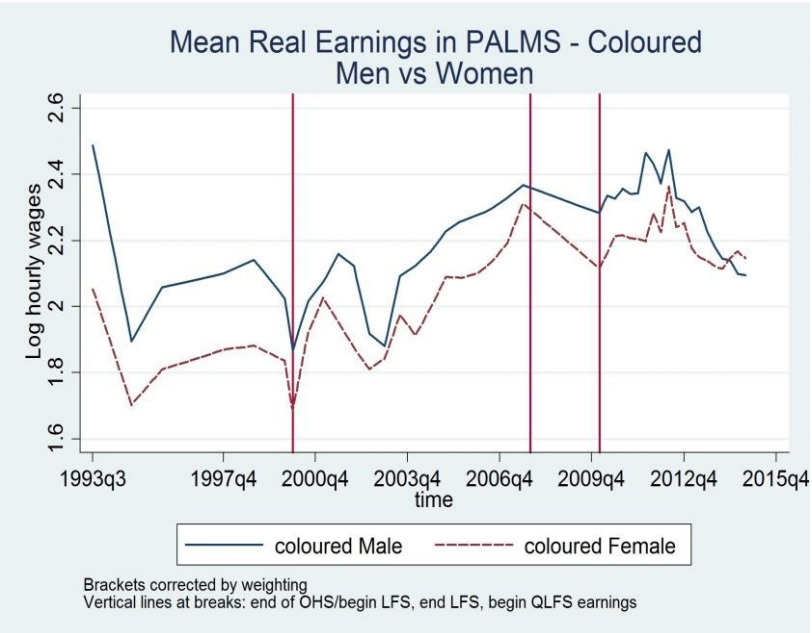

Figure A7: Wage series by gender—Africans

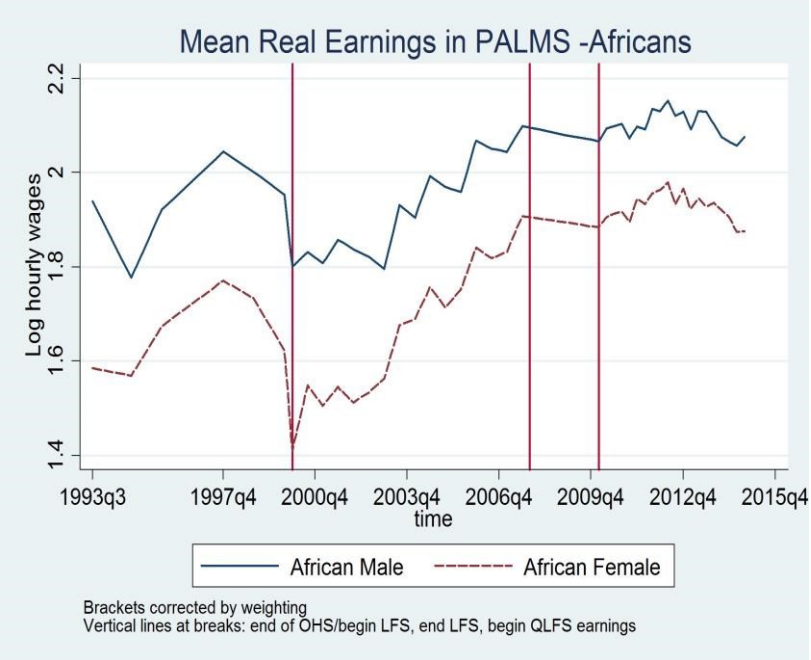

Table A1: Ordinary least squares regressions separately by gender

VARIABLES	OHS94		OHS99		LFS03:2		LFS07:2		QLFS10:4		QLFS13:4	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Less20yrs	0.171***	0.283***	0.315***	0.322***	0.297***	0.344***	0.152***	0.178**	0.108***	0.162***	0.102**	0.107**
	(0.0389)	(0.0386)	(0.0505)	(0.0542)	(0.0364)	(0.0435)	(0.0527)	(0.0737)	(0.0306)	(0.0311)	(0.0432)	(0.0433)
Less30yrs	0.371***	0.343***	0.510***	0.529***	0.548***	0.521***	0.355***	0.328***	0.193***	0.292***	0.185***	0.155***
	(0.0403)	(0.0431)	(0.0605)	(0.0560)	(0.0404)	(0.0438)	(0.0631)	(0.0943)	(0.0354)	(0.0333)	(0.0506)	(0.0457)
more30yrs	0.351***	0.351***	0.559***	0.598***	0.655***	0.627***	0.476***	0.470***	0.322***	0.362***	0.289***	0.235***
	(0.0447)	(0.0454)	(0.0620)	(0.0585)	(0.0433)	(0.0451)	(0.0632)	(0.0815)	(0.0383)	(0.0366)	(0.0560)	(0.0473)
Eastern Cape	-0.0839**	-0.174***	-0.410***	-0.487***	-0.259***	-0.202***	-0.247***	-0.149*	-0.134***	-0.132***	-0.236***	-0.212***
	(0.0408)	(0.0441)	(0.0762)	(0.0744)	(0.0488)	(0.0568)	(0.0574)	(0.0778)	(0.0438)	(0.0437)	(0.0665)	(0.0591)
Northern Cape	-0.466***	-0.527***	-0.194***	-0.316***	-0.0411	-0.299***	-0.0476	-0.182***	-0.209***	-0.0200	-0.0333	-0.107
	(0.0378)	(0.0501)	(0.0659)	(0.0791)	(0.0559)	(0.0586)	(0.0610)	(0.0653)	(0.0427)	(0.0481)	(0.0684)	(0.0738)
Free State	-0.672***	-0.615***	-0.367***	-0.569***	-0.196***	-0.263***	-0.0745	-0.155*	-0.253***	-0.205***	-0.219***	-0.283***
	(0.0532)	(0.0564)	(0.0599)	(0.0759)	(0.0467)	(0.0611)	(0.0696)	(0.0821)	(0.0465)	(0.0464)	(0.0637)	(0.0579)
KwaZulu-Natal	0.0120	-0.0454	-0.0818	-0.204***	-0.00847	-0.180***	-0.0574	-0.108	-0.0634	-0.118***	-0.102*	-0.282***
	(0.0404)	(0.0445)	(0.0620)	(0.0665)	(0.0437)	(0.0533)	(0.0604)	(0.0802)	(0.0437)	(0.0439)	(0.0614)	(0.0567)
North Western	-0.0893*	-0.102*	-0.0413	-0.157**	0.0511	-0.166***	-0.0219	-0.107	0.0647	-0.0328	0.136**	-0.131**
	(0.0486)	(0.0591)	(0.0627)	(0.0754)	(0.0453)	(0.0600)	(0.0579)	(0.0805)	(0.0480)	(0.0520)	(0.0659)	(0.0595)
Gauteng	0.228***	0.243***	0.129**	0.0821	0.218***	0.182***	0.120**	0.132	0.0671*	0.0784*	0.0616	0.00260
	(0.0386)	(0.0401)	(0.0553)	(0.0641)	(0.0417)	(0.0515)	(0.0547)	(0.0976)	(0.0391)	(0.0408)	(0.0585)	(0.0505)
Mpumalanga	-0.217***	-0.257***	-0.116**	-0.264***	0.0157	-0.0962*	0.0106	-0.146*	-0.00795	-0.0324	0.00867	-0.172***
	(0.0557)	(0.0765)	(0.0576)	(0.0726)	(0.0478)	(0.0580)	(0.0756)	(0.0847)	(0.0489)	(0.0496)	(0.0711)	(0.0606)
Limpopo	-0.134**	-0.215***	-0.165**	-0.226***	-0.0911	-0.263***	-0.142**	-0.276***	-0.251***	-0.247***	-0.261***	-0.428***
	(0.0546)	(0.0693)	(0.0652)	(0.0729)	(0.0559)	(0.0636)	(0.0635)	(0.0868)	(0.0537)	(0.0529)	(0.0687)	(0.0626)
Coloured	0.138***	0.152***	0.0848	0.217***	0.253***	0.371***	0.245***	0.376***	0.175***	0.251***	0.0447	0.104**
	(0.0301)	(0.0338)	(0.0558)	(0.0577)	(0.0415)	(0.0491)	(0.0498)	(0.0917)	(0.0358)	(0.0387)	(0.0568)	(0.0506)
White	0.498***	0.443***	0.668***	0.523***	0.832***	0.727***	0.811***	0.657***	0.788***	0.644***	0.538***	0.598***
	(0.0349)	(0.0400)	(0.0595)	(0.0670)	(0.0451)	(0.0499)	(0.0788)	(0.121)	(0.0372)	(0.0351)	(0.0568)	(0.0505)
Indian	0.228***	0.248***	0.299***	0.565***	0.548***	0.667***	0.489***	0.585***	0.545***	0.725***	0.315***	0.449***
	(0.0434)	(0.0567)	(0.0878)	(0.0973)	(0.0589)	(0.0664)	(0.0721)	(0.0979)	(0.0656)	(0.0589)	(0.0907)	(0.0917)
<matric	0.719***	0.701***	0.572***	0.761***	0.564***	0.578***	0.426***	0.515***	0.349***	0.343***	0.276***	0.276***
	(0.0282)	(0.0346)	(0.0382)	(0.0427)	(0.0260)	(0.0323)	(0.0384)	(0.0505)	(0.0299)	(0.0305)	(0.0387)	(0.0349)
matric	1.140***	1.253***	0.967***	1.463***	1.101***	1.257***	0.884***	1.090***	0.787***	0.913***	0.671***	0.771***
	(0.0394)	(0.0418)	(0.0480)	(0.0550)	(0.0337)	(0.0417)	(0.0514)	(0.0719)	(0.0341)	(0.0360)	(0.0461)	(0.0404)
tertiary	1.578***	1.703***	1.680***	2.259***	1.892***	2.159***	1.796***	1.979***	1.581***	1.825***	1.506***	1.601***
	(0.0533)	(0.0496)	(0.0691)	(0.0521)	(0.0465)	(0.0397)	(0.0543)	(0.0650)	(0.0427)	(0.0395)	(0.0565)	(0.0457)
married	0.130***	-0.0485*	0.250***	0.0719**	0.268***	0.0710***	0.280***	0.127***	0.199***	0.0449**	0.202***	0.0457
	(0.0291)	(0.0269)	(0.0358)	(0.0335)	(0.0253)	(0.0269)	(0.0351)	(0.0451)	(0.0240)	(0.0218)	(0.0337)	(0.0278)
Constant	0.998***	0.839***	1.015***	0.589***	0.714***	0.516***	1.139***	0.866***	1.327***	1.025***	1.388***	1.325***
	(0.0472)	(0.0518)	(0.0678)	(0.0736)	(0.0499)	(0.0604)	(0.0638)	(0.107)	(0.0505)	(0.0509)	(0.0700)	(0.0651)
Observations	8,046	5,318	6,355	4,806	7,707	5,772	8,767	6,855	8,486	7,738	8,373	7,886
R-squared	0.472	0.504	0.354	0.490	0.506	0.565	0.501	0.520	0.440	0.495	0.262	0.332

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Omitted category Single, African, from western cape, with primary school education or lower

Table A2: Blinder-Oaxaca decomposition results at the mean

VARs	pslsd93		ohs97		ohs99		LFS03:2		LFS07:2		QLFS10:4		QLFS14:4	
Male	2.416***		2.254***		2.124***		2.129***		2.314***		2.354***		2.229***	
	(0.0234)		(0.0152)		(0.0196)		(0.0164)		(0.0349)		(0.0145)		(0.0179)	
Female	2.073***		2.004***		1.863***		1.945***		2.159***		2.198***		2.079***	
	(0.0264)		(0.0179)		(0.0248)		(0.0219)		(0.0351)		(0.0157)		(0.0171)	
difference	0.343***		0.251***		0.261***		0.184***		0.156***		0.156***		0.150***	
	(0.0353)		(0.0235)		(0.0316)		(0.0273)		(0.0495)		(0.0214)		(0.0247)	
explained	-0.144***		-0.0359		0.0355		-0.0419		-0.0586		-0.0877***		-0.00501	
	(0.0438)		(0.0259)		(0.0401)		(0.0349)		(0.0455)		(0.0216)		(0.0240)	
unexplained	0.487***		0.287***		0.225***		0.226***		0.214***		0.243***		0.156***	
	(0.0405)		(0.0239)		(0.0367)		(0.0293)		(0.0285)		(0.0198)		(0.0268)	
Covariates	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl
Experience	0.00763**	0.115**	0.00985***	0.0545	0.00658**	0.0238	-8.98e-05	-0.00102	-0.00173	-0.0158	-0.00439**	-0.0584*	-0.00534***	-0.00645
	(0.00343)	(0.0547)	(0.00247)	(0.0486)	(0.00326)	(0.0597)	(0.00290)	(0.0413)	(0.00418)	(0.0667)	(0.00187)	(0.0330)	(0.00198)	(0.0471)
married	-0.00476*	0.0888***	8.04e-05	0.0709***	0.00540	0.0790***	0.00223	0.100***	0.0108*	0.0657**	0.00212	0.0535***	0.00793***	0.0343
	(0.00265)	(0.0289)	(0.00339)	(0.0229)	(0.00473)	(0.0304)	(0.00361)	(0.0201)	(0.00555)	(0.0296)	(0.00182)	(0.0172)	(0.00277)	(0.0237)
province	-0.0177***	-0.00633	-0.00128	0.0516	-0.000804	0.0726	0.000648	0.128***	-0.00262	0.0359	0.00219	0.0326	0.00602**	0.101*
	(0.00660)	(0.0614)	(0.00297)	(0.0471)	(0.00636)	(0.0595)	(0.00493)	(0.0447)	(0.00721)	(0.0669)	(0.00244)	(0.0429)	(0.00260)	(0.0614)
race	-0.0305***	0.0475**	-0.0118**	0.0341**	-0.0145***	0.0181	-0.0199***	0.0216**	-0.0149	0.0140	-0.0176***	0.0134	-0.000787	-0.0194
	(0.00824)	(0.0191)	(0.00534)	(0.0134)	(0.00549)	(0.0150)	(0.00612)	(0.0104)	(0.0123)	(0.0159)	(0.00478)	(0.0116)	(0.00341)	(0.0168)
education	-0.0156**	0.105***	-0.0763***	-0.0706**	-0.0621***	-0.0592*	-0.0519***	0.0531*	-0.0604***	0.0308	-0.0555***	-0.0633*	-0.0305***	-0.0909*
	(0.00632)	(0.0340)	(0.00849)	(0.0297)	(0.0101)	(0.0348)	(0.00770)	(0.0281)	(0.0159)	(0.0447)	(0.00802)	(0.0382)	(0.00556)	(0.0516)
occupation	-0.0329	-0.209***	-0.0316**	0.0364	-0.0470*	0.0241	-0.0655***	0.0164	-0.0681***	0.0198	-0.0285*	0.0703**	-0.0129	-0.0307
	(0.0271)	(0.0518)	(0.0135)	(0.0339)	(0.0248)	(0.0505)	(0.0200)	(0.0321)	(0.0195)	(0.0385)	(0.0151)	(0.0322)	(0.0194)	(0.0404)
industry	-0.0708***	0.118**	0.111***	-0.00832	0.152***	-0.0992	0.0921***	-0.0570	0.0766***	-0.0840	0.0114	-0.113**	0.0332***	-0.131**
	(0.0259)	(0.0550)	(0.0185)	(0.0400)	(0.0295)	(0.0766)	(0.0184)	(0.0505)	(0.0179)	(0.0596)	(0.00985)	(0.0475)	(0.0121)	(0.0656)
union	0.0250***	-0.00599	0.0199***	-0.0443***	0.0416***	-0.0726***	0.0339***	-0.0255*	0.0206***	-0.0269	0.0128***	-0.00964	0.00984***	-0.00452
	(0.00524)	(0.0168)	(0.00328)	(0.0140)	(0.00691)	(0.0255)	(0.00478)	(0.0144)	(0.00615)	(0.0182)	(0.00289)	(0.0132)	(0.00260)	(0.0173)
public sector	-0.00475	-0.0201	-0.0559***	-0.0450***	-0.0455***	-0.0335*	-0.0335***	-0.0246**	-0.0189***	-0.0133	-0.0102***	0.00950	-0.0124***	0.0131
	(0.00412)	(0.0158)	(0.00666)	(0.0124)	(0.00906)	(0.0182)	(0.00646)	(0.0109)	(0.00676)	(0.0129)	(0.00250)	(0.00904)	(0.00320)	(0.0118)
Constant		0.254**		0.207**		0.272**		0.0144		0.188		0.308***		0.290**
		(0.116)		(0.0899)		(0.131)		(0.0896)		(0.122)		(0.0854)		(0.127)
Observations	6,294	6,294	15,383	15,383	10,737	10,737	13,314	13,314	15,388	15,388	15,825	15,825	15,003	15,003

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Omitted category Single, African, from western cape, non unionized, with primary school education or lower, in an elementary occupation in the manufacturing sector in the public sector

Table A3: RIF decomposition results at the 10th percentile

VARs	pslsd93		ohs97		ohs99		LFS03:2		LFS07:2		QLFS10:4		QLFS14:4	
Male	0.751***		0.877***		0.689***		0.818***		1.093***		1.118***		0.836***	
	(0.0526)		(0.0202)		(0.0339)		(0.0254)		(0.0234)		(0.0174)		(0.0275)	
Female	0.544***		0.400***		0.250***		0.490***		0.860***		0.937***		0.764***	
	(0.0532)		(0.0303)		(0.0475)		(0.0318)		(0.0277)		(0.0171)		(0.0215)	
difference	0.207***		0.478***		0.440***		0.328***		0.234***		0.181***		0.0721**	
	(0.0748)		(0.0364)		(0.0583)		(0.0406)		(0.0362)		(0.0244)		(0.0349)	
explained	-0.239***		0.0809**		0.270***		0.135**		0.0457		0.0130		0.0408	
	(0.0731)		(0.0412)		(0.0772)		(0.0528)		(0.0319)		(0.0238)		(0.0316)	
unexplained	0.446***		0.397***		0.170**		0.193***		0.188***		0.168***		0.0313	
	(0.0906)		(0.0445)		(0.0808)		(0.0593)		(0.0335)		(0.0315)		(0.0459)	
Covariates	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl
Experience	0.0104	-0.0298	0.0185***	-0.0708	0.0118*	-0.123	-0.00211	-0.115	0.00232	-0.121	-0.00532**	-0.0707	-0.000356	-0.111
	(0.00682)	(0.167)	(0.00511)	(0.0783)	(0.00609)	(0.136)	(0.00498)	(0.0969)	(0.00516)	(0.0809)	(0.00267)	(0.0551)	(0.00258)	(0.0832)
married	-0.0230**	0.00729	-0.0204**	0.156***	-0.0253*	0.263***	-0.00537	0.169***	0.00308	0.0518	-0.00185	0.0540*	0.00250	0.0904**
	(0.00895)	(0.0891)	(0.00844)	(0.0492)	(0.0134)	(0.0759)	(0.00943)	(0.0516)	(0.00594)	(0.0359)	(0.00296)	(0.0285)	(0.00435)	(0.0430)
province	-0.0308*	-0.289**	0.00687	0.100	-0.000256	-0.00607	0.0124	0.00217	0.00140	-0.109*	0.00148	0.0430	0.00631**	0.0847
	(0.0158)	(0.122)	(0.00831)	(0.0745)	(0.0181)	(0.144)	(0.0124)	(0.0817)	(0.0101)	(0.0604)	(0.00448)	(0.0500)	(0.00247)	(0.0925)
race	-0.00835	-0.00924	-0.00348	-0.00401	-0.00707	-0.0265	-0.0106***	0.00395	-0.00344	-0.00126	-0.00793***	-0.00820	0.00121	-0.0504**
	(0.00584)	(0.0377)	(0.00315)	(0.0205)	(0.00468)	(0.0298)	(0.00369)	(0.0172)	(0.00328)	(0.0126)	(0.00252)	(0.0132)	(0.00132)	(0.0246)
education	-0.0254**	-0.0376	-0.0832***	-0.372***	-0.0828***	-0.204**	-0.0460***	-0.122	-0.0419***	-0.163*	-0.0273***	-0.0973	-0.0128**	-0.0434
	(0.0104)	(0.0862)	(0.0126)	(0.0699)	(0.0169)	(0.0997)	(0.0104)	(0.0866)	(0.0116)	(0.0884)	(0.00589)	(0.0838)	(0.00509)	(0.110)
occupation	-0.0141	-0.144	-0.00825	0.146**	0.163***	0.0880	-0.0154	0.147*	0.0131	0.0462	0.00978	0.137**	-0.00303	0.0867
	(0.0364)	(0.132)	(0.0248)	(0.0719)	(0.0520)	(0.130)	(0.0399)	(0.0863)	(0.0190)	(0.0699)	(0.0224)	(0.0591)	(0.0301)	(0.0791)
industry	-0.150**	0.193*	0.229***	0.0811	0.223***	-0.179	0.183***	-0.162*	0.0609***	-0.0560	0.0405***	-0.236***	0.0574***	0.00615
	(0.0639)	(0.114)	(0.0360)	(0.0725)	(0.0623)	(0.143)	(0.0375)	(0.0871)	(0.0221)	(0.0632)	(0.0148)	(0.0678)	(0.0218)	(0.113)
union	0.00818	0.0455	0.0351***	-0.101***	0.0540***	0.0139	0.0462***	-0.0346	0.0209***	-0.0283	0.00844***	0.0210	-0.00255	0.0162
	(0.00872)	(0.0304)	(0.00574)	(0.0221)	(0.0118)	(0.0479)	(0.00719)	(0.0248)	(0.00622)	(0.0204)	(0.00229)	(0.0155)	(0.00286)	(0.0282)
public sector	-0.00631	0.00146	-0.0932***	-0.0875***	-0.0668***	-0.0400	-0.0275***	0.0431**	-0.0106**	-0.00552	-0.00486	0.0176	-0.00791	-0.0298
	(0.00565)	(0.0374)	(0.0123)	(0.0248)	(0.0151)	(0.0369)	(0.00678)	(0.0213)	(0.00432)	(0.0161)	(0.00304)	(0.0128)	(0.00495)	(0.0209)
Constant		0.709**		0.549***		0.382		0.262		0.574***		0.307**		-0.0180
		(0.278)		(0.167)		(0.291)		(0.188)		(0.150)		(0.150)		(0.223)
Observations	6,294	6,294	15,383	15,383	10,737	10,737	13,314	13,314	15,388	15,388	15,825	15,825	15,003	15,003

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Omitted category Single, African, from western cape, non unionized, with primary school education or lower, in an elementary occupation in the manufacturing sector in the public sector

Table A4: RIF decomposition results at the median

VARs	pslsd93		ohs97		ohs99		LFS03:2		LFS07:2		QLFS10:4		QLFS14:4	
Male	2.441***		2.285***		2.118***		2.098***		2.253***		2.265***		2.129***	
	(0.0264)		(0.0185)		(0.0220)		(0.0193)		(0.0348)		(0.0186)		(0.0190)	
Female	2.140***		2.125***		1.875***		1.849***		2.025***		2.053***		1.919***	
	(0.0367)		(0.0255)		(0.0277)		(0.0247)		(0.0456)		(0.0230)		(0.0214)	
difference	0.301***		0.159***		0.243***		0.249***		0.228***		0.212***		0.211***	
	(0.0452)		(0.0315)		(0.0354)		(0.0314)		(0.0574)		(0.0296)		(0.0286)	
explained	-0.136**		-0.0262		0.0907*		0.0413		-0.129**		-0.117***		0.0274	
	(0.0595)		(0.0401)		(0.0503)		(0.0458)		(0.0628)		(0.0330)		(0.0332)	
unexplained	0.437***		0.186***		0.152***		0.208***		0.357***		0.329***		0.184***	
	(0.0586)		(0.0402)		(0.0505)		(0.0447)		(0.0473)		(0.0341)		(0.0377)	
Covariates	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl
Experience	0.00906**	0.0252	0.0123***	-0.0302	0.00491	0.0791	-0.00190	0.0290	-0.00340	0.0165	-0.00694***	-0.0551	-0.00762***	0.0613
	(0.00404)	(0.0781)	(0.00359)	(0.0641)	(0.00301)	(0.0693)	(0.00311)	(0.0550)	(0.00430)	(0.0796)	(0.00256)	(0.0527)	(0.00241)	(0.0568)
married	0.00178	0.105**	0.000214	0.0837**	0.0173***	0.0588	0.00780	0.0421	0.0155**	0.0306	0.00106	0.0863***	0.00854**	0.0112
	(0.00402)	(0.0446)	(0.00552)	(0.0359)	(0.00596)	(0.0371)	(0.00502)	(0.0288)	(0.00760)	(0.0416)	(0.00305)	(0.0276)	(0.00379)	(0.0291)
province	-0.0170**	0.0595	-0.00172	0.0323	-0.00101	0.0908	-0.00318	0.211***	-0.00579	0.275***	0.00287	0.0754	0.00631	0.230***
	(0.00762)	(0.0861)	(0.00393)	(0.0696)	(0.00487)	(0.0878)	(0.00463)	(0.0675)	(0.00707)	(0.101)	(0.00340)	(0.0678)	(0.00409)	(0.0678)
race	-0.0335***	-0.0236	-0.0202***	0.00518	-0.0168***	-0.00741	-0.0189***	0.0237*	-0.0214	-0.00378	-0.0253***	-0.0227	0.000519	-0.00157
	(0.00895)	(0.0275)	(0.00750)	(0.0195)	(0.00644)	(0.0183)	(0.00670)	(0.0143)	(0.0188)	(0.0208)	(0.00703)	(0.0175)	(0.00320)	(0.0187)
education	-0.0170**	0.105**	-0.0822***	-0.0154	-0.0561***	-0.0528	-0.0440***	0.0802*	-0.0595***	0.00132	-0.0538***	-0.125**	-0.0344***	-0.225***
	(0.00691)	(0.0517)	(0.0104)	(0.0462)	(0.0101)	(0.0462)	(0.00774)	(0.0435)	(0.0165)	(0.0740)	(0.00865)	(0.0629)	(0.00691)	(0.0685)
occupation	-0.0647	-0.401***	-0.0417	-0.0780	-0.0112	-0.0542	-0.0516*	-0.0978*	-0.129***	-0.0361	-0.0703***	-0.00475	0.00547	-0.0467
	(0.0407)	(0.0804)	(0.0264)	(0.0616)	(0.0332)	(0.0693)	(0.0297)	(0.0548)	(0.0371)	(0.0694)	(0.0250)	(0.0542)	(0.0283)	(0.0581)
industry	-0.0562	0.100	0.149***	-0.00414	0.164***	-0.151	0.140***	-0.0779	0.0678***	-0.00265	0.0290*	-0.104	0.0391**	-0.113
	(0.0364)	(0.101)	(0.0289)	(0.0737)	(0.0371)	(0.0929)	(0.0338)	(0.0698)	(0.0239)	(0.0947)	(0.0164)	(0.0726)	(0.0171)	(0.0824)
union	0.0482***	-0.00556	0.0298***	-0.0527**	0.0465***	-0.0470	0.0523***	-0.0429*	0.0349***	-0.0452	0.0230***	-0.0396*	0.0194***	0.00227
	(0.00970)	(0.0293)	(0.00515)	(0.0228)	(0.00771)	(0.0298)	(0.00735)	(0.0226)	(0.0107)	(0.0323)	(0.00515)	(0.0218)	(0.00424)	(0.0208)
public sector	-0.00631	-0.0325	-0.0717***	-0.0603***	-0.0565***	-0.0445*	-0.0391***	-0.0160	-0.0284***	0.0155	-0.0162***	0.00195	-0.01000***	0.0147
	(0.00552)	(0.0242)	(0.0102)	(0.0209)	(0.0113)	(0.0230)	(0.00780)	(0.0156)	(0.0101)	(0.0187)	(0.00393)	(0.0132)	(0.00386)	(0.0135)
Constant		0.505***		0.305**		0.281*		0.0564		0.106		0.517***		0.250
		(0.187)		(0.145)		(0.170)		(0.130)		(0.182)		(0.135)		(0.153)
Observations	6,294	6,294	15,383	15,383	10,737	10,737	13,314	13,314	15,388	15,388	15,825	15,825	15,003	15,003

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Omitted category Single, African, from western cape, non unionized, with primary school education or lower, in an elementary occupation in the manufacturing sector in the public sector

Table A5: RIF decomposition results at the 90th percentile

VARs	pslsd93		ohs97		ohs99		LFS03:2		LFS07:2		QLFS10:4		QLFS14:4	
Male	3.945***		3.541***		3.530***		3.535***		3.726***		3.818***		3.851***	
	(0.0414)		(0.0290)		(0.0339)		(0.0296)		(0.0692)		(0.0283)		(0.0317)	
Female	3.531***		3.420***		3.426***		3.505***		3.578***		3.750***		3.666***	
	(0.0318)		(0.0267)		(0.0336)		(0.0305)		(0.0495)		(0.0257)		(0.0251)	
difference	0.414***		0.121***		0.104**		0.0305		0.147*		0.0674*		0.185***	
	(0.0522)		(0.0394)		(0.0478)		(0.0425)		(0.0851)		(0.0382)		(0.0404)	
explained	-0.0586		-0.113***		-0.0675		-0.0957		-0.0827		-0.0801***		-0.0592**	
	(0.0528)		(0.0411)		(0.0727)		(0.0636)		(0.0534)		(0.0298)		(0.0291)	
unexplained	0.473***		0.234***		0.171**		0.126*		0.230***		0.148***		0.244***	
	(0.0643)		(0.0497)		(0.0808)		(0.0678)		(0.0717)		(0.0401)		(0.0409)	
Covariates	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl	Expl	Unexpl
Experience	0.0129**	0.340**	0.00438	0.227**	0.00839*	-0.175	0.00177	0.0908	0.00465	-0.118	-0.00710**	-0.0409	-0.00750**	-0.0337
	(0.00545)	(0.137)	(0.00408)	(0.115)	(0.00448)	(0.147)	(0.00298)	(0.0990)	(0.00605)	(0.136)	(0.00331)	(0.0778)	(0.00328)	(0.0896)
married	-0.00196	0.140**	0.00567	0.0437	0.000461	0.142**	-0.00518	0.161***	0.0265**	0.0321	0.00703*	-0.00713	0.00546	-0.0133
	(0.00434)	(0.0572)	(0.00705)	(0.0496)	(0.00958)	(0.0631)	(0.00789)	(0.0469)	(0.0117)	(0.0643)	(0.00396)	(0.0387)	(0.00463)	(0.0417)
province	-0.00768	0.0446	-0.00415	0.00859	0.00475	0.0365	0.00375	0.0542	-0.00305	0.0290	0.00235	-0.130	0.00444	0.0491
	(0.00736)	(0.170)	(0.00420)	(0.122)	(0.00582)	(0.134)	(0.00458)	(0.115)	(0.00551)	(0.198)	(0.00261)	(0.109)	(0.00274)	(0.103)
race	-0.0454***	0.176***	-0.0136*	0.0612*	-0.0116*	0.0781**	-0.0268***	0.0388	-0.00854	0.133***	-0.0169***	0.0697**	-0.00379	-0.00561
	(0.0135)	(0.0501)	(0.00739)	(0.0347)	(0.00609)	(0.0342)	(0.00819)	(0.0285)	(0.00957)	(0.0501)	(0.00534)	(0.0317)	(0.00533)	(0.0322)
education	-0.00893	0.152**	-0.0667***	0.0647	-0.0498***	0.00960	-0.0461***	0.181***	-0.0631***	0.115	-0.0690***	0.0340	-0.0290***	-0.0265
	(0.00814)	(0.0764)	(0.0123)	(0.0520)	(0.0129)	(0.0593)	(0.0111)	(0.0481)	(0.0222)	(0.0756)	(0.0107)	(0.0578)	(0.00675)	(0.0738)
occupation	0.0111	0.0128	-0.0587**	0.123**	-0.0974**	0.0625	-0.00959	-0.0307	-0.0621**	0.111	0.0243	0.0215	0.0151	-0.0246
	(0.0356)	(0.0854)	(0.0244)	(0.0532)	(0.0496)	(0.0782)	(0.0359)	(0.0538)	(0.0309)	(0.0700)	(0.0219)	(0.0488)	(0.0229)	(0.0506)
industry	-0.0164	0.0959	0.0319	-0.0300	0.0633	-0.0262	-0.00401	0.00327	0.0163	0.0639	-0.0143	-0.176*	-0.0266	-0.154
	(0.0388)	(0.111)	(0.0363)	(0.0913)	(0.0581)	(0.160)	(0.0410)	(0.122)	(0.0415)	(0.151)	(0.0228)	(0.0939)	(0.0170)	(0.110)
union	0.00103	-0.0517	0.00387	-0.0806**	0.0194**	-0.153***	0.00426	-0.0200	0.0139*	-0.00655	0.00301	-0.0434	-0.000501	0.0282
	(0.00802)	(0.0387)	(0.00433)	(0.0339)	(0.00977)	(0.0510)	(0.00690)	(0.0357)	(0.00811)	(0.0546)	(0.00309)	(0.0319)	(0.00313)	(0.0299)
public sector	-0.00332	-0.0833**	-0.0160**	-0.0450*	-0.00489	0.0157	-0.0138**	-0.0171	-0.00731	0.0157	-0.00945*	0.0132	-0.0168***	0.0234
	(0.00318)	(0.0354)	(0.00789)	(0.0254)	(0.00819)	(0.0347)	(0.00557)	(0.0249)	(0.00725)	(0.0398)	(0.00506)	(0.0239)	(0.00539)	(0.0218)
Constant		-0.354		-0.138		0.182		-0.335		-0.145		0.407**		0.402*
		(0.273)		(0.205)		(0.265)		(0.216)		(0.313)		(0.188)		(0.206)
Observations	6,294	6,294	15,383	15,383	10,737	10,737	13,314	13,314	15,388	15,388	15,825	15,825	15,003	15,003

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Omitted category Single, African, from western cape, non unionized, with primary school education or lower, in an elementary occupation in the manufacturing sector in the public sector

Table A6: Studies on the gender wage gap in South Africa

Study	Data	Sample	Estimation Methods	Selection Bias	Controls	Finding
Winter 1999	OHS 1994	Formal sector workers	OLS, OB	No	Experience, Experience squared, Education, Log hours	female-male wage ratio All (0.87), Africans (1.01), Coloured (0.88)[a], Asian (0.80), whites 0.67
Hinks 2002	OHS1995	age 15-65 defined education	OLS, OB	Lambda insignificant	Age, age^2, Education Tenure, Occupation, province, union, sector	Gap Africans (-0.096), Coloureds (0.0455), Indians (0.24), whites (0.46)
Grun 2004	OHS1995,1997 and 1999	Africans and whites	OB	yes	Age, age^2, Education province, union, sector Occupation,union, income category rural, tenure,tenure^2	Africans:1995: (-0.1799), 1997: 0.1203, 1999:0.1294 Whites:1995: 0.5137, 1997: 0.3352, 1999:0.3350
Rospabe 2001	OHS 1999	age 15-65	OB, Interval Regressions	No	Race, Experience Tenure^2, Occup, prov, union, sector, Formal sector, Education Urban, Tenure, married	All (0.257), Africans (0.34) Coloureds (0.192), whites (0.349), Indians (0.202)
Ntuli 2007	OHS 1995,1999 LFS 2004	Africans Formal	quantile regressions	Lambda insignificant	Age, age^2, log hours Education province, union, sector Occupation married	Raw Wage gap in quantiles 1995: $\theta = 10$ (0.56), $\theta = 25$ (0.41), $\theta = 50$ (0.36), $\theta = 90$ (0.11) 1999: $\theta = 10$ (0.56), $\theta = 25$ (0.76) $\theta = 50$ (0.55),$\theta = 90$ (0.13) 2004: $\theta = 10$ (0.66),$\theta = 25$ (0.61) $\theta = 50$ (0.60), $\theta = 90$ (0.05)
Muller 2009	OHS 1995-1999 LFS 2001-2006	Part-time and Full-time workers	OB, JMP	No	Model I-Race, Age, Education, Marital status,Children Model II- Covariates in model I plus Tenure, Province, union, Firm size, sector, Occupation, Model III- covariates in model II plus Conditions of work that is, sector of employment Medical insurance, Pension, (Formal/Private)	1995 Full Time -0.020[a], -0.030[b] 1999 Full Time 0.239[b], 0.245[a] 2001 Full Time 0.209[c,a], 0.203[b] 2006 Full Time 0.172[a], 0.159[b] , 0.162[c]
Bhorat and Goga 2013	LFS 2007(Sept)	Africans	RIF	No	Experience, Experience^2, married, Province Education (5 categories), wage employed Formal sector, Occupation, pubic, Sector	10th Quantile gap 0.632 50th Quantile gap 0.35 90th Quantile 0.072

Note: a=Model I, b=Model II c=Model III
Source:Winter (1999, p.30 and table 16 p.31), Rospabé (2001, Table 3A P.36),Hinks (2002, Calculations from table 4 p.2048), Ntuli (2007, Table 3 p.24), Bhorat & Goga (2013, table 3 col 1 p.15) Muller (2009, Table 7 and 8 p.22)

[a]In the text it says 88% but in the table it is written 0.80